Market Power and Distorted Democracy in the Progressive Era*

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Abstract

Does market power undermine democracy? We analyze that question in the context of Progressive Era America. Using new furnace-level data, we construct county-level measures of economic concentration in the steel industry from 1880 to 1916. Increases in steel market power led to lower voter turnout, increased support for leftist parties, and misalignment between voters and legislators on labor and antitrust policy. We develop a formal model in which firms and workers seek to influence policymaking to help interpret our empirical findings. Concentration increases equilibrium levels of worker repression and firm influence on policy through three channels. First, concentration creates rents which drive support for leftist policies, increasing firms' willingness to repress. Second, increased rents from concentration fund repression. Third, concentration reduces free-riding because each firm internalizes a larger share of the benefit from preventing leftist policies. Market power can polarize politics and distort policy away from voters.

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1 INTRODUCTION

Does market power undermine democracy? Early anti-trust reformers from Sherman and Roosevelt to Brandeis certainly thought so (Wilson, 1913; Brandeis, 1914; Brands, 2011). Contemporary neo-Brandeisian critics of American anti-trust law identify the effect of concentrated economic power on political power as a major reason why current law focusing narrowly on consumer welfare is inadequate (Khan, 2017; Wu, 2018).

Exponents of this view do not always clearly articulate how market power threatens democracy. Some seem to mean that the inequality of economic outcomes that results from oligopoly and monopoly are undemocratic themselves; others suggest that the concentration of economic power creates conditions that foster the abandonment of democratic institutions. Arguably, the most common concern is that concentrated special interests distort policy away from what voters want.

Empirical evidence evaluating the consequences of increased market power for democratic representation has a long history. It includes narrative evidence such as in classics of the Progressive Era like Ida Tarbell's *History of the Standard Oil Company* (1904) and Louis D. Brandeis's *Other People's Money and How the Bankers Use It* (1914) and contemporary works like Tim Wu's *The Curse of Bigness* (2018) and Luigi Zingales's *A Capitalism for the People* (2012). Contemporary analyses using quantitative evidence suggest that economic elites often get the policies they want (Bartels, 2008; Hacker and Pierson, 2010; Gilens, 2012; Gilens and Page, 2014) and that this influence is secured primarily through the funding of campaigns and lobbying (Bonica et al., 2013; Bonica, 2016; Barber, Canes-Wrone and Thrower, 2017).[1]

This body of evidence, however, does not provide a compelling answer to the specific question of the effect of market power on the quality of democratic representation. First, as Hersh (2023) argues, the evidence that economic elites secure preferred policy outcomes that

[1]See Hersh (2023) for a review of this literature.

are distinct from what the public wants is mixed. Economic elites may be getting what they want because, most of the time, they want the same things as middle-class voters (Enns, 2015; Lax, Phillips and Zelizer, 2019). Moreover, economic elites do not have disproportionate access to the tools of campaign contributions and lobbying and therefore do not necessarily get what they want beyond smaller particularistic goals (Hersh, 2023).[2] Second, even if there is empirical evidence of economic elite influence or money shaping politics, this evidence does not speak directly to the question of whether market power worsens representation. Competitive capitalism also has firms and wealthy citizens with resources to transfer their economic power to political power. It is not clear from this evidence that concentrated capitalism is worse for democracy than competitive capitalism.

A smaller but growing literature has directly studied the relationship between market structure, firm investments in politics, and business success in influencing policy. In an early quantitative study, Salamon and Siegfried (1977) show that industries with larger firm sizes are able to secure higher rates of tax avoidance, but find a negative relationship between industry concentration and tax avoidance. Bombardini (2008) also focuses on firm size and the distribution of firm size in an industry to help explain why larger firms are more likely to contribute to political campaigns. Bombardini presents evidence of the importance of these firm and industry structural features in explaining contributions and trade policy outcomes. Cowgill, Prat and Valletti (2024) also study the relationship between market power and political power. They show that mergers are followed by large, persistent increases in lobbying activities by both firms and trade associations. In contrast, McCarty and Shahshahani (2023) do not find a clear relationship between economic concentration and the concentration of lobbying behavior. Their results resonate with Hersh's (2023) observation that the fact that economic elites—such as larger, dominant firms—can access tools of influence, does not

[2]Gehlbach, Sonin and Zhuravskaya (2010) study the related question of when business elites run for public office. They argue businessman candidates occur specifically in contexts like post-Soviet Russia with weak electoral institutions that allow politicians to extract rents.

undermine democratic representation if other interests—such as small firms—can also use these tools. Taken together, these and related studies suggest that our understanding of whether and under what conditions economic concentration and market power may distort democracy is incomplete.[3]

In this paper, we use the Second Industrial Revolution in the Midwestern United States to study the effect of concentrated market power on the quality of representative democracy. We study this era of rising concentration to diagnose the problems that market power can create for democratic politics, and inform our understanding of the present era of rising concentration (Kwon, Ma and Zimmermann, 2024) and growing concerns about the influence of firms over voters (Hertel-Fernandez, 2016, 2017; Frye, Reuter and Szakonyi, 2014, 2025). Using furnace-level data in the US steel industry from 1880 to 1916, we create a new digitized and geographically coded dataset that allows us to construct a county-level Herfindahl-Hirschman Index (HHI) of production capacity for approximately each decade of the period. Our primary measure of market power is HHI multiplied by the production capacity in the county, which corresponds to average firm size, weighted by market share. Descriptively, we provide new estimates of national level and county-level trends over time in concentration and market power. We show not only that concentration and market power in the steel industry grew dramatically during this period but where that growth took place.

We study the consequences of market power for turnout, voting for socialist and progressive parties and candidates, legislative support for workplace and antitrust reform, and alignment between voter and legislative support for reform. During the period we study, electoral

[3]Two papers that explore these questions using different types of data are Weymouth (2012) and Basihos (2025). Weymouth (2012) uses the World Bank's Enterprise Survey in 42 developing countries to show evidence that firm size and market power are predictive of self-reported lobbying and influence activities. Basihos (2025) provides panel evidence for 80 countries for the period 1990 to 2019 that market power as measured by aggregate country-level markups decreased levels of electoral democracy.

manipulation largely took the form of depressing turnout (Mares, 2015; Cox and Kousser, 1981); lower turnout is consistent with higher repression. Leftist parties advocated for workplace regulation and the regulation of trusts; voting for those parties is in part a measure of voter support for those issues. We present evidence from ordinary least squares regressions with fixed effects for county and state-by-year that increasing market power decreased turnout but increased support for left parties. Changes in market power, however, had no impact on legislator support for workplace and antitrust reforms. We combine our electoral data and legislative rollcall data to measure the extent of policy misalignment on workplace and antitrust reform. Misalignment between voter and legislator support for reform is our primary measure of the quality of democratic representation. We find evidence that increasing market power led to higher levels of misalignment on both workplace and antitrust reforms. Economic concentration distorted at least some dimensions of democratic representation in the Progressive Era.

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Finally, we present a theoretical model in which firms and workers seek to influence policymaking to help interpret our empirical findings. In the model, firms have monopsony power in local labor markets which allows them to earn profits, but they are threatened by tax and other left policies that would transfer profits to the workers. Firms choose whether and how much to invest in repression that reduces a worker's expected utility from voting

for candidates advocating leftist policies, within a probabilistic voting framework (Dixit and Londregan, 1996).[4] Repression should be viewed broadly in our setting as reducing worker turnout, suppressing left voting, financing non-left candidates, paying off legislators so they don't support the left policy once in office, or any action that reduces the probability that the left policy is implemented.

The model yields several insights. Economic concentration generates profits that firms and workers will contest in politics. Concentration increases equilibrium levels of repression through three channels: threat, capacity, and coordination. First, concentration creates rents which drive support for leftist policies, increasing the willingness of firms to repress. Second, increased rents from concentration are a resource to fund repression. Third, concentration reduces free-riding because each firm internalizes a larger share of the aggregate benefits from preventing left policies. While concentration increases the prize that both firms and workers seek to attain in elections and policymaking, our model suggests that concentration on balance favors firms, lowering the probability that the policy preferred by workers will be implemented. Market power can distort democracy.

The paper's core contribution is in tracing both empirically and theoretically the consequences of market power for a range of political outcomes, including voter preferences, participation, and the quality of representation. While a vast literature studies the political causes and consequences of the distributions of income and wealth, there is no comparable body of scholarship on the distributions of firm size or market share. One reason for this absence is the need for geocoded firm-level data. We make an empirical contribution in digitizing furnace-level records and providing a new spatial and temporal description of the steel industry in the progressive era. Existing scholarship on the effects of market concentration on politics focuses on how concentration helps firms solve the collective action problem in

[4]In doing so, the model builds on a literature that incorporates special interests into formal models of electoral politics (Baron, 1994; Grossman and Helpman, 1996; Buisseret and Van Weelden, 2025).

lobbying (Olson, 1965; Bombardini, 2008; Cowgill, Prat and Valletti, 2024; Callander, Foarta and Sugaya, 2022). While our model reproduces this insight, our findings are novel on two margins. First, in our theoretical model, market power itself drives both voter support for the left and firm efforts to intervene in politics. This matches our empirical results of the effects of rising concentration. We show that concentration does not just facilitate firms getting what they want, but influences the preferences and motivation of a range of political actors. Second, we demonstrate the relevance of market power to electoral politics and legislative representation and broaden the study of market power from the focus on lobbying in much of the literature.

The remainder of the paper proceeds as follows. The next section presents our new measure of county-level market power in the US steel industry from 1880 to 1916. Section 3 presents results linking market power to turnout and support for the left while Section 4 reports estimates of the effect of market power on the support of members of Congress for workplace and antitrust reforms and the extent of misalignment between voters and representatives. We present and discuss our theoretical model in Section 5. Section 6 concludes.

2 Market Power in the US Steel Industry, 1880–1916

The goal of this paper is to study the impact of market power in the steel industry on the quality of democracy in the United States during the Progressive Era. To do this, we need to measure and understand the origins of market concentration in this period. This section presents newly digitized data on steel production and concentration at the county level. Between 1880 and 1916, the size and concentration of the steel industry increased drastically. These developments were driven in part by the discovery of vast iron ore deposits in Minnesota. Cheap ore advantaged firms that were large enough to invest in infrastructure and plant, in practice, the firms that would become US Steel. Concentration increased most in counties with transportation access to the ore deposits.

We constructed a new furnace-level dataset measuring the iron and steel production

capacity of all firms at five different points from 1880 to 1916.[5] The data was collected by the American Iron and Steel Association and the American Iron and Steel Institute and includes details such as the year of operation, furnace name, firm owner, location of the firm (county/city and state), and the total production capacity of the furnace in net tons. We digitize this data and combine production capacity across steel and iron products in order to measure broad industry concentration relevant for studying the impact of market power in the iron and steel industry on political outcomes. Appendix A describes the data construction process in detail. We aggregate the data from furnace level to firm level and then aggregate further to the firm-county or national level to describe temporal and spatial variation in market concentration.

The concentration of production capacity increased explosively during this period. Table 1 reports measures of concentration for the steel industry at the national level: the shares of production accounted for by the top three, five, and ten firms in the industry and a Herfindahl-Hirschman Index (HHI) of production capacity. The Top 3 Share increased by a factor of 5 while HHI increased by a factor of 26. The initial decade between 1880 and 1890 saw significant increases in concentration but it was the period between 1890 and 1901 in which the steel industry was transformed. This transformation was part of the larger merger movement and, in the steel industry, culminated in the formation of US Steel in 1901.[6]

In this paper, we study the impact of market power on the quality of democracy and exploit variation over space and time. To capture market power at the local level, however, we want to distinguish between places that are concentrated but the extent of production is limited and places that are both concentrated and engaged in significant production. We expect politically relevant market power to be increasing with both concentration and the extent of production. Market concentration is more relevant to politics in a place with two

[5]Years of data collection are 1880, 1890, 1901, 1908, and 1916.

[6]See Lamoreaux (1985); Nelson (1959) for discussion of merger movement and Warren (1987, 2001); Misa (1995) for background on the formation of US Steel.

Year	Top 3 Share	Top 5 Share	Top 10 Share	HHI
1880	0.11	0.17	0.26	95.39
1890	0.20	0.25	0.36	215.32
1901	0.56	0.61	0.69	2432.82
1908	0.58	0.63	0.71	2615.57
1916	0.57	0.62	0.69	2538.30

Table 1: *Concentration in US Steel Industry, 1880-1916.* Data is from American Iron and Steel Association and American Iron and Steel Institute. See Appendix A.

large firms than one small firm. Our main measure of market power in the paper is *Weighted HHI*, which is equal to HHI multiplied by total steel production capacity in the county in thousands of net tons. Figure 1 shows the spatial distribution of this variable in 1901. The derivation below shows that this variable corresponds to average firm size in a county, weighting firms by market share, whereas HHI corresponds to average firm market share. Writing the capacity of firm i in $\{1, ..., N\}$ as Y_i, we have at the county level:

$$\textit{Weighted HHI} = \underbrace{\left(\sum_{i=1}^{N} Y_i\right)}_{\text{total capacity}} \underbrace{\sum_{i=1}^{N} \left(\frac{Y_i}{\sum_{i=1}^{N} Y_i}\right)^2}_{\text{HHI}} = \sum_{i=1}^{N} \underbrace{\left(\frac{Y_i}{\sum_{i=1}^{N} Y_i}\right)}_{i\text{'s market share}} \underbrace{Y_i}_{i\text{'s capacity}} .$$

We validate our use of *Weighted HHI* to measure labor market power by showing it correlates with an increased number of hours worked by steelworkers (a major union grievance in this period), and with a decreased labor share in the steel industry (defined as the ratio of wages to product value) in Table B.1. A decreased labor share is consistent with firms exerting labor market power to pay workers less than their marginal product.[7] We also use the presence of US Steel—by far the largest steel firm—as a supplementary measure of the presence of powerful steel firms in a county.

Why did steel concentration increase sharply in the 1890s? While economies of scale and technological innovations pushed towards concentration in the steel industry globally,

[7]Data on county-level wages, hours worked, and product values in the steel industry was only collected for the 1880 census of manufacturing (Fishbein, 1973; Manson et al., 2020).

Spatial Distribution of 1901 *Weighted HHI* in US Steel Industry

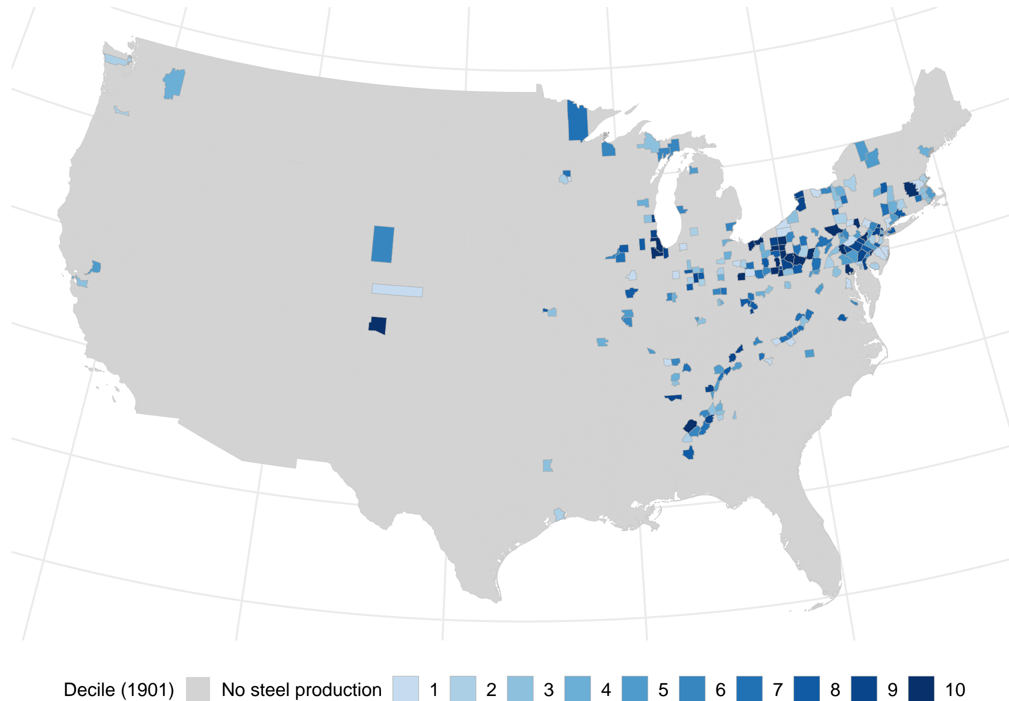

Figure 1: *Spatial Distribution of 1901 Weighted HHI in US Steel Industry.* Figure plots deciles of *Weighted HHI* with darker shades indicating higher values. Light gray refers to counties without steel production.

economic historians identify the discovery of vast iron ore deposits at Mesabi in northern Minnesota as a major cause of the industry's growth in the US (Irwin, 2017; Allen, 1979). This discovery was unexpected (Nasaw, 2007, 514). After the first shipments in 1892, the domestic price of iron ore plummeted, making US steel production globally competitive (Irwin, 2017). There are strong theoretical reasons to expect such a discovery to also increase concentration. Cheaper ore reduced variable costs, but only for firms able to afford the large fixed costs of new transportation infrastructure and plant necessary to exploit the new ore. Both developments served to magnify economies of scale and privilege large firms. In Appendix C we find both narrative historical and quantitative evidence for this hypothesis. Leasing the Mesabi ores gave Carnegie Steel a competitive advantage which in turn prompted other firms in the industry to consolidate, eventually leading to the formation of US Steel in 1901 (Smith, 1911; Nasaw, 2007). Access to this ore discovery also explains spatial variation

in consolidation. Proximity to Mesabi affected steel production in locations that were close enough to benefit from cheaper ore. We use pre-discovery data on the transportation network, and calculate a binary measure of proximity that best explains subsequent steel growth (Appendix Figure C.2). Locations close to Mesabi on this measure experienced sharp increases in steel production and concentration after the discovery, but not before (Figures C.4 and C.5).

3 MARKET POWER AND ELECTIONS

This section investigates whether the local transformation of market power in the steel industry during the Progressive Era influenced voter turnout and support for left candidates who supported reforms, especially labor and antitrust reforms. We study voter turnout as an indicator of the quality of the democratic process. Higher levels of participation are consistent with a democratic process of free and fair elections with mass participation. We examine leftist voting to examine both whether rising concentration changed voters' demands, and to gauge the quality of democratic representation in addressing these demands. We focus specifically on leftist presidential voting because it is less distorted by repression than other outcomes, such as voting in lower-level elections.

The case of Gary, Indiana, motivates our focus on turnout and leftist voting. Gary provides an extreme case to analyze how market power might affect democracy. The city was essentially created by US Steel as a new location for steel production; it was named after US Steel chairman Elbert Gary (Meister, 1967). Its location on Lake Michigan was ideal to receive iron ore from Mesabi (Brook, 1975; Mohl and Betten, 1986). US Steel was heavily involved in the city's management. The Gary Land Company and Gary Heat, Light, and Water Company, together responsible for selling plots of land and homes, installing and operating the city's sewage system, operating streetcars, and providing gas and electricity, were subsidiaries of US Steel (Mohl and Betten, 1986; Quillen, 1942; Lane, 1978; Greer, 1976). US Steel officials also populated Gary's three-man school board (Cohen 2014, 4).

US Steel interfered with electoral politics in Gary. Its primary tools for influencing elections were suppressing turnout among voters who would likely support candidates who threatened its interests, discouraging workers from supporting such candidates in the first place, and providing resources to allied candidates. The 1909 mayoral election illustrates the use of all three tools. That election was a tight race between Thomas E. Knotts, a local policeman and Populist-leaning newspaper editor, and a US Steel-backed Republican candidate, Horace S. Norton, who worked for the Gary Land Company (O'Hara 2011, 63–64). Knotts campaigned against US Steel. He warned working men against "letting your employer dictate to you how you shall vote" (Quillen, 1942, 212). On the eve of the election, the Republican sheriff of Lake County arrested Knotts and the entire Gary police force for defamation of character (O'Hara, 2011, 64-65). On election day city police refused to let a boxcar of immigrants vote despite their right to do so under Indiana law (Lane 1978; Quillen 1942, 210). The county sheriff also attempted to confiscate the ballot box as votes were being tallied. More broadly, voting took place under the perceived threat of violence (Lane, 1978; Quillen, 1942). In other instances, US Steel foremen would wait outside Democratic Party rallies to make sure that none of their men attended (Lane 1978; Meister 1967, 23).

In addition to the power of trusts debated in the 1909 election, labor regulation was a contentious issue in Gary. There is much evidence of workers in Gary protesting against the 12 hour workday demanded by US Steel; the issue led to a strike in 1919 (Moye, 1977, 23). Yet the power of US Steel in the local labor market gave workers few avenues to protest. The discharging of men for union activities in Gary was reported as early as 1911, and new employees to Gary mills by 1916 were required to pledge to not join a union (Quillen, 1942, 317). Instead, dissatisfied workers likely voted for leftist candidates. In 1912, leftist candidates, including the Progressives, won 40% of the Lake County presidential vote, relative to a national average of 28%. This figure is all the more notable given the extent of voter repression in Lake County; measured leftist voting is likely an understatement of demand for leftist policy by voters.

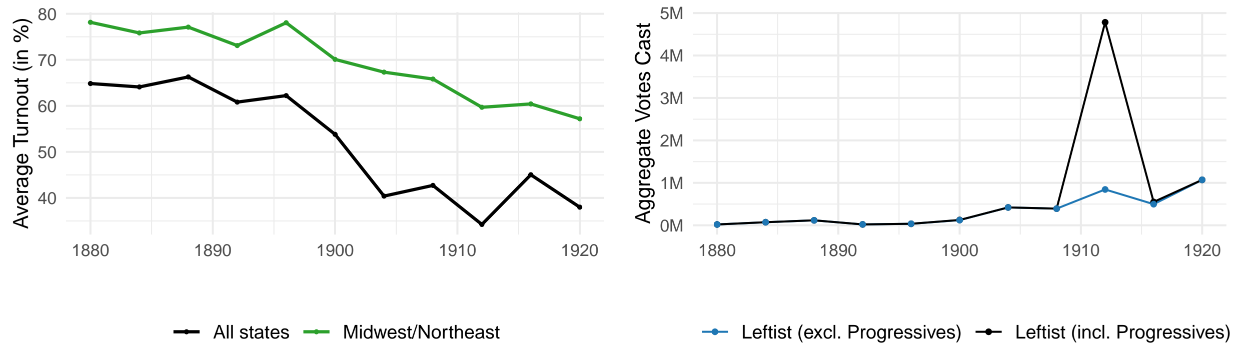

Figure 2: *Average Voter Turnout and Leftist Voting in the United States, 1880-1920.* The left panel shows average presidential turnout. The right panel shows the number of votes cast for leftist presidential candidates, as defined in the text.

3.1 *Variables*

TURNOUT We use data from Clubb, Flanigan and Zingale (2006) to measure turnout in presidential elections. The left panel of Figure 2 shows average voter turnout across all US counties between 1880 and 1920. In the immediate aftermath of the Civil War, voter turnout in the US was relatively high, with approximately 70–80 percent of eligible voters participating in elections. However, starting in the 1890s, voter turnout began to decline significantly. While this decline is consistent with rising concentration leading to lower turnout, concentration was not the only factor influencing turnout.

Commentators have attributed some of this decline to the adoption of the Australian—i.e., secret—ballot during this period.[8] The Australian Ballot is relevant to our analysis because it enhanced the strategic incentive to repress turnout. Instead of voting in public places, voters now had privacy at the ballot box. Political parties, firms, and immigrant group leaders were less able to monitor whether voters actually supported a particular party. After secret ballot reform, the strategies of parties were likely "deflationary," consisting of efforts to

[8]Nationally, voter disenfranchisement in the South is crucial for understanding the fall in participation. All of our analyses subset our data to the Midwest/Northeast where changes in disenfranchisement were less significant.

convince voters to stay home on election day (Mares, 2015; Cox and Kousser, 1981). Secret ballot adoption cannot account for our estimates. All our regression specifications include state-by-year fixed effects, which absorb any effects of secret ballot adoption.

LEFTIST SUPPORT During the Progressive era, leftist political candidates garnered significant support. In the 1912 presidential election, six percent of the eligible American electorate voted for the Socialist Party candidate, and approximately 1,100 socialists were elected to state and local positions prior to World War I (Gould et al., 2008; Lipset and Marks, 2000). Socialist and other leftist candidates campaigned on issues important to American industry, including worker welfare, child labor reform, antitrust regulation, and the right to unionize.

The right panel of Figure 2 plots the number of votes in presidential elections from 1880 to 1920 for leftist political parties.[9] The key pattern is the rise and fall of support for leftist presidential candidates nationally during the first two decades of the twentieth century. This pattern can largely be attributed to the Progressive and Socialist Parties.

The main leader in the Socialist Party of America was Eugene V. Debs, who ran as the party's presidential candidate in each election from 1900 to 1920 with the exception of 1916. Initially an organizer of the American Railway Union, Debs advocated a wide array of social and political reforms including advancing worker rights and limiting trusts (Chace 2009, 186). In the 1912 presidential election, former President Theodore Roosevelt broke from the Republican Party after his failure to win the nomination against the incumbent, Taft. His newly-created "Progressive (Bull Moose) Party" advocated for workplace labor reforms, the regulation of trusts, women's suffrage, and various other reforms (Chace, 2009, 206–207). Campaigning in Duluth, Minnesota, in 1912, Roosevelt claimed he would run a "bad third" among the board members of US Steel (Gould, 2008, 157).

To study how concentrated market power affected support for leftist parties during this

[9] See below for discussion of how parties are coded as "leftist."

period, we measure the percentage of the vote won by leftist parties. We measure leftist voting using data from the Inter-university Consortium for Political and Social Research (1999), which contains vote counts of smaller political parties. We categorize a party as leftist if its name contains any of the following terms: "social", "progress", "monopoly" or "monopolist", "worker", "workingmen", "labor", "owner", "communist", and words related to the "proletariat." In 1912 we include additional party names used to refer to Roosevelt's Progressive party on different state ballots. Note that most of the variation in the total leftist vote will be driven by the large Socialist and Progressive parties and not by the mix of very small parties. We only include parties that received at least 1,000 votes over the entire time period. Appendix Table D.1 shows the list of parties and their aggregate vote count. Finally, we create an additional variable that excludes Progressive parties.

3.2 *Empirical Strategy*

To examine how rising concentration affected *Turnout* and *Leftist Support*, we estimate the following equation by OLS:

$$Y_{it} = \alpha_i + \beta \log(\textit{Weighted HHI}_{it}) + \mathbf{x}_i' \gamma_t + \delta_{s(i)t} + \varepsilon_{it}.$$

Here Y_{it} is the outcome of interest—turnout or leftist support—in county i at time t, α_i is a county fixed effect, $\log(\textit{Weighted HHI}_{it})$ is the natural log of our measure of market power, *Weighted HHI*, $\mathbf{x}_i$ is a vector of controls, included in our preferred specification, for 1880 percent steel employment, 1880 percent agriculture, and 1880 rail length—the time-varying vector of coefficients γ_t allows for differential trends related to these controls, $\delta_{s(i)t}$ is a state-by-year fixed effect, and ε_{it} is the error term. Our coefficient of interest is β, the relationship between steel concentration and the outcome.

To construct this panel, we take election data in years that are on or closest to the decade (1880, 1888 for 1890 data, 1900, 1912 for 1910, and 1920) and merge it with our concentration

data between 1880 and 1920. We subset all regressions to the Midwest and Northeast and cluster standard errors by county.[10]

Our empirical strategy is broadly within the generalized difference-in-differences framework. County fixed effects allow different counties to have different levels of the relevant outcome, and state-year fixed effects allow states to follow differential trends.[11] Restricting the sample to the Northeast and Midwest, and allowing for nonlinear trends relating to initial manufacturing, agriculture and railways, make the parallel trends assumption more plausible. Our approach implicitly compares counties which experienced large increases in steel concentration to others in the same state with similar initial levels of industrialization, which experienced smaller increases in steel concentration, for counties within a set of similar states. The identification assumption is that in the absence of changing steel concentration, these two groups of counties would have followed similar trajectories.

3.3 *Estimates*

Table 2 shows our estimates. The coefficient in model (2) suggests that a 100% increase in *Weighted HHI* corresponded to around a 0.4 percentage point decrease in turnout. This estimate must be understood in the context of the very large increases in *Weighted HHI* during our period of study. Using our dichotomous measure indicating closeness to Mesabi, an estimate of which counties it was feasible to transport Mesabi ore to, we find that in steel-producing counties near Mesabi, *Weighted HHI* increased by an average of 2300% between 1880 and 1920. Consequently, it is substantively informative to consider the impact

[10]We include 1888 as a base year for 1890, rather than 1892, as it preceded the Mesabi discovery. We use 1912 for 1910 because this was the high-water mark for progressive and socialist voting, but our results are similar if we use 1908 instead (Appendix Tables D.2 and D.3).

[11]Note that the state-by-year fixed effects also absorb remaining variation in Australian Ballot adoption within our sample.

	Pres. Turnout %		*Pres. Leftist %*	
	(1)	(2)	(3)	(4)
Log Weighted HHI	-0.451^{***}	-0.427^{***}	0.464^{***}	0.393^{***}
	(0.123)	(0.123)	(0.099)	(0.094)
Controls	–	✓	–	✓
County FEs	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓
Cluster SEs	County	County	County	County
N	5985	5584	5922	5562
R^2	0.879	0.888	0.930	0.925

This table shows regression estimates of *Voter Turnout (in %)* (1)-(2) and *Leftist Support (in %)* (3)-(4) on *Log Weighted HHI*. Voter turnout and leftist support are both measured in percent in presidential races and all regressions are subset to the Midwest/Northeast only. The following electoral years are included: 1880, 1888 (for 1890), 1900, 1912 (for 1910), and 1920. Data are normalized to 1890 county boundaries. Model (1) shows the base specification. Model (2) adds controls for length of rail in 1880, 1880 percent agriculture, and 1880 steel employment, all interacted with year dummies. Models (3)-(4) repeat with the leftist support outcome. All models include state-by-year and county fixed effects. Robust standard errors are clustered at the county-level for all regressions. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table 2: *Market Power and Voter Turnout (1)-(2) and Leftist Support (3)-(4).*

of large increases in concentration. An increase from the 50th to the 95th percentile of log *Weighted HHI* corresponds to a 1.7 percentage point decrease in presidential turnout. This effect corresponds to a quarter of the gap in turnout between counties above and below median urbanization in 1912.[12]

Model (4) suggests that a 100% increase in *Weighted HHI* corresponds to an increase in a county's leftist support of 0.3 percentage points. This effect is substantively important given the substantial increases in *Weighted HHI* and low rate of leftist voting. An increase from the 50th to 95th percentile of log *Weighted HHI* in this sample corresponds to a 1.54 percentage point increase in the leftist vote. To put this into perspective, in 1912, the median urban and rural counties differed in leftist voting by 3 percentage points (1 percentage point excluding progressives). The effect of concentration is approximately half of this difference.

Appendix Tables D.2 and D.3 show that signs and patterns of significance are not sensitive

[12]It also comprises approximately 10 percent of the gap between counties with above and below median shares of immigrants.

to whether we use 1908 or 1912 data, or exclude the Progressives. To further assess the parallel trends assumption, we exploit the fact that our estimates identify off a rapid increase in concentration between 1890 and 1910. We check whether counties that experienced increases in concentration were following differential trends prior to the increase (Appendix Tables D.4 and D.5). There is no evidence that such counties followed differential trends in terms of leftist voting. We do find that counties which experienced increases in steel concentration post-1890 also experienced declining turnout pre-1890, though this relationship is not statistically significant. We verify that our estimates are unchanged allowing for nonlinear trends related to pre-1890 turnout trajectories. We use our *Mesabi Proximity* variable to estimate the effect of its discovery on turnout and support for leftist parties and report substantively similar estimates (Appendix Table D.6). Our estimates using the presence of the US Steel Corporation as an alternative measure of concentration are also similar (Appendix Table D.7). While we prefer *Weighted HHI* as our independent variable for theoretical reasons, it is not consequential for our results. We separately re-estimate the models using log HHI as the independent variable; Appendix Table D.8 shows that the results remain substantively similar using this measure.

A potential concern about these estimates is that immigrants were disproportionately attracted to areas that were industrializing and may have voted at lower rates or for leftist parties for reasons unrelated to local steel concentration. Further, insofar that our log *Weighted HHI* variable is correlated with industrialization during this period, we may also be concerned that we are simply estimating the effect of industrialization on changes in voter turnout or leftist support. To assuage these concerns, in Appendix Table D.9 and D.10 we re-estimate the models in Table 2, controlling separately for the percent urban share in a county, the percent foreign-born share, log manufacturing, and log population. We find slightly attenuated coefficients but similar substantive magnitudes and statistical significance. This evidence suggests that neither immigration nor industrialization is likely to account for our results.

4 MARKET POWER AND REPRESENTATION

This section turns to evaluating the consequences of market power for the quality of democratic representation. We first estimate the effect of market power in the steel industry on the voting behavior of members of Congress on workplace and antitrust reforms. We next assess the impact of market power on alignment between voter preferences and Congressional behavior on these issues.

4.1 *Congressional Voting*

To investigate legislative support for reform, we estimate issue-specific Congressional ideal points using the algorithm developed by Imai, Lo and Olmsted (2016). They develop an Expectation Maximization algorithm to estimate the static one-dimensional ideal point model proposed by Clinton, Jackman and Rivers (2004). We estimate issue-specific ideal points by using votes in the House of Representatives on issues related to workplace regulation and antitrust, as classified by Poole and Rosenthal (1991), between 1880 and 1920. Following Clinton, Jackman and Rivers (2004) we use an eigendecomposition of the rollcall matrix for starting values. The scale and direction of ideal point models are not identified. We therefore normalize the scale of the ideal points so they have mean zero and standard deviation one. We infer the substantive meaning of the direction from the position of two prominent supporters of reform in Congress from this period: Representative Henry Clayton for antitrust reform and Representative William Adamson for workplace reform.[13] Figure 3 shows their ideal points. We code the variables so a higher score indicates more support for regulation. We assign each county a value for each issue area based on the value assigned to the members of Congress in the districts for that county, weighted by the proportion of the county in the

[13]Both Congressmen were sponsors of their respective Progressive-era acts: the 1914 Clayton Act and the 1916 Adamson Act, the latter of which established an eight-hour day for interstate rail workers.

Relationship between Antitrust Ideal, Workplace Ideal, and DW-Nominate Scores, 1880–1920

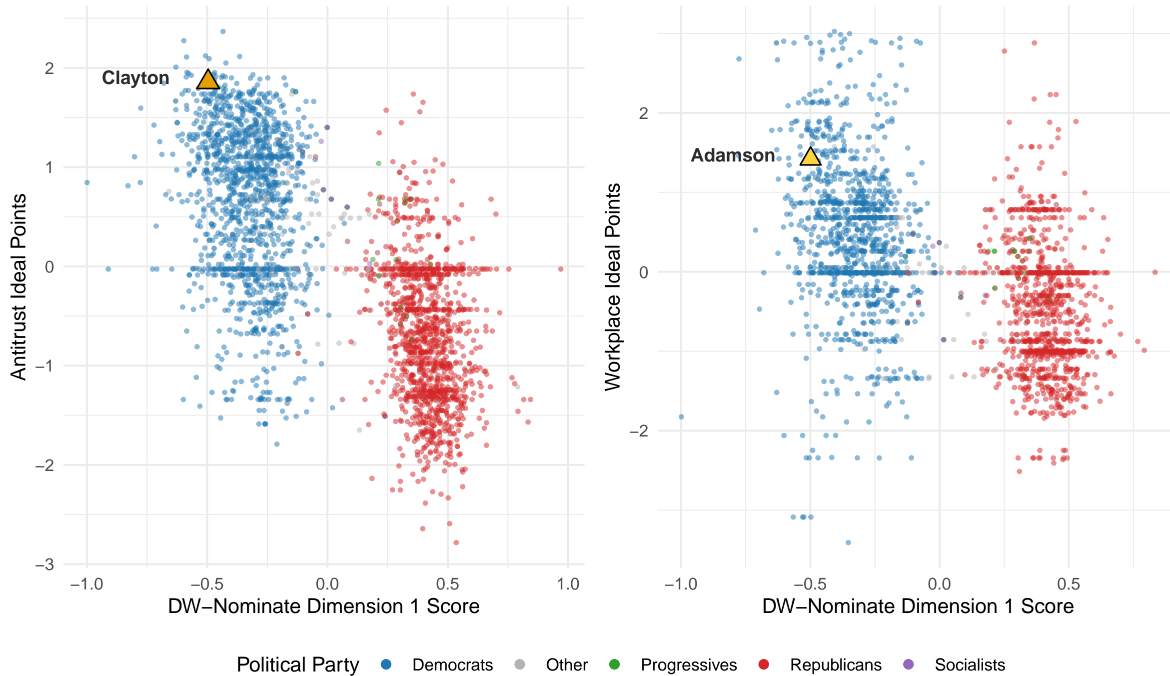

Figure 3: *Relationship between Antitrust Ideal, Workplace Ideal, and DW-Nominate Scores, 1880–1920*. Left panel shows scatterplot of antitrust ideal points and DW Dimension 1 scores, with orange triangle referring to Henry Clayton. Right panel shows scatter plot of workplace ideal points and DW Dimension 1 scores, with yellow triangle referring to William Adamson. Each point refers to a single Congressman over his entire career. Ideal points are estimated across the entire period, from the 46th Congress (1879–1881) to the 66th Congress (1919–1921).

district. Because we estimate one set of ideal points on each issue using roll call votes for the entire period, all estimated ideal points on a given issue are on the same scale and so are comparable over time. Our estimation assumes that the ideal point of each member of Congress on each issue does not vary over time, and so within-county variation is driven by changes in the identities of Congressional representatives.

Figure 3 plots the antitrust and workplace ideal points against DW-Nominate Dimension 1 scores between the 46th and 66th Congresses. The first dimension of DW-Nominate captures the main left-right political divide over economic policy, which in this period largely concerned the tariff and monetary policy. Higher values indicate adherence to protectionism

	Antitrust Ideal		*Workplace Ideal*	
	(1)	(2)	(3)	(4)
Log Weighted HHI	0.015	0.015	0.006	0.002
	(0.012)	(0.012)	(0.015)	(0.015)
Controls	–	✓	–	✓
County FEs	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓
Num. obs.	4699	4554	4556	4412
R^2	0.768	0.769	0.736	0.733

This table shows estimates for regressions of *Antitrust Ideal* and *Workplace Ideal* on *Log Weighted HHI*. Ideal points are estimated across the entire period, i.e. 1879-1921 (46th to 66th Congresses). They are then pooled by decade, with data for 1880s, 1890s, 1900s, and the 1910s only. Data are normalized to 1890 and are subset to the Midwest/Northeast only. Model (1) uses *Log Weighted HHI* for the base specification. Model (2) includes controls for 1880 length of rail, percent agriculture employment in 1880, percent steel in 1880, all of which are interacted with year fixed effects. Models (3)-(4) repeat for workplace ideal points. All models include county and state-by-year FEs. Robust standard errors are clustered at the county level for all regressions. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table 3: *Market Power and Congressional Representation (antitrust, workplace).*

and support for the gold standard. The ideal points for workplace and antitrust-related policy are negatively related to the DW-Nominate first dimension. Unlike for DW-Nominate, there is substantial within-party variation in antitrust and workplace regulation ideal points, with many Republicans—the less supportive party on average—having higher ideal points than the average Democrat.

To evaluate the impact of market power on Congressional voting behavior, we estimate a two-way fixed effect regression model analogous to the specifications in the previous section, substituting the antitrust and workplace regulation ideal points for the turnout and voting dependent variables. In these specifications, we use the values of *Weighted HHI* in 1880, 1890, 1900, and 1910 and the values of the ideal point estimates for the 1880s, 1890s, 1900s, and 1910s to create a four decade panel. Table 3 reports the results. For both issues, the coefficient on log *Weighted HHI* is small, precisely estimated, and statistically insignificant. There is no evidence that rising concentration led to more or less support for reform in Congress.

4.2 *Misalignment*

Thus far, we have found that rising steel concentration correlated with increased leftist voting, but not legislators adopting stances more supportive of leftist reforms. These results indicate a failure of responsiveness. In this section, we combine our voting and legislative behavior data to measure the extent of misalignment between voters and legislators by county in order to test directly if rising concentration decreased the quality of democratic representation.

Voting for leftist parties is in part a measure of demand for the policies advocated by those parties. Given our period of study predates the development of survey methods, we cannot measure individual voter demand for policies (e.g. as in Becher and Stegmueller (2021)). We can however show that support for leftist parties strongly correlates with support for leftist policies. In 1912 Ohio voters voted on a series of proposed reforms. These included the enactment of an eight-hour day for state employees, measures to improve welfare of employees (including the adoption of a minimum wage), the provision of workmen's compensation, and regulation of corporations via state supervision, and regarding the sale of corporate stocks and securities (Sponholtz, 1969). Figure 4 plots support for leftist parties against support for these reforms, using data from Inter-university Consortium for Political and Social Research (1992). We find that Ohio counties supportive of constitutional reforms overwhelmingly also support Progressive or Socialist candidates. Our use of voting in presidential elections as a measure of constituency preferences in order to study legislative responsiveness to those preferences is consistent with much scholarship, for instance Olson and Rogowski (2024). In presidential elections all voters are presented with essentially the same choice of candidates, and so cross-county variation cannot be attributable to differences in candidate positioning.

To more directly capture the idea that this change in voter preferences decreased alignment between voters and legislators, we measure misalignment on antitrust and workplace reforms. Our measure of misalignment is the absolute value of the difference between leftist votes and the relevant ideal point, after normalizing both variables by subtracting the mean and dividing by the standard deviation. The substantive assumption underpinning this measure

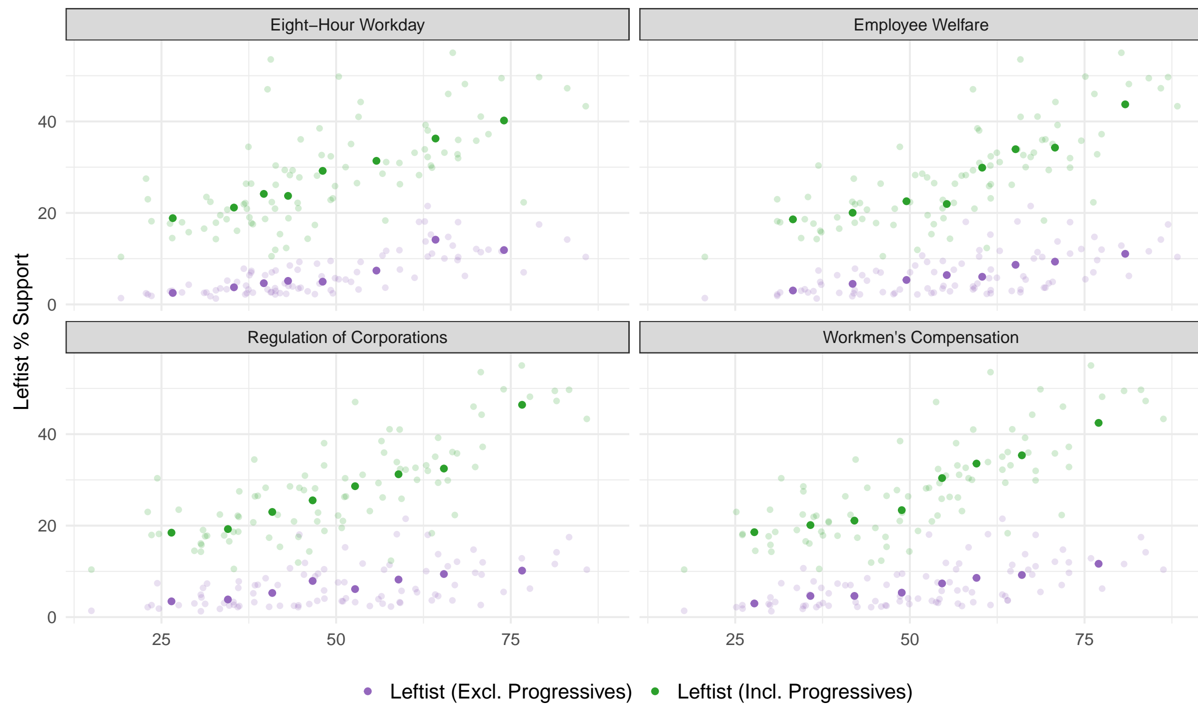

Figure 4: *Reform and Leftist Support in 1912 Ohio.* Y-axis refers to presidential vote share in 1912 in the county. X-axis shows the county's support for a given progressive issue. Dark dots are binned averages, green include the Progressives, purple exclude them.

	Antitrust Misalign		*Workplace Misalign*	
	(1)	(2)	(3)	(4)
Log Weighted HHI	0.031**	0.028**	0.033**	0.030**
	(0.013)	(0.013)	(0.014)	(0.014)
Controls	–	✓	–	✓
County FEs	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓
Num. obs.	4539	4418	4396	4276
R^2	0.565	0.557	0.577	0.550

This table reports regressions of *Antitrust Misalignment* and *Workplace Misalignment* on *Log Weighted HHI.* Ideal points are estimated over the full period (1879-1921), then pooled by decade and merged with measures of leftist support from 1880, 1888 (mapped to 1890), 1900, and 1912 (mapped to 1910). Both the ideal point estimates and leftist outcomes are standardized (z-scores), and misalignment is defined as their absolute difference. Higher values indicate greater misalignment. Model (1) shows base specification for *Log Weighted HHI.* Model (2) includes controls for 1880 length of rail, 1880 percent agriculture employment, and 1880 steel employment, interacted with period FEs. Models (3)-(4) repeat but for workplace misalignment. All models include county and state-by-period fixed effects. Robust standard errors are clustered at the county level for all models. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table 4: *Market Power and Misalignment (antitrust, workplace).*

is that with responsive representation, a county one standard deviation above the mean in demand for reform would be represented by a legislator one standard deviation above the mean in roll call voting for reform. Our measure quantifies the deviation from this benchmark. As in the prior analysis, we pool ideal points over the 1880s, 1890, 1900s, 1910s, and match it to the nearest leftist vote (1880, 1888 for 1890, 1900, and 1912 for 1910).

Table 4 shows the relationship between steel concentration and these measures of misalignment. For both antitrust and workplace issues, rising concentration is associated with an increase in misalignment between voters and legislators. The coefficients in models (2) and (4) implies that a 100% increase in *Weighted HHI* is associated with a 0.02 unit increase in both antitrust and workplace misalignment. These effects correspond to around 7% of the average increase in antitrust misalignment and around 10% of the average increase in workplace misalignment over the period studied. Recall however that many counties experienced much larger increases in *Weighted HHI.*

For the misalignment results, we detected some sensitivity to specification. In Appendix

Tables D.6 and D.7, we show that the results are robust to employing the presence of US Steel or *Mesabi Proximity* rather than *Weighted HHI* as the main measure of concentration for workplace reform but not antitrust. We also re-estimate the models using log HHI as the independent variables. The estimates in Appendix Table D.8 indicate that the results hold for antitrust, but not workplace, misalignment. Overall, the results in our preferred specifications that concentration increases misalignment resonate with our previous findings: counties with rising steel concentration experienced rising demand for reform, but this demand was not catered to by their representatives.

5 A MODEL OF MARKET POWER AND DISTORTED DEMOCRACY

Thus far we have seen that rising concentration was associated with (1) greater demand for leftist policy by voters, (2) decreased turnout, indicating repression, and (3) increased misalignment between voters and policy, as demand for leftist policy failed to translate into leftist representation. In this section we develop a formal model to helps understand these patterns.

There are $N \geq 1$ firms and $\bar{L}$ workers. We study the behavior of these agents in the economic and political spheres. In the economic sphere, firms hire workers. Workers have heterogeneous preferences for working for different firms, which provides firms with market power. Firms pay labor less than its marginal product and make profits. In the political sphere, workers elect politicians who can alter the division of these profits between firms and workers, but firms can expend funds to influence this process. Concentration raises firm profits, driving voter demand for more pro-worker policies. However, concentration also makes firms better able to influence policy, through increased resources and ease of coordination. These forces operate to push policy away from voters' preferences.

5.1 *Setup*

5.1.1 The Economy

Firms produce a numeraire good using labor under constant returns to scale. Labor productivity is z. If firm j hires L_j workers it produces output valued at zL_j. As discussed below, this assumption that firms have access to the same technology allows us to link market concentration to the main exogenous variable, the number of firms (N). Each firm j sets its own wage, w_j.

Each worker supplies one unit of labor. Workers choose where to work based on both the wage offered and idiosyncratic firm-by-worker factors. These idiosyncratic tastes proxy for the role of social networks, community ties, and firm-specific skills in influencing labor market decisions. This modeling choice follows current scholarship on monopsony (Card et al., 2018; Azar, Berry and Marinescu, 2022). The utility worker i receives from working for firm j is

$$u_{ij} := \alpha w_j + \iota_{ij}$$

where ι_{ij} is distributed iid across firms and workers according to a type I extreme value distribution. The parameter α scales the importance of wages relative to these idiosyncratic preferences. Workers work for the firm that gives them the greatest utility. Standard results from the discrete choice literature (McFadden, 1974) imply that the share of workers working for firm j is

$$s_j := \frac{e^{\alpha w_j}}{\sum_{k=1}^{N} e^{\alpha w_k}},$$

and so the number of workers who work for j is $L_j = s_j \bar{L}$. The number of workers a firm hires is increasing in the wage it pays (w_j) and the total supply of labor ($\bar{L}$), and decreasing in the wages paid by other firms (w_k). Firm j's profits are then

$$p_j := (z - w_j)L_j.$$

Total profits are $\bar{p} := \sum_{j=1}^{N}(z - w_j)L_j$. From the properties of the type I extreme value distribution, expected utility for workers, inclusive of ι_{ij} benefits, is, up to a constant,

$$\bar{u} = \ln\left(\sum_{j=1}^{N} e^{\alpha w_j}\right). \tag{1}$$

5.1.2 The Polity

The government can tax firm profits and redistribute them lump-sum to workers. Firm j spends r_j to influence the political process—we describe how below—leaving net profits $p_j - r_j$. Total expenditure on influencing the political process is $\bar{r} := \sum_{j=1}^{N} r_j$. The government implements transfer policy $t \in [0,1]$, so that firm j's post-transfer profits are $(1-t)(p_j - r_j)$ and worker i at firm j's post-transfer income is $w_j + t\frac{\bar{p}-\bar{r}}{\bar{L}}$. These transfers represent policies like union rights, workplace compensation, and limits on the length of the workday, that alter the division of profits between firms and workers.

There are two political parties: a leftist party that maximizes the welfare of workers, and a conservative party that maximizes the welfare of firms. These parties choose transfer policies t_l and t_c. The parties cannot commit to policies ex-ante, and so the leftist party campaigns on the policy that, if implemented, maximizes workers' payoffs, $t_l = 1$, and the conservative party campaigns on the policy that maximizes firms' payoffs, $t_c = 0$.

Workers constitute the electorate. Workers vote sincerely, based on both policy, repressive actions taken by firms, and idiosyncratic preferences for the two parties. The utilities a worker i obtains from voting for the leftist and conservative parties are

$$v_{li} := t_l\frac{\bar{p}-\bar{r}}{\bar{L}} + \psi + \varepsilon_i + \zeta - \beta\frac{\bar{r}}{\bar{L}},\ v_{ci} := t_c\frac{\bar{p}-\bar{r}}{\bar{L}}.$$

Here $t_l\frac{\bar{p}-\bar{r}}{\bar{L}}$ is the material payoff from the leftist party's transfer policies, ψ captures factors unrelated to policy that affect the mean level of support for the left, and $\varepsilon_i \sim U\left[-\frac{1}{2\varphi}, \frac{1}{2\varphi}\right]$ captures idiosyncratic variation across voters in support for the left. $\zeta \sim U\left[-\frac{1}{2\varphi}, \frac{1}{2\varphi}\right]$ is an

aggregate shock to support for the left that converts an expression for vote-share into an expression for the probability that the left wins more than half the vote.

Firm j influences the political process by spending r_j to repress workers. Repression reduces the payoff workers receive from voting for the left. Total expenditure on repression per worker is $\frac{\bar{r}}{\bar{L}}$. The parameter β determines how responsive voters are to repression. We assume $\beta > 0$ so that repression decreases support for the left.

We make two further assumptions about parameters:

Assumption 1. $-\frac{1}{2\varphi} + \frac{\beta N}{\alpha(N-1)} < \psi < \frac{1}{2\varphi} - \frac{N}{\alpha(N-1)}$

Assumption 2. $\frac{\beta+1+N}{\alpha(N-1)} + \psi > \frac{1}{2\varphi}$.

Assumption 1 ensures that the probability of the left winning is always between zero and one, even at the maximum and minimum possible levels of repression. Assumption 2 restricts to the part of the parameter space in which repression is effective enough to occur in equilibrium.

Taking these expressions for voters' utilities, and the policies chosen, the probability that the left wins a majority is

$$\sigma := \frac{1}{2} + \varphi \left(\psi + \frac{\bar{p} - (\beta + 1)\bar{r}}{\bar{L}} \right). \tag{2}$$

The left is more likely to win when firm profits are greater relative to the number of workers ($\frac{\bar{p}}{\bar{L}}$ is large)—workers have more to gain from left-wing policies that will give them a larger share of these profits—but less likely to win when there is more repression.

After the election, the elected government implements its policy, and workers and firms receive their payoffs.

5.2 *The Firm's Problem*

Firm j chooses wages w_j and repression r_j to maximize expected post-transfer profits, P_j. If the leftist party wins, firm net profits are transferred to workers, if the conservative party

wins, firms keep their profits. The firm's problem is thus

$$\begin{aligned}\max_{w_j,r_j} P_j &:= (p_j - r_j)\left((1-\sigma)(1-t_c) + \sigma(1-t_l)\right) \\ &= (p_j - r_j)\left((1-\sigma)(1-0) + \sigma(1-1)\right) \\ &= (p_j - r_j)(1-\sigma).\end{aligned}$$

We solve for Nash equilibrium. Each firm chooses the wage and repression levels that maximize its payoff holding fixed the other firms' strategies.

Lemma 1. *Any pair of wages w_j and repression r_j that maximizes expected post-tax profits P_j for firm j also maximizes profits before tax and repression, p_j.*

The proof is in Appendix E.1. It is more effective for a firm to maximize profits and use the resulting surplus to repress workers than to strategically reduce profits to avoid antagonizing workers. In addition to reducing the surplus available for the left to expropriate, repression directly reduces workers' utility from supporting the left. Lemma 1 means we can analyze firm behavior in the economic and political spheres separately: In the economic sphere, incentives are to maximize profits (p_j).

5.2.1 Equilibrium Wages and Profits

Each firm chooses wages to maximize profits: $w_j = \arg\max_{w_j}(z - w_j)L_j$. Taking first order conditions and rearranging gives the following expression for wages

$$w_j = z - \frac{1}{\alpha(1-s_j)}, \tag{3}$$

which in turn implies firm profits of

$$p_j = \frac{s_j \bar{L}}{\alpha(1-s_j)}. \tag{4}$$

Profits are higher for firms with larger market share (s_j), though lower when workers are more responsive to wages in their choice of firm (α is high), which reduces market power.

As all firms face the same optimization problem, they choose the same wage and receive the same market share, giving $s_j = \frac{1}{N}$ and $w_j = z - \frac{N}{\alpha(N-1)}$ for all $j \in \{1, ..., N\}$. Because firms have equal productivity, market concentration is directly linked to the main exogenous variable, the number of firms:

$$\text{HHI} = \sum_{j=1}^{N} s_j^2 = \frac{1}{N}.$$

Proposition 1. *Pre-transfer individual and collective profits are increasing in concentration,* $\frac{\partial p}{\partial HHI} > 0$ *and* $\frac{\partial \bar{p}}{\partial HHI} > 0$*; pre-transfer worker welfare is decreasing in concentration,* $\frac{\partial \bar{u}}{\partial HHI} < 0$*.*

Proof. Substituting $s_j = \frac{1}{N}$ into Equation (4) gives the following expressions for individual and collective profits

$$p = \frac{\bar{L}}{\alpha(N-1)}, \ \bar{p} = \frac{\bar{L}N}{\alpha(N-1)}. \tag{5}$$

Both expressions are decreasing in N, and so are increasing in HHI. Substituting the expression for wages from (3) into that for worker utility (1) gives

$$\bar{u} = \ln\left(Ne^{\alpha w}\right) = \ln N + \alpha z - \frac{N}{N-1}$$

which is increasing in N and so decreasing in HHI. ■

Increasing the number of firms increases worker welfare both by making it more likely that a worker will find a firm for which they have a strong idiosyncratic preference (the $\ln N$ term) and by raising wages through decreased market power (the remainder of the expression).

Firm concentration increases support for the left in the absence of repression. This claim follows from the probability of the left winning the election in Equation (2) increasing in firm profits $\bar{p}$, which are increasing in concentration. This prediction matches our empirical finding of support for the left in presidential elections increasing in places with rising concentration. We treat voting for leftist parties in presidential elections—which minority parties were

unlikely to win—primarily as a measure of support for leftist policies that is less affected by repression than voting in lower level elections.

5.2.2 Equilibrium Repression

Having solved for optimal wages, we solve for optimal repression, taking firm pre-transfer profits as given. The firm's political problem is

$$\max_{r_j} (p_j - r_j)\left(\frac{1}{2} + \varphi\left(\frac{(\beta+1)\bar{r}_{-j} - \bar{p}}{\bar{L}} - \psi\right) + \frac{\varphi(\beta+1)r_j}{\bar{L}}\right)$$

In this expression we use $\bar{r}_{-j} := \bar{r} - r_j$ to refer to repression by firms other than j. This expression is maximized for

$$r_j = \frac{1}{2}\left(p_j + \frac{\bar{p}}{\beta+1} - \bar{r}_{-j} - \frac{\bar{L}}{\beta+1}\left(\frac{1}{2\varphi} - \psi\right)\right). \tag{6}$$

More profitable firms (higher p_j) repress more as they have more to lose from leftist policies that will reduce their profits. The other comparative statics are intuitive. Because profits are only realized if the leftist movement fails, factors that increase the probability of the leftist movement succeeding—total profits ($\bar{p}$) and voters' biases towards the left $\left(\psi - \frac{1}{2\varphi}\right)$—increase repression because the expected value of the profits a firm loses by repressing are smaller. Repression by other firms ($\bar{r}_{-j}$) that decreases the probability of the left succeeding has the opposite effect, creating an incentive to free-ride. Factors that make a given dollar of repression more effective $\left(\frac{\beta+1}{\bar{L}}\right)$ increase repression.

Subtracting $\frac{r_j}{2}$ from both sides gives an expression that only differs across firms in terms of p_j:

$$r_j = p_j + \frac{\bar{p}}{\beta+1} - \bar{r} - \frac{\bar{L}}{\beta+1}\left(\frac{1}{2\varphi} - \psi\right). \tag{7}$$

Summing over firms and solving for $\bar{r}$ gives total repression:

$$\bar{r} = \sum_{j=1}^{N} r_j = \bar{p} + N\left(\frac{\bar{p}}{\beta+1} - \bar{r} - \frac{\bar{L}}{\beta+1}\left(\frac{1}{2\varphi} - \psi\right)\right)$$

$$\bar{r} = \frac{\bar{p}(\beta+1+N)}{(\beta+1)(N+1)} - \frac{\bar{L}N}{(\beta+1)(N+1)}\left(\frac{1}{2\varphi} - \psi\right). \tag{8}$$

Proposition 2. *Equilibrium repression is increasing in concentration,* $\frac{\partial \bar{r}}{\partial HHI} > 0$.

Proof. Equation (8) is increasing in $\bar{p}$ and decreasing in N (recall that $\psi\varphi < \frac{1}{2}$ and $\beta > 0$). From Proposition 1 we have that $\bar{p}$ is increasing in concentration, and concentration is the inverse of N. ■

Concentration increases repression through three channels:

1. Threat: Concentration creates rents which drive support for leftist policies, increasing firms' motives to repress
2. Capacity: These rents also increase the resources at firms' disposal
3. Coordination: Concentration reduces free-riding by firms because each firm internalizes a larger share of the aggregate benefits to firms of preventing leftist policies

One can see how the first two channels operate distinctly in Equation (6): concentration increases total profits ($\bar{p}$) which increases the probability of the left winning, and increases the profits of individual firms (p_j), both of which motivate repression. Equation (8) illustrates the latter mechanism. Even fixing total profits ($\bar{p}$) but varying concentration (by decreasing N) increases repression.

Proposition 3. *The probability of the policy preferred by workers being implemented is decreasing in firm concentration,* $\frac{\partial \sigma}{\partial HHI} < 0$

Proof. Inserting the solution for $\bar{r}$ in Equation (8) into Equation (2) gives

$$\sigma = \frac{N + \varphi\psi + \frac{1}{2}}{N+1} - \frac{\varphi\beta\bar{p}}{\bar{L}(N+1)} \tag{9}$$

Because $\varphi\psi < \frac{1}{2}$, the left term is increasing in N. Because $\beta > 0$ and $\bar{p}$ is decreasing in N, the right term is also increasing in N. If σ is increasing in N it is decreasing in HHI. ■

Increasing firm concentration leads to policies that in expectation are further from those preferred by voters. In Equation (9) both reduced free-riding (the left-hand term), and the fact that profits can be used to repress to a greater extent than they motivate leftist demands ($\beta > 0$), contribute to this result. Even if we assume a firm can reduce leftist support as much by decreasing its profits by a dollar as by investing that dollar in repression ($\beta = 0$), the free-riding mechanism would ensure that concentration still distorts democracy.

5.3 *Extensions*

Appendix E discusses four extensions. In the main version of the model, market power takes the form of labor market monopsony. While we view this mechanism as the best fit for our empirical context, it is not necessary for the model's results. In the first extension we show that isomorphic expressions for profits and so for the other results can be derived from a model of oligopoly in the product market.

Second, in the main version of the model, policy is decided only via elections. In our empirical context, electoral interference was likely not the only way businesses influenced policy. Appendix E.3 considers an alternative model of the policy process based around firm influence over incumbent politicians, not electoral politics, that generates an identical expression for σ.

Third, we extend the model to endogenize the number of firms. Firms have to pay a fixed cost to produce: in equilibrium, expected profits conditional on entry equal this fixed cost. This extension helps us understand how the Mesabi discovery influences politics. Raising the fixed costs of production reduces firm entry, leading to more concentrated markets and distorted democracy.

Fourth, we extend the model to allow for firms with heterogeneous productivity levels. Allowing for heterogeneous firms makes concentration an equilibrium object and so makes

it harder to speak of comparative-statics results concerning concentration. Nonetheless, if we restate our results as considering the effects of a change in economic fundamentals that increases a measure of average market shares similar to HHI, and decreases the number of firms, the same predictions apply.

6 CONCLUSION

Kwon, Ma and Zimmermann (2024) document that economic concentration in the United States has increased over the last 100 years. This steady transformation of American capitalism has been made salient in the last two decades with the rise of dominant technology firms such as Amazon and Meta, reintroducing fundamental questions about the consequences of concentration for American democracy (Khan, 2018; Boix, 2019). The concern is not only the possibility that economic concentration distorts democracy but that there is a positive feedback loop in which market power generates political power which in turn increases market power (Zingales, 2017; Lamoreaux, 2019; Callander, Foarta and Sugaya, 2022).

This paper brings new data, evidence, and theory to the study of market power and democracy. In the context of Progressive Era America, we trace the consequences of rising steel concentration for voter preferences, participation and representation. Concentrated steel increased support for the left among voters but had no effect on legislative behavior, decreasing alignment between legislators and voters. We document how market power shapes politics outside the specific context of lobbying largely considered in the literature (Bombardini, 2008; McCarty and Shahshahani, 2023; Cowgill, Prat and Valletti, 2024). Our theoretical model illustrates how market power itself drives both voter support for the left and firm mobilization, in equilibrium leading to unrepresentative policy.

The paper differs from existing scholarship on market power and politics in considering not monopoly in the national product market but monopsony in local labor markets. This focus fits with our empirical context and builds on a growing literature in labor economics that documents both major differences in outcomes across, and considerable market power

within, local labor markets (Moretti, 2011; Berger, Herkenhoff and Mongey, 2022). Studying local labor markets opens up an array of channels through which market power can affect the functioning of democracy beyond lobbying. In this paper we explore political behavior and representation. But market power is likely relevant for many processes that play out across local labor markets, including adjustment to economic change and spatial polarization (Colantone and Stanig, 2018; Rodden, 2019). This paper provides a framework for future work to tackle those questions.

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Online Appendix for "Market Power and Distorted Democracy in the Progressive Era"

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A County-level steel market power dataset

This section details the data collection process for the size of iron and steel furnaces in the United States during the Second Industrial Revolution. Section A.1 introduces the variables collected from *American Iron and Steel Association* (AISA) and the *American Iron and Steel Institute* (AISI) documents between 1880-1916. Section A.2 discusses the historical period and the data collection process for each year. Finally, Section A.3 shows a validation check of our measure with steel employment data from Ruggles et al. (2021).

A.1 *Variables*

We digitize ten main variables to capture the size and geographic location of iron and steel firms during this period: Year, State, Furnace, Firm, (Furnace) Type, Location, National Historical GIS (NHGIS) state code, NHGIS county code, ICPSR county name, and Capacity.

Year Each *AISA* and *AISI* directory from which we obtain our data represents a specific year. Our data utilizes directories from 1880, 1890, 1901, 1908, and 1916. We first digitize the year corresponding to each directory.

Furnace The furnace name is prominently featured in each entry within the directories. We transcribe these names exactly as they appear in the directory. Examples of furnace names include “Pennsylvania Steel Works” and “Wood’s Works.”

Firm Following the furnace name, the firm name associated with each furnace is typically listed. We carefully record these names. If the directory lists a subsidiary of a larger firm, the larger firm is listed.

Type The directories often categorize establishments based on the type of furnace they operate, such as blast furnaces, steelworks/rolling mills, and forges/bloomaries. We record for each furnace its production type as recorded in the directories.

Location Each furnace entry includes a location identifier, either specifying the county or city where the furnace is located. In cases where a county identifier is absent, we utilize the city or township name and geocode it using a Google API. We merge this data with the NHGIS shapefiles for other geographic identifies.

Capacity Finally, we record the aggregate production capacity of each furnace in net tons (2,000 pounds), combining capacity counts across all product types. Some entries, especially those in 1901, 1908, and 1916, are in gross tons (2,240 pounds) and are converted to net tons. This comprehensive approach allows us to capture the full extent of iron and steel production capacity within each furnace.

A.2 *Construction of Furnace-Level Data*

In the period after the Civil War and before the First World War, various interest groups in the United States were formed to support favorable legislation to the iron and steel industry, notably in relation to import tariffs. The most prominent of these was the American Iron and Steel Association (AISA). Its secretary, James Swank, played an influential role in tariff legislation and coordinated with the heads of steel firms to lobby for favorable legislation on the industry's behalf. He also supported the federal government's efforts to track the growth of the industry. Every few years between 1880 and 1910, he created a directory of all iron and steel firms across the United States, as well as parts of Canada, entitled "Directory to the Iron and Steel Works of the United States." Around the time of Swank's death, the American Iron and Steel Institute (AISI) was found in the place of the AISA. Run by Judge Elbert Gary (of US Steel), the AISI continued to record iron and steel capacity at the firm level, but the structure of the bulletins changed drastically.

We digitize AISA directories for 1880, 1890, 1901, 1908, and an AISI directory for 1916. 1901 is the best available proxy for 1900; 1908 for 1910, and 1916 for 1920. To capture production capacity, we aggregate all iron and steel products produced at a furnace. As we show in our description of the data below, this data can be used to create county-level measures of steel industry concentration. To move from our furnace-level dataset to the firm-county level, we also combine different locations owned by the same firm in the same county.[1]

Our concentration measure is broad in that it aggregates across all products. In contrast, Orris Herfindahl's PhD dissertation uses AISA and AISI directories between 1898-1948 to consider concentration within each individual *product* market, e.g., steel ingots. Conversely, our measure of market concentration is most relevant for capturing how concentrated firm power, which could be employed in the political process, is in a given geographical location.

1880 DATA The 1880 directory is organized by state. We digitize the Blast Furnaces, Rolling Mills and Steel Works, Forges, and Bloomaries sections, although we exclude recently abandoned furnaces. Within each paragraph, we digitize the state, location (county or city), the furnace, and the firm. We then aggregate the capacity values among all products by firm in a given county. Where possible, we mark the original text, highlighting each capacity number in blue for convenient reference.

1890 DATA In 1890, the structure of the directory followed that of 1880. We digitize the Blast Furnaces, Rolling Mills and Steel Works, Forges, and Bloomaries sections, and we exclude recently abandoned furnaces. Within each paragraph, we digitize the state, location (city, county, or both), the furnace, and the firm. We then aggregate the capacity values among all products.

[1] To do so, we match strings perfectly for a firm to be qualified as one and the same. Herfindahl wrote his 1950 PhD dissertation on steel market concentration. Similarly, he looked into AISA and AISI directories, albeit over 4 to ten year intervals between 1898 and 1948. He writes "Since the data are presented on essentially an establishment basis, fortunately with the company name, scattered holdings had to be combined. *The extent of a company's holdings was determined by following decisions of the directory's compilers.* Cases of control by minority holdings seem to be few in number" (emphasis added).

Example Furnace Digitization, 1880

MASSACHUSETTS.

Bay State Iron Works, Bay State Iron Company, 2 Pemberton Square, Boston, Suffolk county. Puddle mill built in 1847; 16 double puddling furnaces and 2 trains of rolls. Rail mill built in 1847; 12 heating furnaces and 2 trains of rolls; annual capacity, 22,000 net tons of rails. Plate mill No. 1 built in 1863; 2 trains of rolls and 5 heating furnaces; product, tank plate and boiler tube and pipe strips; annual capacity, 6,000 net tons. Plate mill No. 2 built in 1873; 2 trains of rolls and 6 heating furnaces; product, homogeneous steel plates, flange, boiler, and tank plates; annual capacity, 6,900 net tons. One 6-gross-ton Siemens open-hearth steel furnace; annual capacity, 2,800 net tons of ingots. Brand of iron and steel plates made, "Bay State." J. Avery Richards, Treasurer and General Manager. The other officers are as follows: Charles O. Whitmore, President; F. Gorden Dexter, Silas H. Witherbee, Wm. P. Hunt, and T. K. Lothrop, Directors. *See New York Furnaces.*

Figure A.1: Example Furnace Digitization, 1880. Sourced from pg. 85 of the *Directory to the Iron and Steel Works of the United States, Corrected to March 15, 1880.*

1901 DATA By 1901, the structure of the directories changed to reflect the growing concentration in the industry.[2] We digitize both Part I, entitled "Chiefly Consolidations", and Part II, "By States and Districts." Part II tends to include independent firms, and refers the reader back to the "Chiefly Consolidations" section for large firms (essentially acting as a placeholder). For consistency, however, we still record these furnaces in the data frame, but their production is listed as NA. We then drop these NA values in the data-cleaning process.

1908 DATA The directory follows a similar structure in 1908. Large firms were placed at the top of the directory.

1916 DATA In 1916, the structure of the directory changed again following Swank's death and the establishment of the American Iron and Steel Institute (AISI).[3] According to the introduction of the 1916 directory, the authors had found that "The method of arrangement adopted in previous editions of the Directory, which had been found to be cumbersome, inconvenient, and productive of frequent duplications and repetitions, has been entirely discarded and the companies are treated in this issue in one alphabetic list." We record the alphabetic list, recording state, location, furnace, firm, and annual capacity.[4] Because of the new structure of the directory, it is not possible from the directory to determine whether

[2]Swank wrote in 1901 directory: "It will be seen that the arrangement of the new Directory differs in some material respects from that of its predecessors, but the innovations have all been rendered necessary by the radical changes that have taken place in the iron trade itself" (ix).

[3]Note, Swank died after AISI was started. The AISI began as a means to replace the vision of a staunchly protectionist AISA with a US Steel-led export system.

[4]Note that we automatically exclude firms/furnaces in Canada. One furnace at the Panama Canal is also immediately excluded (see pg. 248 of the 1916 Directory).

a furnace is a rolling mill or steel work and so this dataset cannot be used to calculate a concentration measure by furnace type in 1916.

UNITS IN IRON AND STEEL INDUSTRY The directories switch between recording entries primarily in net tons and gross tons. In 1880 and 1890, most entries are in net (or short) tons, equivalent to 2,000 pounds. Only two entries, both Carnegie operations, use gross tons at this point. Even when the term "tons" is used without specification, we assume in these years that the entries are in net tons, consistent with the summary statistics provided at the front of the directory. In the cases in which gross tons are used, we convert them by multiplying by the ratio of pounds in a gross ton (2240) to pounds in a net ton (2000) or 1.12:

$$X \text{ gross tons} \times 1.12 = X \text{ net tons} \tag{10}$$

However, in 1901, 1908, and 1916, there is an unstated trend towards more frequent use of gross tons, which equates to 2,240 pounds.[5] We assume for 1901, 1908, and 1916 that the term "tons" now means gross tons and convert these values as well as all explicit uses of gross tons to net tons using the formula above.

Note that changes in units across years will not affect our empirical estimates, in which measures of steel capacity and concentration are in logarithms and which include state-by-year fixed effects. A change in scales across years corresponds to an additive change in a logarithmic variable, which will be collinear with year or state-by-year fixed effects.

GEOCODING LOCATIONS In general, we prefer the structure of the earlier directories, as Swank listed county names more frequently than towns or cities. If given both county and city names in those years, we list the county name only and merge with 1890 shapefiles to harmonize the variables to 1890. In other instances, Swank only listed the town, city, or neighborhood. We therefore geocode these places using a Google API. This returns latitude/longitude coordinates which we merge to 1890 county shapefiles using the spatial join function in the `sf` package in R.

In a few cases, the directory lists furnaces located in different counties within the same paragraph. In these cases, we *equally* distribute the production capacity of a firm into the counties mentioned, adding an additional row for each county.

ADDITIONAL NOTES ON DIGITIZATION

Point 1. Building Furnaces If a furnace is not yet operational, we do not record its expected capacity. We want to capture the county-level capacity at a particular point in time.

[5]This is explicitly reflected in a 1900 Census Document: "In the census for 1870, 1880, and 1890, all quantities were reported in net tons of 2,000 pounds, but *as gross tons are now almost universally used in the iron and steel industry,* it has been deemed advisable to adopt this weight in the present report, changing, of course, from net to gross tons in every case the figures already printed for the three preceding censuses" (emphasis added) (see here).

Point 2: Idle Furnaces Similarly, we do not record the capacity of idle works. In some instances, Swank explicitly wrote that a furnace had been **idle or not in operation** for several years. In these instances, we record the furnace as "idle," so its *potential* capacity is not conflated with its realized capacity.

Point 3. "Product X or Product Y" In some cases throughout the directory, a given furnace seemingly must choose between producing x tons of one product or y tons of another. We find the midpoint of these two values.

Point 4. Kegs to Tons We convert kegs to net tons, such that 1 net ton is equal to 20 kegs.

Point 5. Non-ton/Non-keg Measurements Certain firms created iron and steel products, such as car wheels, tinplate boxes, bushels (often of charcoal), and turnbuckles, that are *not listed* by weight. In these instances, we note the existence of these other products as a comment but we are unable to include them in the overall capacity.

Point 6. Capacity Midpoint If a range of capacity is listed, we take the midpoint of the estimate. For example, if the annual capacity for a furnace is between 10,000-15,000, we record 12,500.

Point 7. Daily or Weekly Capacity In certain instances, Swank recorded daily or weekly capacity rather than annual. If daily capacity is recorded, we multiply it by 365 days. If weekly capacity is recorded, we multiply by 52 weeks. We assume that steel firms were operational all year round.[6]

Point 8. Inclusion of capacity "for own use." In several occasions throughout the directory, the authors will mark that a furnace or a firm is producing for its own use. We still record this capacity into the overall capacity of the firm. It seems that this amount can still be brought to market, should the firm choose.

Point 9. Furnace/Firm In certain cases, the directory does not list a furnace, so we only digitize the firm name and specify the furnace as missing. However, it is not always clear if a furnace-sounding name is in fact a company. For example, "La Belle Works" has no reference to a company, corporation, or partnership and sounds similar to many other furnaces from this period. We determine if a stand-alone paragraph is a firm by considering if it has a firm-like board structure.

[6]According to various sociological reports from the period, steel mills operated almost continuously: the work force would turnover at the 12-hour mark and this would be repeated seven days a week (Eggert, 1981). Most men worked the 12-hour shifts, with one 24-hour shift in a week (Brody, 1965). The text itself also reveals this pattern: in occasional instances, the author will write that a furnace takes Sunday off, as if this is a peculiarity.

Point 10. Exclusion of Transport and Natural Resource Companies, as well as By-Products By 1901, US Steel had purchased iron ore mines, coke ovens, coal mines, water companies, limestone companies, railroad companies, steamships to transfer ore, cement-producing firms, among other companies. The directory lists many of these companies, but we do not include them if they do not produce iron and steel products.

Furthermore, certain companies–particularly blast furnaces in the US South–produced coke as a by-product of their pig iron process. We do not count this in the overall capacity count, as it is not an iron and steel product. Finally, we do not include cement companies or production from "slag pits."

Point 11. Directory Addenda At the end of most furnace descriptions, Swank added an addendum that updated ownership of works and other details that were too late to be printed in its proper place.

In most cases, this is inconsequential. For the 1908 directory, it is quite important as it was only in the addenda that Swank recognized that the Tennessee Coal and Iron Company had been bought by US Steel in a major consolidation brought about by 1907 Bankers' Panic. We therefore change the corporate structure to reflect this.

CORPORATE STRUCTURE As we are constructing a firm-level by county dataset of concentration, we need to find a reliable way to ascertain the corporate structure of the industry.

The ownership of larger firms are easier to identify than smaller ones. We capture any subsidiary of US Steel (est. 1901) as belonging to the firm. In 1901 and 1908, the first few pages of the directory documents which firms belong to US Steel. In 1916, US Steel's subsidiaries do not appear until later (pg. 331).

In addition to in-text references to ownership, Swank often discussed major acquisitions or consolidations in his upfront commentary to each directory between 1880 and 1908. For example, Swank noted developments in both Chicago and the US South in the preface to the 1890 directory.

Dozens of time in each directory, a firm name might have a term "lessee" attached to it. We interpret the term lessee to be akin to leasing a property, where the lessor is the one who owns the property (like a landlord) and is leasing it out to the lessee, who pays to use the space (like a tenant). Often, it seems that a larger firm was renting out space from a smaller firm. We therefore include the count of the entry into the lessee's total capacity and not the lessor's. Based on this logic, in any instance in which we see a lessee, we replace that directory name with "Owner." For example, if the "Allentown Rolling Mill Company, lessees" is producing 5,000 tons of steel in 1880, we indicate that this capacity belongs to the "Allentown Rolling Mill Company."

A.3 *Validation Checks*

Using micro-census data, we examine the relationship between overall county capacity and steel employment across different decades. We consider steel employment in primary steel, i.e., only blast furnaces, steel works, and rolling mills. This corresponds with IPUMS classification 336.

The following table shows correlation coefficients and p-values for the correlation between steel employment and county capacity between 1880-1916. The extremely large correlations are reassuring, in that they suggest that our measure fairly comprehensively captures steel production. Production should be very strongly but not perfectly correlated with steel employment.

Year	Correlation Coefficient	P-Value
1880	0.9	0.000
1900	0.889	0.000
1908	0.93	0.000
1916	0.959	0.000

Table A.1: *Pearson Correlation, Steel Employment (Primary) and County Capacity.* Census steel employment is missing in 1890 due to the Census fire.

B SUPPORTING MATERIALS FOR MARKET POWER MEASURES

	Log. Avg Hours/Wk		*Labor Share*	
	(1)	(2)	(3)	(4)
Log 1880 Weighted HHI	0.387***	0.278*	−0.051**	−0.033**
	(0.115)	(0.145)	(0.020)	(0.015)
State FEs	✓	✓	✓	✓
Controls	–	✓	–	✓
N	186	186	144	144
R^2	0.428	0.444	0.202	0.258

This table shows regression estimates of log average hours worked per week in steel (1)-(2) and labor share (3)-(4) on *1880 Log Weighted HHI*. Labor share is calculated as the ratio of annual wages in steel to the overall product value in 1880. All regressions are subset to the Midwest/Northeast only. Data are normalized to 1890 county boundaries. Model (1) shows the base specification for the log average hours worked per week. Model (2) adds controls for length of rail in 1880, 1880 percent agriculture, and 1880 steel employment. Models (3)-(4) repeat with the labor share outcome. All models include state fixed effects and robust standard errors. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table B.1: Regression results show that 1880 *Log Weighted HHI* is associated with increased labor repression, including higher average number of weekly hours worked by steelworkers and a lower labor share.

C EVIDENCE FOR MESABI AS A DRIVER OF MARKET POWER

This appendix presents more evidence of the contribution of the Mesabi ore discovery to rising concentration in the steel industry and its spatial patterns.

To some extent, the steel industry globally in this period had many characteristics that push toward greater concentration in any industry. Production was characterized by large economies of scale making it hard for smaller firms to compete, and the capital requirements of the industry prevented new firms from entering markets. Technological innovation was rapid and firms with technological advantages and the ability to continue to innovate could further extend their market share and prevent the entry of new firms. Producing steel requires raw materials—iron ore, coal, and limestone—and distribution networks to transport these materials to furnaces. Control over raw materials and distribution networks allowed some firms an advantage that led to further concentration. These characteristics of iron and steel production in this period meant that increases in concentration were observed in many countries. The local incidence of concentration in any given country depended in large part on a combination of access to raw materials and transportation networks in addition to idiosyncratic patterns of innovation.

While all of these factors likely contributed to national and local trends in the United States (Mancke, 1972; Irwin, 2017), it is clear from the concentration data in Table 1 that these processes were rapidly accelerated in the 1890s and took place more in some parts of the country than others. The story of extreme concentration of market power in the United States is primarily one that takes place in this decade and in the upper Midwest states. Economic historians have pointed to the discovery of vast iron ore deposits in the Mesabi range in northeastern Minnesota as the cause of the industry's growth (Irwin, 2017; Allen, 1979). These deposits were cheap to mine due to their proximity to the surface and were of good quality for steel making. The first shipments from Mesabi were in 1892.[7] The domestic price of iron ore fell once Mesabi shipments hit the market, reducing input costs for producing finished iron and steel products (Irwin, 2017). The influx of cheap natural resources allowed American steel producers to compete with British steel producers for the first time: by 1900, the US produced 37 percent of the world's steel and became a major exporter.

There are strong theoretical reasons to think that this growth also led to concentration. Access to Mesabi decreased a firm's variable costs of production—as it could access cheaper ore—but increased its fixed costs, as the firm would need to set up infrastructure to access and use the new ore. Foundational models of market structure predict that markets with higher fixed relative to variable costs will have fewer firms and be more concentrated (see for instance Dixit and Stiglitz 1977). The logic for this result is that high fixed costs deter firms from entering, which reduces competition in the product and labor markets and creates rents for the firms that do enter that allow them to cover their fixed costs. Facing competition from low variable cost producers with access to Mesabi ore, firms unable to pay the fixed costs of accessing the new ore would leave the market.

The historical scholarship on the Mesabi discovery emphasizes that it was largely unexpected by the steel industry. Congressional testimony from the early 20th century indicates that the deposits were discovered by seven members of the Merritt family, who began investigating the region in the 1880s. The Minnesota Iron Company was convinced there were no profitable unexplored deposits in the area (de Kruif, 1929). Similarly, Andrew Carnegie, who eventually leased the ore deposits in the mid-1890s, initially had no intention of investing in the region (Nasaw, 2007, 514). This evidence suggests that the discovery of Mesabi was not

[7]See Figure C.1 for time-series evidence of the growth of Minnesota ore production.

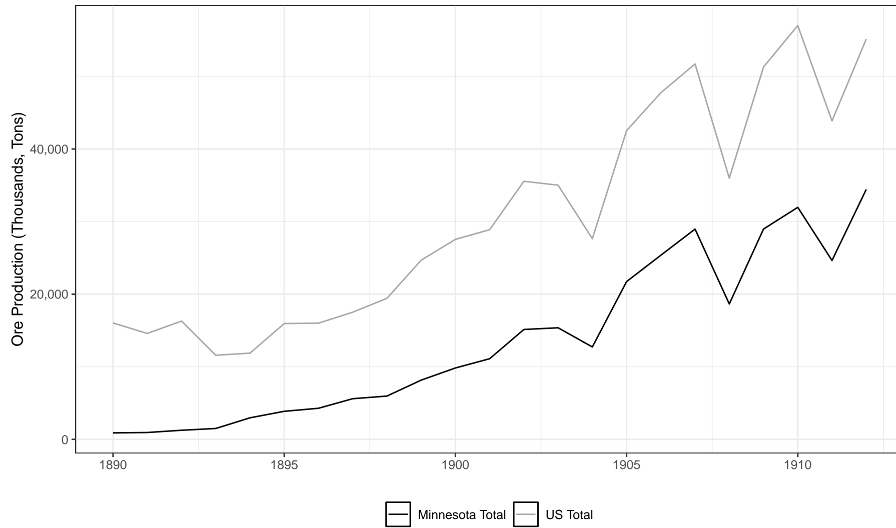

Figure C.1: *Minnesota & Total US Ore Production, 1890-1912.* Sourced pp. 156–162 from the 1912 Mineral Resources Report, courtesy of Hathitrust (Smith, 1913). Minnesota went from producing almost zero iron ore to constituting a large portion of US total ore production.

a byproduct of incentives to look for iron ore near already-growing steel-producing regions.

As evident in Table 1, the industry's consolidation started prior to the discovery of Mesabi. Notably, in 1889, Illinois Steel acquired North Chicago Rolling Mill, Union Steel, and Joliet Steel Works, integrating multiple aspects of the steel-making process in Chicago. That said Mesabi significantly accelerated consolidation as key industry players, including Andrew Carnegie and John D. Rockefeller, sought to exploit the range. Rockefeller's Lake Superior Consolidated Iron Mines, owned by Standard Oil, bought a vast portion of the range from the Merritt Brothers.[8] In 1896, he entered into a contract with Carnegie and his associate Henry Oliver, leasing them significant amounts of Mesabi iron ore for the next fifty years (Mancke 1972; Smith 1911; Nasaw 2007, 517). Carnegie finalized control over the supply chain for Carnegie Steel—stretching from the Great Lakes to Pittsburgh—in 1896-1897 (Hogan, 1971).[9] A later commission described Carnegie's exploitation of Mesabi ore and the advantage it gave him over competitors as:

> With rebates of approximately 50 per cent of the through rate from the Vermilion Range to Lake Superior, a 50-year contract with the Rockefeller interests, for an

[8]The Merritt brothers then accused Rockefeller of defrauding them, and the United States Circuit Court in 1895 awarded them close to 1 million dollars in damages. Two years later, however, the Merritt family signed a retraction of their charges of fraud, and the brothers were paid another half million by Rockefeller to drop the lawsuit (de Kruif, 1929).

[9]This was through the acquisition of the Pittsburgh, Shenango & Lake Erie Railroad, which was later reorganized under the name of the Pittsburgh, Bessemer, and Lake Erie (Hogan, 1971, 249). This railroad ran from Conneaut Harbor on Lake Erie to Pittsburgh; Carnegie considered persuading the government to finance a canal from the Great Lakes to Pittsburgh (Nasaw, 2007, 519). Carnegie speculated that "If we elect a Republican President, as I think we shall by an immense majority, it is probable that we shall get our bill through for a canal from Pittsburgh to Lake Erie" (Nasaw, 2007, p. 519).

> annual supply of 1,200,000 tons of Mesabi ore at a royalty of 25 cents per ton transported by his own steamship lines to Conneaut and thence to Pittsburgh via the Bessemer & Lake Erie Railroad (of which he had acquired control), Carnegie commanded facilities for assembling his raw materials which no competitor could hope to approach (Smith, 1911, 45).

Mesabi also encouraged other Midwestern steel firms to expand and merge. For example, in 1898, Federal Steel incorporated Illinois Steel and the Minnesota Iron Company (Hogan, 1971, 266). It also eventually added the Lorain Steel Company and the Johnson company (of Pennsylvania) to the holding company (Smith, 1911). The Federal Steel deal was financially backed by J.P. Morgan, and it integrated multiple aspects of the supply chain, including ore mining, railroad transportation, and steel production.

Around this time, additional firms integrated backward, creating tension among suppliers (Morris, 2006, 207). More specifically, the National Tube Company erected blast furnaces and mills to supply itself with steel billets rather than obtain them from the Carnegie Company. Carnegie responded in turn, announcing that his firm would establish a tube plant at the base of Lake Erie to compete with National Tube (Nasaw, 2007, 583).

This was considered a threat to other steel companies. The proposed solution was simply to buy out Carnegie (Smith, 1911). In turn, in 1901, four main groups assembled to form one syndicate, the US Steel Corporation.[10] This included: 1) The J.P. Morgan group, composed of Federal Steel, National Tube, American Bridge among others (Smith, 1911).[11] 2) The Moore group, including National Steel, American Tin Plate, American Sheet Steel, and the American Steel Hoop companies (Hogan, 1971, 284-296). 3) The Carnegie interests, including its access to iron ore in Minnesota.[12] 4) The Rockefeller interests, which involved only ore mining and transportation, as opposed to steel and iron production.[13] Morgan underwrote the transaction. The deal was massive, with US Steel's capitalization equivalent to approximately 6.8% of US GNP in 1901. The most important company going into the deal was still Carnegie's, for which US Steel paid $480 million (McCraw and Reinhardt, 1989, 593).

To empirically evaluate the importance of access to Mesabi ore for understanding the temporal and spatial variation of concentration in the steel industry in this period, we develop a measure of the proximity of all other US counties to Mesabi. We measure proximity to Mesabi as a function of the estimated cost of transporting iron ore from St. Louis County Minnesota, which contained the Mesabi range, to the centroid of every other county in the United States. We use the transportation network database developed by Donaldson and Hornbeck (2016) and expanded by Hornbeck and Rotemberg (2019), restricted to infrastructure present in 1880. The Donaldson-Hornbeck database provides information on the locations of transportation infrastructure, the cost of shipping goods along a stretch of infrastructure, and connections

[10] In addition, the American Steel and Wire Company was not closely affiliated with any of the above groups, but it was also controlled by US Steel (Smith, 1911).

[11] Federal Steel had already incorporated Illinois Steel in 1898, which had set off the industry consolidation (Warren, 2001, 11).

[12] By this time, one plant of Carnegie's–The Edgar Thomson Plant–was producing more rails than all of Chicago combined (Warren, 2001, 55).

[13] When Rockefeller and Carnegie made their deal regarding Mesabi ore, Rockefeller was required to pledge that he would stay out of the steel business (Nasaw, 2007, 517), but he eventually invested heavily in the Colorado region (Martelle, 2008, 36-37).

between types of infrastructure. Because that database was developed with reference to trade in agricultural goods, we modify a number of the costs based on historical scholarship from Kim (1999), mainly to reflect the importance of water transportation for shipments of iron ore (Table C.1).

Transport Mode	**Unit Cost (c/ton mi)**	**Source**	**Notes**
Rail	0.4	Kim (1999), Footnote 18	Kim takes from Warren (1987)
Lake	0.079	Kim (1999), Footnote 18	Kim takes from Warren (1987)
Nonlake water	0.43	Donaldson and Hornbeck (2016) p. 811-12, footnote 11	Donaldson and Hornbeck use estimates from Fogel (1962)
Wagon	23.1	Fogel (1962); Donaldson and Hornbeck (2016)	According to Fogel (1962), the cost of wagon transportation was in the neighborhood of twenty-five cents per ton-mile. Donaldson and Hornbeck (2016) adjust this slightly, using the cost of $16.5 c/mi and a 1.4x adjustment for crow-flies distance.
Transfer Fixed Cost	50c/ton	Donaldson and Hornbeck (2016) p. 811	Donaldson and Hornbeck (2016) mention a transfer fixed cost, which is approximated based on a decomposition of Fogel's railroad rate.

Table C.1: *Transport Network Assumptions.* Table reports assumptions for costs of transporting one ton of iron ore for one mile.

The relationship between transportation costs from Mesabi and the growth of steel production was nonlinear (see Figure C.2). Counties closer to Mesabi increased noticeably in steel employment, but this increase was driven by those closest to the discovery. This nonlinear relationship is what we would expect if it was only commercially viable to use Mesabi ore below a certain transportation cost threshold. Consequently, we define *Mesabi Proximity* to be equal to 1 for counties with low transportation costs of iron ore from Mesabi and 0 otherwise. To find a cutpoint c to identify low transportation cost counties, we consider every possible cutpoint between [15, 20] by an interval of 0.01. We optimize a regression specification that includes as its dependent variable the change in steel employment between 1880 and 1910. We include as regressors the discretized value of the transportation cost, percent steel employment in 1880, percent agriculture employment in 1880, and the length of rail in a county in 1880. We select the transportation cost cutoff that gives the highest R^2,

Change in Steel Employment vs. Transportation Costs, 1880–1910

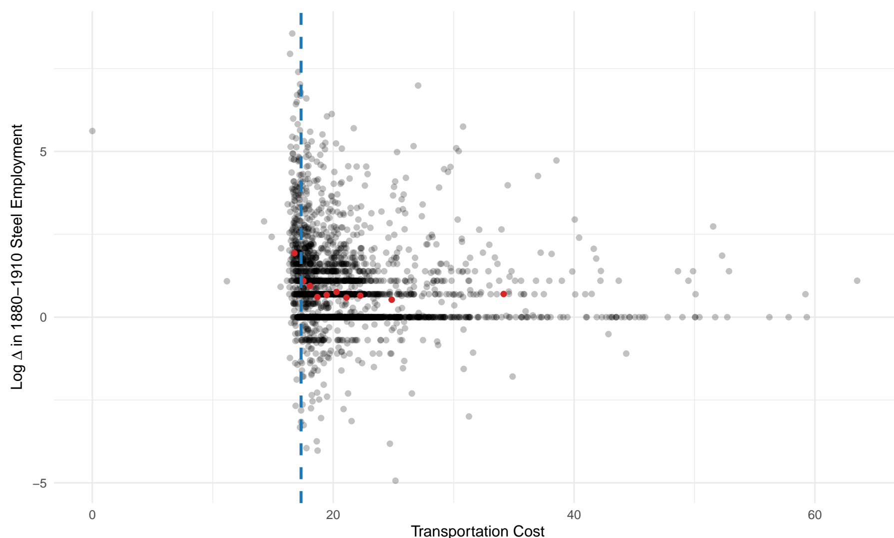

Figure C.2: *Change in Steel Employment vs. Transportation Costs, 1880–1910*. Figure depicts scatterplot of the log difference in steel employment at the county level, calculated as log(steel employment 1910 + 1) - log(steel employment 1880 + 1), against the transportation costs from Mesabi for one ton of iron ore. Red points depict the mean of each group bin, graphed with 10 bins. Blue line indicates cutpoint at 17.33.

and find that a value of c equal to 17.33 maximizes the variance explained.[14]

We estimate the effect of access to Mesabi on market power employing the following event study specification:

$$Y_{it} = \alpha_i + \beta_t \left(\textit{Mesabi Proximity}\right)_i \mathbf{1}\{t \neq \text{base}\} + \mathbf{x}_i' \gamma_t + \delta_{s(i)t} + \varepsilon_{it}$$

where Y_{it} is *Log Weighted HHI* or *US Steel Presence* for county i at year t, α_i is a county fixed effect, $(\textit{Mesabi Proximity})_i$ is the *Mesabi Proximity* variable, $\mathbf{1}\{t \neq \text{base}\}$ is an indicator function that takes a value of zero if the year is the base year 1890, one otherwise, $\mathbf{x}_i$ is a vector of pre-shock controls, $\delta_{s(i)t}$ is a state-by-year fixed effect, and ε_{it} is the error term. β_t gives the year specific effect of discrete proximity to Mesabi on the outcome Y_{it} relative to the base period. Our baseline specifications omit $\mathbf{x}_i$, the vector of pre-Mesabi discovery controls and our preferred specification includes them. We subset our regressions to the Northeast and Midwest regions, as defined by the US Census, in order to increase the comparability of counties with and without access to Mesabi. We cluster heteroskedasticity-robust standard errors at the county-level.

In our preferred specification, we include a vector $\mathbf{x}_i$ of pre-Mesabi discovery controls in order to allow for non-linear trends between counties in proximity to Mesabi and comparison counties. We add the length of rail within 40 miles of the county centroid in 1880 (in meters), the percent of employment in agriculture in 1880, and the percent of employment in the

[14]Figure C.3 shows the spatial distribution of *Mesabi Proximity*.

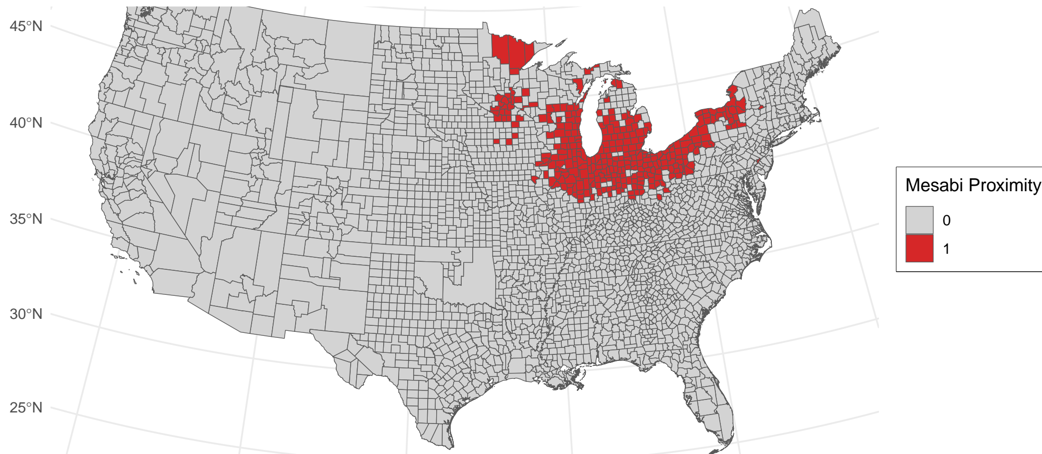

Figure C.3: *Spatial Distribution of Mesabi Proximity.* Figure plots the geographic distribution of *Mesabi Proximity* when transportation costs are dichotomized at cutpoint of 17.33 across all counties in the United States.

steel industry in 1880.[15] In addition, we incorporate a control for how central a county is in general. This addresses the concern raised by Borusyak and Hull (2023) that some places that are "close" to a particular place—in our case Mesabi—are central in general and therefore may have different trajectories for reasons other than being close to the place in question. To measure how central each county is in the 1880 transportation network, for each county we calculate the proportion of counties for which the transit cost is less than or equal to $ 17.33, the cutoff we use for the Mesabi proximity variable.

Figure C.4 reports our estimates of the effect of *Mesabi Proximity* on *Log Weighted HHI* and *US Steel Presence*.[16] In our preferred specification, we find that Mesabi's effect on *Weighted HHI* is large and statistically significant. By 1908, proximity to Mesabi, all else equal, increased *Weighted HHI* by 55.111%. We also find that counties proximate to Mesabi had an increased probability of having at least one US Steel furnace by 1908 of 8.02 percentage points. Taken together, this appendix has documented when and where steel industry concentration increased in the late 19th and early 20th century and provided evidence that the timing and location of these changes were shaped by the discovery of iron ore in the Mesabi range.

[15]The first is calculated using the `sf` package in R, the second using the Donaldson Hornbeck database, and the third and fourth using the IPUMS census microdata.

[16]To further validate the Mesabi proximity measure and our estimation strategy, Figure C.5 reports estimates of the impact of *Mesabi Proximity* on steel and manufacturing employment. As anticipated, there are large, statistically significant effects for *Mesabi Proximity* on these two outcomes.

Mesabi Proximity and Market Power in Steel Industry

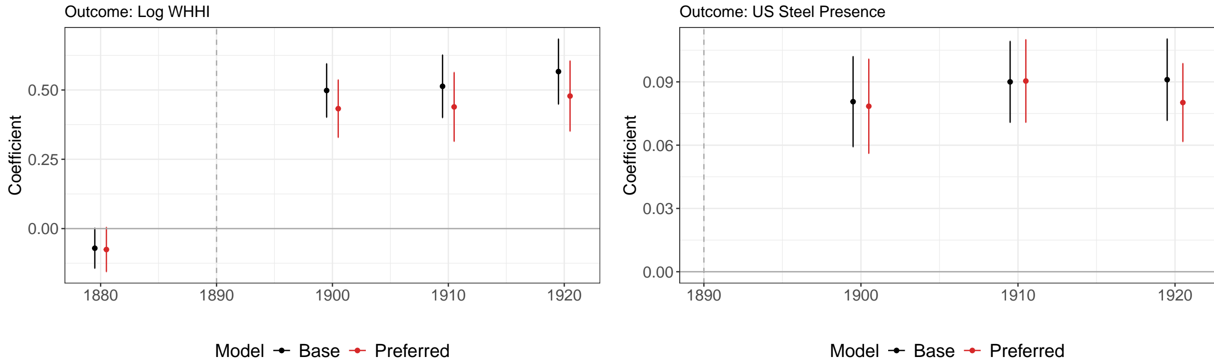

Figure C.4: *Mesabi Proximity and Market Power in Steel Industry*. Base year set to 1890. 1880 data is dropped for *US Steel Presence*. Regressions are subset to the Midwest/Northeast only. County and state-by-year FEs are included. Standard errors are clustered at county level.

Mesabi Proximity and Steel/Manufacturing Employment Growth

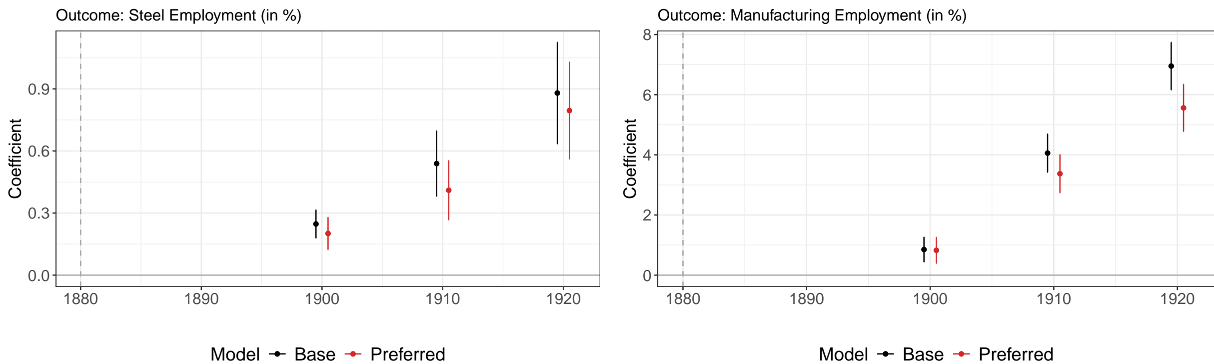

Figure C.5: *Mesabi Proximity and Steel/Manufacturing Employment Growth*. Base year set to 1880 as there is no Census data in 1890 because of a fire. Regressions subset to Midwest/Northeast. County and state-by-year FEs are included. Standard errors are clustered at the county level.

D SUPPORTING MATERIALS FOR MARKET POWER AND ELECTIONS

Party	No. Votes
Pres Bull Moose Vote	60,964
Pres Democratic Social Vote	9,607
Pres Farmer-Labor Vote	198,205.6
Pres Farmer-Worker Vote	3,108
Pres Greenback And Anti-Monopoly Vote	39,514.5
Pres Greenback Labor Vote	53,381.5
Pres Independent Vote	119,718
Pres Industrial Labor Vote	1,896.3
Pres Labor Vote	26,819
Pres National Labor Vote	4,226
Pres National Progressive Vote	599,386
Pres Progressive-Bull Moose-Roosevelt Vote	1,157.29
Pres Progressive For S J Vote	386,478
Pres Progressive Independent Vote	61,908
Pres Progressive Peoples Vote	4,244
Pres Progressive Republican Vote	57,225.9
Pres Progressive Vote	2,329,973
Pres Public Ownership Vote	51,174.9
Pres Roosevelt Progressive Vote	33,065
Pres Social Democrat Vote	194,535.3
Pres Socialist Labor Vote	205,004.7
Pres Socialist Vote	2,766,809
Pres Union Labor Vote	137,649.3
Pres United Labor Vote	1,020
Pres Washington Vote	350,865

Table D.1: *Final List of Leftist Presidential Parties, 1880-1920.* Using the political parties in Table **??**, we decide to include a party in the final list if it receives at least 1000 votes over the entire period. This table shows all the parties in the *Leftist Support* variable.

	Turnout %	
	(1)	(2)
Log Weighted HHI	-0.456^{***}	-0.428^{***}
	(0.120)	(0.120)
Controls	–	✓
County FEs	✓	✓
State-by-Year FEs	✓	✓
N	5976	5584
R^2	0.875	0.893

This table shows regression estimates of voter turnout on *Log Weighted HHI*. Voter turnout is measured in percent in presidential and all regressions are subset to the Midwest/Northeast only. The following electoral years are included: 1880, 1888 (for 1890), 1900, 1908 (for 1910), and 1920. Data are normalized to 1890 county boundaries. Model (1) shows the base specification. Model (2) adds controls for length of rail in 1880, 1880 percent agriculture, and 1880 percent steel employment, all interacted with year dummies. All models use state-by-year and county fixed effects. Robust standard errors are clustered at the county-level for all regressions. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.2: *Voter turnout results are robust to using the 1908 election and are thus not driven solely by the 1912 election.*

	Leftist (in %)				*Leftist (in %), Excl. Progress.*	
	(1)	(2)	(3)	(4)	(5)	(6)
Log Weighted HHI	0.219^{***}	0.152^{***}	0.464^{***}	0.393^{***}	0.315^{***}	0.241^{***}
	(0.048)	(0.043)	(0.099)	(0.094)	(0.060)	(0.055)
Controls	–	✓	–	✓	–	✓
County FEs	✓	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓	✓
Includes 1912?	–	–	✓	✓	✓	✓
N	5929	5562	5922	5562	5922	5562
R^2	0.640	0.665	0.930	0.925	0.659	0.684

This table shows estimates for regressions of *Leftist Support* on *Log Weighted HHI*. Columns (1)-(2) use 1908 in place of 1912 data. Columns (3)-(4) correspond to the main estimates using 1912. Columns (5)-(6) use 1912 but exclude the Progressive Party. For (1)-(2), data include 1880, 1888 (set to 1890), 1900, 1908 (set to 1910), and 1920. For (3)-(6), data include 1880, 1888 (set to 1890), 1900, 1912 (set to 1910), and 1920. Data are normalized to 1890. Model (1) shows the base specification for *Leftist Support* for panel with 1908. Model (2) adds controls for length of rail in 1880, 1880 percent agriculture, and 1880 steel employment, all interacted with year dummies. Model (3) shows the base specification for *Leftist Support* for panel with 1912. Model (4) adds same controls as (2). Model (5) shows the base specification for *Leftist Support, Excl. Progressives* for panel with 1912. Model (6) adds same controls as (2). All models include state-by-year and county fixed effects. Robust standard errors are at the county-level for all regressions. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.3: *Leftist results are robust to using 1908 election (i.e., they are not driven solely by the 1912 election), and when excluding the Progressive Party.*

	Turnout (%)				
	(1)	(2)	(3)	(4)	(5)
Log Weighted HHI $(t + 10)$	-0.315				
	(0.201)				
Log Weighted HHI $(t + 20)$		-0.144			
		(0.128)			
Log Weighted HHI			-0.279^{**}	-0.326^{**}	-0.337^{***}
			(0.131)	(0.128)	(0.126)
Period	1880–1890	1870–1890	1890–1920	1890–1920	1890–1920
1880–1890 turnout trends	–	–	–	✓	–
1870–1890 turnout trends	–	–	–	–	✓
Controls	✓	✓	✓	✓	✓
County FEs	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓
N	2207	3250	4496	4313	4123
R^2	0.883	0.828	0.916	0.928	0.928

This table examines whether the pre-1890 changes in turnout correlate with post-1890 changes in log *Weighted HHI* and whether the post-1890 effects of changing log *Weighted HHI* on turnout are robust to controlling for non-linear trends related to pre-1890 turnout. The dependent variable is presidential turnout. (1) subsets to the 1880 and 1888 elections and has as the independent variable the 10-year lead of log *Weighted HHI*, i.e. log *Weighted HHI* in 1890 and 1900. (2) subsets to the 1872, 1880, and 1888 elections and has as the independent variable the 20-year lead of log *Weighted HHI*, i.e. log *Weighted HHI* in 1890, 1900, and 1910. These models show that pre-1890 changes in turnout are moderately correlated with post-1890 changes in log *Weighted HHI*. Models (3)–(5) assess whether the post-1890 effects of log *Weighted HHI* on turnout are robust to flexibly adjusting for these pre-1890 trends. (3)–(5) subset to 1888, 1900, 1912, and 1920 and uses the correct-year value of log *Weighted HHI*. In addition to baseline controls, (4) controls for nonlinear trends related to the change in turnout between 1880 and 1890 by interacting that change in turnout with year fixed effects. (5) controls for nonlinear trends related to the change in turnout between 1870 and 1890. All models control for 1880 agricultural and steel employment interacted with year indicators and railroad length interacted with year indicators, with the same lead structure as for log *Weighted HHI*, and include county and state-year fixed effects, with standard errors clustered by county in parentheses. Data is subset to the Midwest and Northeast. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.4: *Adjusting for pre-1890 trends in turnout does not change post-1890 effects of log Weighted HHI in turnout.*

	Leftist (in %)				
	(1)	(2)	(3)	(4)	(5)
Log Weighted HHI $(t+10)$	−0.003	0.062			
	(0.041)	(0.040)			
Log Weighted HHI $(t+20)$			−0.013	0.003	
			(0.028)	(0.033)	
Log Weighted HHI					0.337***
					(0.112)
Period	1880–1890	1880–1890	1870–1890	1870–1890	1890–1920
Controls	–	✓	–	✓	✓
County FEs	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓
N	2149	2148	3143	2148	4534
R^2	0.847	0.850	0.777	0.850	0.928

This table examines whether post-1890 changes in log *Weighted HHI* correlate with pre-1890 changes in voting. The dependent variable is the share of the presidential vote won by leftist parties. (1) and (2) are subset to the 1880 and 1888 elections and have as the independent variable the 10-year lead of log *Weighted HHI*, i.e. log *Weighted HHI* in 1890 and 1900. (3) and (4) are subset to the 1872, 1880, and 1888 elections and have as the independent variable the 20-yearlead of log *Weighted HHI*, i.e. log *Weighted HHI* in 1890, 1900, and 1910. For reference and to place the coefficients on the lead variables into context, (5) subsets to 1888, 1900, 1912, and 1920 and uses the correct-year value of log *Weighted HHI*. Models (2), (4), and (5) control for 1880 agricultural and steel employment interacted with year indicators and railroad length interacted with year indicators, with the same lead structure as for log *Weighted HHI.* All models include county and state-year fixed effects and standard errors clustered by county in parentheses. Data is subset to the Midwest and Northeast. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.5: *Pre-1890 changes in leftist voting were orthogonal to post-1890 changes in steel concentration.*

	Turnout %		*Leftist %*		*Antitrust Mis.*		*Workplace Mis.*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mesabi × *1892*	−0.949*	−0.537	1.612***	2.027***	0.060	0.098*	0.145***	0.139**
	(0.522)	(0.558)	(0.334)	(0.320)	(0.050)	(0.056)	(0.055)	(0.064)
Controls	–	✓	–	✓	–	✓	–	✓
County FEs	✓	✓	✓	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
Num. obs.	5985	5584	5922	5562	4539	4418	4396	4276
R^2	0.879	0.890	0.930	0.926	0.564	0.557	0.577	0.550

This table reports regression estimates of presidential *Voter Turnout* in percent (columns 1–2), *Leftist Support* in percent (columns 3–4), *Antitrust Misalignment* (columns 5–6), and *Workplace Misalignment* (columns 7–8) on *Mesabi Proximity.* The regressions are restricted to counties in the Midwest and Northeast and use the electoral years 1880, 1888 (mapped to 1890), 1900, 1912 (mapped to 1910), and 1920, with data normalized to 1890 county boundaries. The misalignment regressions are estimated at the county-decade level in 1880, 1890, 1900, and 1910. These regressions are also subset to the Midwest/Northeast. Odd-numbered columns report baseline specifications. Even-numbered columns add controls for 1880 railroad length, 1880 percent agriculture, 1880 steel employment, and 1880 average proximity, each interacted with year fixed effects. All models include county fixed effects and state-by-year fixed effects. Robust standard errors are clustered at the county level. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.6: *Robustness to using Mesabi Proximity as an alternative measure.*

	Turnout %		*Leftist %*		*Antitrust Mis.*		*Workplace Mis.*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
US Steel	−1.858**	−1.541*	1.971***	1.348**	0.094	0.024	0.253***	0.216**
	(0.791)	(0.813)	(0.583)	(0.604)	(0.080)	(0.083)	(0.083)	(0.087)
Controls	–	✓	–	✓	–	✓	–	✓
County FEs	✓	✓	✓	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
Num. obs.	5985	5584	5922	5562	4539	4418	4396	4276
R^2	0.879	0.888	0.930	0.925	0.564	0.556	0.577	0.550

This table reports regression estimates of *Voter Turnout* in percent (columns 1–2), *Leftist Support* in percent (columns 3–4), *Antitrust Misalignment* (columns 5–6), and *Workplace Misalignment* (columns 7–8) on *US Steel Presence*. The regressions are restricted to counties in the Midwest and Northeast and use the electoral years 1880, 1888 (mapped to 1890), 1900, 1912 (mapped to 1910), and 1920, with data normalized to 1890 county boundaries. The misalignment regressions are estimated at the county-decade level in 1880, 1890, 1900, and 1910. These regressions are also subset to the Midwest/Northeast. Odd-numbered columns report baseline specifications. Even-numbered columns add controls for 1880 railroad length, 1880 percent agriculture, and 1880 steel employment, each interacted with year fixed effects All models include county fixed effects and state-by-year fixed effects. Robust standard errors are clustered at the county level. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.7: *Robustness to using US Steel Presence as an alternative measure.*

	Turnout %		*Leftist %*		*Antitrust Mis.*		*Workplace Mis.*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log HHI	−0.124***	−0.130***	0.102***	0.105***	0.010*	0.011**	0.001	0.001
	(0.045)	(0.045)	(0.036)	(0.035)	(0.006)	(0.006)	(0.007)	(0.007)
Controls	–	✓	–	✓	–	✓	–	✓
County FEs	✓	✓	✓	✓	✓	✓	✓	✓
State-by-Year FEs	✓	✓	✓	✓	✓	✓	✓	✓
Num. obs.	5985	5584	5922	5562	4539	4418	4396	4276
R^2	0.879	0.888	0.930	0.925	0.564	0.557	0.576	0.549

This table reports regression estimates of presidential *Voter Turnout* in percent (columns 1–2), *Leftist Support* in percent (columns 3–4), *Antitrust Misalignment* (columns 5–6), and *Workplace Misalignment* (columns 7–8) on *Log HHI*. The regressions are restricted to counties in the Midwest and Northeast and use the electoral years 1880, 1888 (mapped to 1890), 1900, 1912 (mapped to 1910), and 1920, with data normalized to 1890 county boundaries. The misalignment regressions are estimated at the county-decade level in 1880, 1890, 1900, and 1910. These regressions are also subset to the Midwest/Northeast. Odd-numbered columns report baseline specifications. Even-numbered columns add controls for 1880 railroad length, 1880 percent agriculture, and 1880 steel employment, each interacted with year fixed effects.All models include county fixed effects and state-by-year fixed effects. Robust standard errors are clustered at the county level. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.8: *Robustness to using Log HHI as an alternative measure.*

	Turnout (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log Weighted HHI	−0.451***	−0.427***	−0.321**	−0.280**	−0.276**	−0.284**
	(0.123)	(0.123)	(0.139)	(0.125)	(0.139)	(0.123)
Baseline controls	–	✓	✓	✓	✓	✓
Urban share	–	–	✓	–	–	–
Foreign-born share	–	–	–	✓	–	–
Log Manufacturing	–	–	–	–	✓	–
Log Population	–	–	–	–	–	✓
County and State-by-Year FEs	✓	✓	✓	✓	✓	✓
N	5985	5584	4465	4465	4465	5584
R^2	0.879	0.888	0.895	0.903	0.895	0.890

This table reports regression estimates of presidential *Voter Turnout* (in percent) on *Log Weighted HHI*. The sample is restricted to counties in the Midwest and Northeast, using electoral years 1880, 1888 (mapped to 1890), 1900, 1912 (mapped to 1910), and 1920, with data normalized to 1890 county boundaries. Column (1) reports the baseline specification. Column (2) adds controls for 1880 railroad length, percent agriculture, and steel employment, each interacted with year fixed effects. Columns (3)–(6) sequentially add time-varying controls for urbanization, foreign-born share, log manufacturing activity, and log population, respectively. For columns (3)-(5), sample size is reduced as there is no Census microdata for 1890. All models include county and state-by-year fixed effects. Standard errors are clustered at the county level. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.9: *Relationship between log Weighted HHI and Voter Turnout is robust to controlling for urbanization, immigration, population growth and manufacturing growth.*

	Leftist (%)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log Weighted HHI	0.464***	0.393***	0.325***	0.353***	0.257**	0.256***
	(0.099)	(0.094)	(0.108)	(0.109)	(0.106)	(0.090)
Baseline controls	–	✓	✓	✓	✓	✓
Urban share	–	–	✓	–	–	–
Foreign-born share	–	–	–	✓	–	–
Log Manufacturing	–	–	–	–	✓	–
Log Population	–	–	–	–	–	✓
County and State-by-Year FEs	✓	✓	✓	✓	✓	✓
N	5922	5562	4442	4442	4442	5562
R^2	0.930	0.925	0.933	0.932	0.933	0.927

This table reports regression estimates of presidential *Leftist Support* (in percent) on *Log Weighted HHI*. The sample is restricted to counties in the Midwest and Northeast, using electoral years 1880, 1888 (mapped to 1890), 1900, 1912 (mapped to 1910), and 1920, with data normalized to 1890 county boundaries. Column (1) reports the baseline specification. Column (2) adds controls for 1880 railroad length, percent agriculture, and steel employment, each interacted with year fixed effects. Columns (3)–(6) sequentially add time-varying controls for urbanization, foreign-born share, log manufacturing activity, and log population, respectively. For columns (3)-(5), sample size is reduced as there is no Census microdata for 1890. All models include county and state-by-year fixed effects. Standard errors are clustered at the county level. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

Table D.10: *Relationship between log Weighted HHI and Leftist Support is robust to controlling for urbanization, immigration, population growth and manufacturing growth.*

E MODEL EXTENSIONS

E.1 *Proof of Lemma 1*

Suppose towards a contradiction that w'_j and r'_j maximize P_j and that w'_j does not maximize p_j. Write p'_j as the pre-tax profits from choosing wages w'_j, and σ' as the probability of the left winning given j choosing w'_j and r'_j. Then there exists a wage w^*_j other than w'_j that would give profits $p^*_j > p'_j$. Firm j can then choose wage w^*_j to make profit p^*_j, and increase repression to $r^*_j := r'_j + p^*_j - p'_j$, giving a probability of the left winning σ^*. Inserting profits and repression into (2), we have

$$\sigma^* - \sigma' = \frac{\varphi}{\bar{L}}\left(p^*_j - p'_j - (\beta+1)\left(p^*_j - p'_j\right)\right) = -\frac{\varphi\beta}{\bar{L}}\left(p^*_j - p'_j\right) < 0.$$

Recalling that $P_j = (p_j - r_j)(1-\sigma)$, we have that

$$(p'_j - r'_j)(1-\sigma') < (p^*_j - r^*_j)(1-\sigma^*),$$

and so choosing $\{w^*_j, r^*_j\}$ leads to greater expected post-tax profits than $\{w'_j, r'_j\}$, a contradiction.

E.2 *Alternative Sources of Market Power*

In the main version of the model, market power takes the form of labor market monopsony. The labor market is the most plausible arena for market power in our empirical context, steel towns in the US in the late 19th and early 20th century. Labor market monopsony may also be especially relevant for politics because it touches on fairness concerns. Pigou (1932) referred to "an attempt to pay the workpeople less than their marginal worth," that is, the wedge between workers' marginal products and their wages—represented by $\frac{\bar{p}}{\bar{L}}$ in our model—as "exploitation."

However, the results in our model do not rely on this particular form of market power. Market power in the product market could generate the same predictions about repression. This section sets out an alternative model of the economy in which differentiation in the product market generates the same expressions linking concentration to firm profits.

There are N firms, each of which produces a differentiated good using labor with constant returns to scale technology z. A firm j that employs L_j workers produces $q_j := zL_j$ units of output. Suppose now that the labor market is perfectly competitive: firms can hire labor at wage w. The cost of producing q_j units of output is then $\frac{q_j w}{z_j}$. Firms set prices b_j. A mass of $\bar{L}$ consumers each buys one product. Consumers have heterogeneous preferences across varieties but dislike paying high prices. The utility consumer i gets from buying one unit of the good produced by firm j is

$$u_{ij} := -\alpha b_j + \xi_{ij}$$

where ξ_{ij} is drawn iid from a type I extreme value distribution. Here α represents how sensitive

consumers' purchase decisions are to prices. Sales of j's good are then

$$q_j = \frac{e^{-\alpha b_j}}{\sum_{k=1}^{N} e^{-\alpha b_k}} \bar{L} = s_j \bar{L}$$

where s_j now represents j's share of the product market. Firms set prices to maximize profits:

$$\max_{b_j} p_j = q_j \left(b_j - \frac{w}{z} \right)$$

Rearranging the firm's first order condition gives

$$b_j = \frac{1}{\alpha(1 - s_j)} + \frac{w}{z}$$

With differentiated demand on the consumer side of the market we get the same expression as the wage markdown in (3), $\frac{1}{\alpha(1-s_j)}$, which instead represents a markup over marginal cost. Substituting in $q_j = \bar{L} s_j$ we get

$$p_j = q_j \left(b_j - \frac{w}{z} \right) = \frac{\bar{L} s_j}{\alpha(1 - s_j)}$$

which is the same expression for profits as Equation (4). Inserting $s_j = \frac{1}{N}$ then reproduces the expressions for individual and collective profits in Equation (5). The other results in the paper can all also follow from this alternative foundation of market power.

E.3 *Alternative Forms of Influence*

This section considers an alternative model of the policy process based around firm influence over politicians, not electoral politics, that generates an identical expression for σ.

The policy t is chosen by an incumbent politician. The politician decides whether to implement the left-wing policy ($t_l = 1$) or the conservative policy ($t_c = 0$), factoring in both voter welfare under the two policies, contributions from firms, and his own idiosyncratic preferences. The utility the politician receives from implementing the policies are

$$v_l = t_l \bar{p} + \psi \bar{L} + \eta, \; v_c := t_c \bar{p} + (\beta + 1)\bar{r}.$$

Here the $t\bar{p}$ terms capture the welfare of voters—$\bar{L}$ voters each receive $\frac{t\bar{p}}{\bar{L}}$ in transfers. The $\beta\bar{r}$ term represents the value to the politician from contributions made to him by firms, conditional on him not implementing the leftist policy. Instead of $\bar{r}$ measuring repression, here it measures contributions. Instead of $(\beta + 1)$ scaling how responsive voters are to repression, it scales how much weight the politician places on contributions. The ψ term here scales the politician's unmodeled preference for leftist policies. We arbitrarily scale ψ here by $\bar{L}$. The η term captures uncertainty—from the perspective of the firms—about the politician's policy preferences. We assume $\eta \sim U \left[-\frac{\bar{L}}{2\varphi}, \frac{\bar{L}}{2\varphi} \right]$. Firms promise contributions conditional on the policy being implemented, not knowing the value of η. If the left-wing policy is implemented, firms payoffs are zero because profits are taxed. If the conservative policy is implemented,

firms keep their profits but have to make good on their promised contributions, receiving payoffs $p_j - r_j$.

The probability the politician implements the leftist policy is

$$\sigma = \frac{1}{2} + \varphi \left(\frac{\bar{p} - (\beta + 1)\bar{r}}{\bar{L}} + \psi \right).$$

This expression is identical to Equation (2), and so other results that depend on Equation (2) are consistent with this alternative model of politics. In particular, results linking concentration to greater repression can also be interpreted as linking concentration to stronger influence over politicians by legislators, which serves to distort policy away from the preferences of voters.

E.4 *Endogenizing the Number of Firms*

Our analysis thus far treats the number of firms (N) as the main exogenous variable. A natural question is whether we can use this setup to understand the effects of developments like the Mesabi discovery. This section extends the model to endogenize the number of firms and explore how changing fixed costs of production influence political outcomes.

Suppose that there are many potential entrants. To enter, a firm must pay a fixed cost f. After being paid, this fixed cost is sunk, and it is not tax-deductible. It does not feature in the firm's subsequent optimization decisions. If a potential entrant does not enter, it receives a payoff of zero. Firms enter until the payoff from entering—expected realized profits net of repression, minus the fixed cost—equals the payoff from not entering: $P_j - f = 0$.

Remark 1. *If the number of firms is pinned down by free entry and fixed costs of production f, increasing fixed costs increases concentration $\frac{\partial HHI}{\partial f} > 0$.*

Proof. Differentiating $P_j - f = 0$ with respect to f gives

$$\frac{\partial P_j}{\partial f} = \frac{\partial P_j}{\partial N} \frac{\partial N}{\partial f} = 1$$

This expression allows us to sign $\frac{\partial N}{\partial f}$. Raising the cost of entering must also raise the payoff firms receive conditional on entering. Thus if increasing the number of firms decreases payoffs conditional on entry, then raising fixed costs must decrease the number of firms that enter. We therefore want to show that $\frac{\partial P_j}{\partial N} < 0$.

Recall that $P_j = (p_j - r_j)(1 - \sigma)$. From Proposition 3 we have that $\frac{\partial(1-\sigma)}{\partial N} < 0$.

Rearranging Equation (7) gives

$$p_j - r_j = \frac{1}{\beta + 1} \left((\beta + 1)\bar{r} - \bar{p} + \bar{L} \left(\frac{1}{2\varphi} - \psi \right) \right).$$

Differentiating both sides with respect to N indicates that the sign of $\frac{\partial(p_j - r_j)}{\partial N}$ is the same as the sign of $\frac{\partial((\beta+1)\bar{r} - \bar{p})}{\partial N}$. As $((\beta + 1)\bar{r} - \bar{p})$ is the only component of $(1 - \sigma)$ that changes with N, the sign of $\frac{\partial(p_j - r_j)}{\partial N}$ is the same as the sign of $\frac{\partial(1-\sigma)}{\partial N}$. As both $(p_j - r_j)$ and $(1 - \sigma)$ are positive and decreasing in N, $\frac{\partial(p_j - r_j)(1-\sigma)}{\partial N} < 0$ and so $\frac{\partial N}{\partial f} < 0$.

■

The Mesabi discovery—among other things—raised fixed costs of production. Firms that wanted to use cheaper Mesabi ore needed to invest in new plant and infrastructure. The prediction from this remark is that raising fixed costs should increase firm concentration, and so also increase repression and misalignment.

E.5 *Firm Heterogeneity*

In the main version of the model, all firms have the same productivity, z. Here we discuss how our results are robust to allowing for firm heterogeneity in productivity. If firms differ in z, so firm j has productivity z_j, then Equation (4) is unchanged, but labor market shares s_j differ across firms. Total profits are then

$$\bar{p} = \sum_{j=1}^{N} p_j = \frac{\bar{L}}{\alpha} \sum_{j=1}^{N} \frac{s_j}{1 - s_j}.$$

This summation is similar to HHI. Both are weighted sums of a variable positively correlated with market share—$\frac{1}{1-s_j}$ in the case of this measure, s_j itself in the case of HHI—weighted by market share (s_j). The other two propositions are expressed in terms of total profits ($\bar{p}$) and the number of firms (N). With heterogeneous-sized firms, concentration is an equilibrium object, not a primitive of the model. Thus it makes more sense to speak of a change in fundamentals—productivities (z_j) and the number of firms (N)—that increases concentration. Provided such a hypothesized change increased $\sum_{j=1}^{N} \frac{s_j}{1-s_j}$ or decreased N, it would also generate the results in Propositions 2 and 3. The proofs of Propositions 2 and 3 only rely on profits increasing in concentration and concentration decreasing in the number of firms, not on the assumption that firms have equal technology.