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Railroads and the Silver Shoes of Populism: The Rise and Fall of the People's Party in 19th-Century America*

Massimo Anelli,[†] Massimo Morelli[‡] and Marvin Pappalettera[§]

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Abstract

The People's Party is the only major populist movement in American history that was quickly reabsorbed by mainstream parties. We study the main trigger of its rise—technological disruption from railroad expansion—and discuss its dissolution in light of the conceptual framework we develop and test empirically. We construct a novel county-level measure of *Technological Disruption Exposure* (TDE) that captures the change in competitive pressure each county faced from all other counties, driven by railroad-induced reductions in transportation costs between 1870 and 1890. TDE positively predicts People's Party vote share in the 1894 congressional elections: a one standard deviation increase raises Populist support by nearly 3 percentage points. Heterogeneity analysis shows that the effect is concentrated in counties with high crop specialization—where competitive vulnerability translates into concentrated losses. A commitment-politics framework organizes these patterns: railroads reduced the probability of being a market winner in high-TDE counties, where voters shifted from discretionary to commitment politicians. The 1890s episode is uniquely informative because, unlike today, there was fiscal and institutional room to rebuild trust: mainstream parties credibly adopted Populist demands, and the movement dissolved. Today those conditions do not hold—which may explain why modern populism has proven more persistent.

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[†]Bocconi University dept of Social and Political Science.

[‡]Bocconi University dept of Economics, LISER and CEPR.

[§]University of Zurich.

1. Introduction

In L. Frank Baum's *The Wonderful Wizard of Oz* (1900), Dorothy's silver shoes carry her down a yellow brick road through a landscape of dispossessed farmers, displaced industrial workers, and a cowardly political leader. As Littlefield (1964) first argued and Rockoff (1990) formalized, the story is a monetary allegory for the Populist movement of the 1890s: the scarecrow is the American farmer, the tin man the industrial laborer, the cowardly lion is William Jennings Bryan, the champion of free silver who ran for president on both the Democratic and Populist tickets, and the silver shoes represent the free-silver platform that promised relief from deflation. The allegory endures because the forces that gave rise to Populism have recurred throughout American history: technological transformation reshaping markets, creating winners and losers, and generating demands for protection. The railroads were the general-purpose technology of the nineteenth century. Today, automation and artificial intelligence play an analogous role. In both eras, structural economic change raises the same political question: what happens when large groups of citizens find themselves on the losing side of progress?

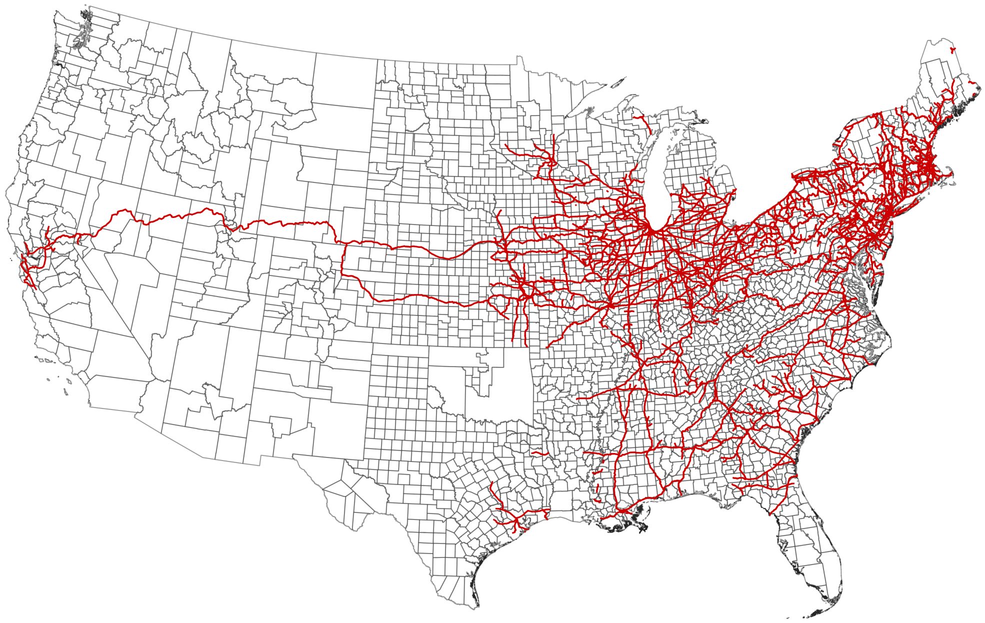
The People's Party is the only major populist movement in American history that was fully reabsorbed by the mainstream. By 1900 it had effectively dissolved, its core demands—free silver, railroad regulation, a graduated income tax, direct election of senators—adopted by the Democratic Party and eventually enacted into law. The rise of populism in the 1890s looks strikingly similar to today's: a technological shock created distributional losers who turned to commitment politicians promising simple, verifiable changes. But the outcome was different. The nineteenth-century United States had room to raise institutional trust—the belief that losers would be compensated—because no federal income tax yet existed, public debt was low, and the fiscal space for inclusive redistribution was large. Today those conditions do not hold. This paper studies how technological disruption from railroad expansion has fueled populism in the 1890s. This historical period is uniquely interesting and informative because it is the only case where we observe the full populism cycle, from onset through reabsorption. We discuss the conditions that made resolution possible in light of the conceptual framework we develop and test empirically, allowing us to discuss what determines whether populism persists or dissolves.

The U.S. railroad network grew from roughly 9,000 miles in 1850 to over 160,000 miles by 1890 (Figure 1), dramatically reducing transportation costs and integrating previously isolated local economies into a national market. This integration was not uniformly beneficial. Some counties benefited from expanded market access; others faced intensified competitive pressure from more productive regions, resulting in falling prices and declining profitability. The resulting farm unrest followed a clear organizational trajectory—from the Grange movement of the 1860s, to the Greenback Party, to the Farmers' Alliance, and finally to the People's Party, which secured roughly 10% of the national vote in the 1894 congressional elections (Hicks, 1931).

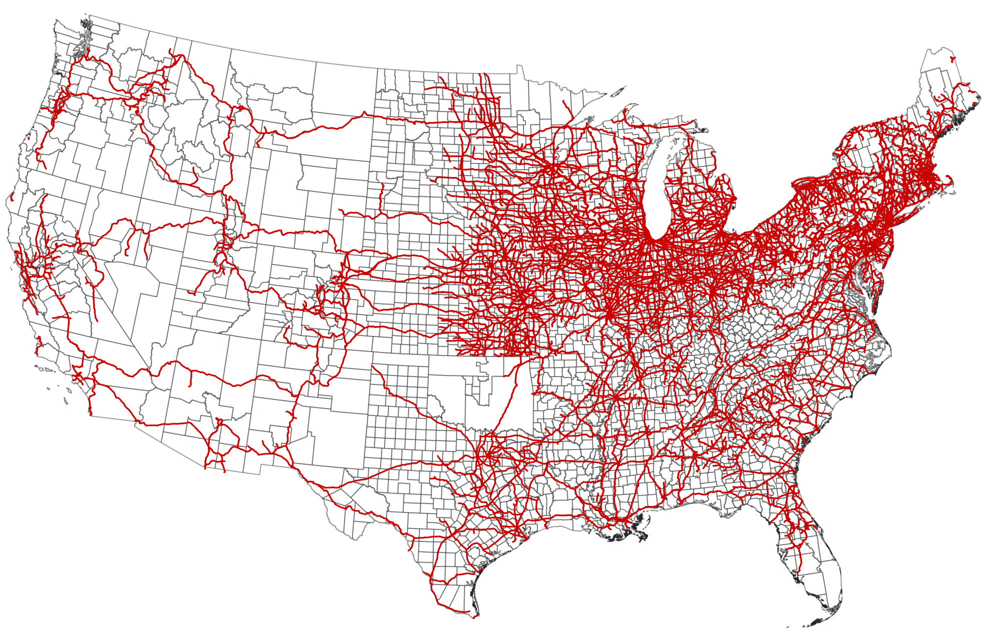
The economic history of railroads has focused on aggregate effects. Fogel (1964) estimated that railroads accounted for roughly 2.7% of GNP. Donaldson and Hornbeck (2016) overturned this consensus with a market-access framework showing that removing all railroads would have decreased agricultural land values by 60%. Subsequent work has shown that output gains came from additional resources rather than Ricardian comparative ad-

Figure 1: Evolution of the railroad network, 1870-1890.

(a) 1870



(b) 1890



vantage (Chan, 2022), that railroads generated indirect manufacturing productivity gains (Hornbeck and Rotemberg, 2024), and that railroad expansion increased wealth inequality, with financial development partially mitigating this effect (Chaudhary, 2024). But even the scant work focusing on distributional effect in this railroad expansion literature stops at economic outcomes. We contribute to this literature by identifying for the first time the distributional effects of railroad technology on *political* outcomes.

A large modern literature documents how structural shocks generate populist politics: the China trade shock increased political polarization (Autor et al., 2020), exposure to industrial robots predicted the Trump vote (Frey et al., 2018), individual vulnerability to automation increases support for the radical right in Europe (Anelli et al., 2021), and import competition contributed to the Brexit vote (Colantone and Stanig, 2018). Guriev and Papaioannou (2022) survey this evidence comprehensively. (Bellodi et al., 2025) and Guiso et al. (2026) develop a framework in which voters shift from discretionary to commitment politicians and demand commitment to drastic reforms when two conditions materialize : the probability of being a market winner falls, and trust that institutions will compensate losers is low. All of these studies focus only on the onset of populism. Our unique leverage is that the 1890s episode lets us study not just how a technological shock triggers populism, but why this particular episode proved transitory—because the institutional environment allowed trust to be rebuilt.

To quantify how railroads created distributional losers, we construct a novel county-level measure of *Technological Disruption Exposure* (TDE, denoted ΔT_d). The measure captures the change in competitive pressure a county faces from all other counties, driven solely by the reduction in transportation costs between 1870 and 1890. It builds on network centrality in a county-to-county iceberg-cost network (Eaton and Kortum, 2002), weighted by crop productivity. Only transport costs change between the 1870 and 1890 networks; all other county characteristics are held at 1870 values, so TDE isolates the competitive shock attributable to railroad expansion rather than to concurrent endogenous changes in the agricultural economy.

We find that TDE positively predicts People's Party vote share in the 1894 congressional elections. The key result emerges when we control for the change in market access (ΔMA, constructed following Donaldson and Hornbeck, 2016): the TDE coefficient strengthens and the market-access effect turns negative. A parallel literature frames railroads through the lens of globalization and market access—Scheve and Serlin (2024) link railroad-driven port access to protectionist voting, Klein et al. (2023) correlate populist support with farm-gate price gaps, and Han and Milner (2024) find a positive association between port-based market access and populist vote share. Our results suggest that these regressions confound the aggregate benefit of market integration with the distributional harm from technological disruption. It is the competitive displacement from internal transportation improvements, not international market exposure, that appears to drive populist voting.

A commitment-politics framework organizes our heterogeneity results. The TDE effect is concentrated in counties with high crop specialization, where the competitive shock translates into concentrated losses and in counties highly dependent on agricultural production. In such contexts, voters' demand of protection reform commitments is highest.

The 1890s episode is uniquely informative because we observe the full populism cycle. The rise mirrors today's pattern—a technological shock creating distributional losers who turn to commitment politicians. But unlike today, there was fiscal and institutional room to rebuild trust: mainstream parties adopted populist demands, gold discoveries eased deflation, and durable institutional reforms followed. Today, when institutional capacity is structurally constrained by high debt and taxes near the top of the Laffer curve, inclusive commitments lose credibility and exclusionary alternatives dominate—which may explain why modern populism has proven more persistent and more right-leaning than its nineteenth-century predecessor. The remainder of the paper proceeds as follows. Section 2 describes the historical background. Section 3 presents the empirical setting, including the construction of TDE and the data. Section 4 reports the main results. Section 5 introduces the conceptual framework. Section 6 presents heterogeneity analysis. Section 7 examines why populism was reabsorbed. Section 8 concludes. Appendix A reports additional robustness checks.

2. Historical Background

In the decades following the Civil War, American farmers perceived their political and economic standing as being in sharp decline (Hicks, 1931). Their grievances coalesced around four complaints: falling farm prices, monopolistic railroads and grain elevators charging unfair rates, excessively high interest rates, and the growing political influence of railroads, big business, and moneylenders. These complaints gave rise to a sequence of organized movements that grew steadily in ambition and scale, culminating in the formation of the People's Party and one of the most significant third-party challenges in American political history.

The first major organizational response came in the 1860s with the Grange, or Patrons of Husbandry, which focused on farmers' grievances against railroads and promoted cooperation in business dealings. The Greenback Party followed in the 1870s, with a more pointed political agenda centered on expanding the money supply and lowering credit costs.[1] The Farmers' Alliance emerged in the 1880s, organizing cooperative marketing efforts and lobbying for regulation of business and banking. Each movement built on the last, broadening the base and sharpening the demands. By 1891, these efforts gave birth to the People's Party, formed explicitly to challenge the dominance of both Republicans and Democrats.

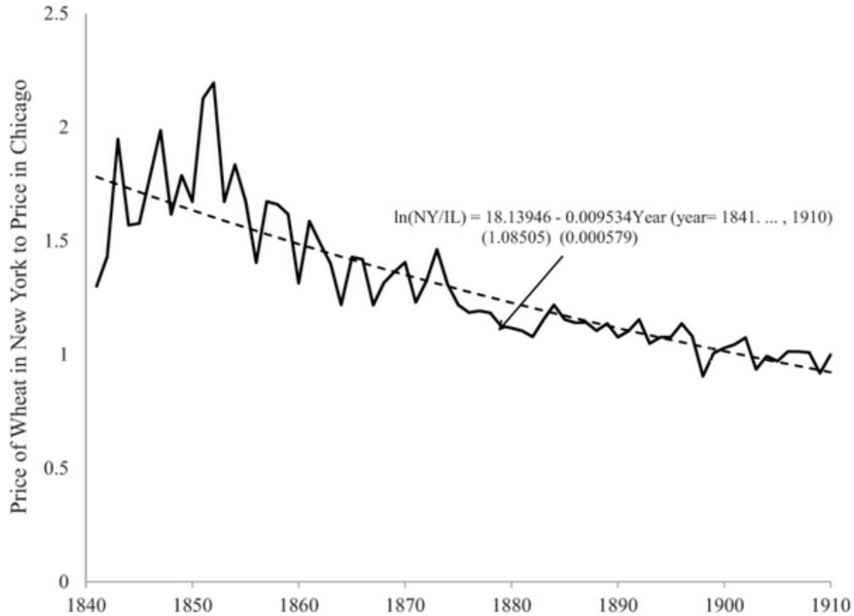
The growth of the American railroad network was staggering. The country had 9,021 miles of track in 1850; by 1890, it had 163,597 (Carter et al., 2006). Figure 1 illustrates this transformation. Railroads opened the settlement of millions of acres, created long-distance outlets for wheat and other crops, and enabled wholesalers to ship consumer products from Eastern factories to merchants across the country. Before the railroads, areas more than 40 miles from a waterway faced wagon transportation costs that could be prohibitively expensive (Donaldson and Hornbeck, 2016). The railroad changed this dramatically.

The consequences for agriculture were profound. In 1850, farming was concentrated along the East Coast. By 1920, it had shifted decisively to the Midwest, and many Eastern farms had been abandoned entirely. Commercial farming became both more feasible and more profitable, but it also meant that the self-sufficient farmer of the antebellum period was gone. A Minnesota farmer captured the shift in 1879:

> "Fifty years ago, almost everything consumed in a farmer's family was produced

[1] During the Civil War, the Union had abandoned bimetallism in favor of "greenbacks"—unbacked fiat currency. In 1873, Congress adopted the gold standard, a deflationary policy that raised the real burden of farmers' debts.

Figure 2: Price convergence: ratio of New York to Chicago wheat prices, 1841–1910.



> on his own farm or produced under his own roof. [. . .] A farmer's trade with the outside world was very limited. All this changed now, the farmer has become a purchaser—buys all that he wears, buys much that he eats, buys often times his fuel and lights."
> —*Minnesota Farmer*, June 1879 (from Rome, 1982)

Historians have labeled this transformation "commercialization" (Mayhew, 1972; Rome, 1982). Railroads improved interconnection across local markets substantially and very quickly. Isolated communities found themselves suddenly integrated with distant markets. Business operations now depended on railroad pricing, grain elevator fees, creditors, merchants, and price movements in far-off cities. As Eichengreen (2018) puts it, "commercialization [. . .] created a heightened sense of insecurity by exposing farmers and others to market forces beyond their control."

The price data confirm the scale of market integration. Figure 2 plots the ratio of wheat prices in New York to those in Chicago between 1841 and 1910. Early in the period, the ratio exceeded 2, reflecting the high cost of overland transport. As the railroad network expanded, the gap narrowed steadily, converging toward parity by the turn of the century (Atack, 2013).

The People's Party articulated its vision most clearly at its 1892 convention in Omaha, Nebraska. The choice of venue was laden with symbolism, whether intended or not. Omaha was the headquarters of the Union Pacific Railroad and the eastern terminus of the first transcontinental line, completed in 1869. By the 1890s it was one of the largest railroad centers in the country, served by every major carrier. It was in this city—the nerve center of the industry the Populists held most responsible for their plight—that the party adopted its call for government ownership of railroads. The convention was held on July 4, deliberately framed as a "second Declaration of Independence" from corporate tyranny.[2] The platform framed American politics as a contest between "the plain people" and an elite of financiers, railroad barons, and industrialists. Its preamble stated the party's aim "to restore the government of the Republic to the hands of 'the plain people'." On railroads, the language was blunt: "the railroad corporations will either own the people or the people must own the railroads." The platform called for a national currency "issued by the general government only. . . without the use of banking corporations," the "free and unlimited coinage of silver and gold" at a ratio of 16 to 1, and an expansion of the circulating medium to "not less than $50 per capita." Beyond monetary policy, it demanded a graduated income tax, public ownership of utilities, the secret ballot, direct election of Senators, initiative and referendum introduction.

In the 1892 presidential election, People's Party candidate James B. Weaver received more than one million votes (8.5% of the total) and won 22 electoral votes (Hicks, 1931). The party continued to grow. In the 1894 congressional elections, it reached its highest level of support, with roughly 10% of the national vote. These 1894 elections, which took place after the full expansion of the railroad network and in the midst of a severe economic depression, are the focus of our empirical analysis.

3. Empirical Setting

To evaluate the causal impact of railroad-driven competitive displacement on populist voting, we need a county-level measure of the competitive pressure each county faced from all other counties due to the expansion of the railroad network. Our approach models counties as nodes in a directed network, where edge weights depend on transport costs, competitive vulnerability, and production capacity. By substituting 1890 transport costs into the network while holding all other variables at their 1870 values, we construct a measure—Technological Disruption Exposure (TDE)—that captures how much the reduction in transport costs between 1870 and 1890 increased the competitive pressure each county faces.

The measure builds up in four layers, each taken from the perspective of the destination county d—the county under threat:

1. **Competitive vulnerability** (a_{oj}/a_{dj}): county d's productivity disadvantage relative to county o in crop j. The larger the ratio, the more easily o can undercut d.

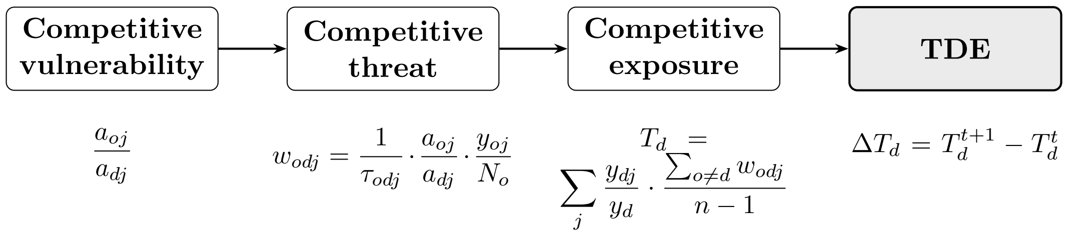
2. **Competitive threat** (w_{odj}): how effectively o can displace d, combining d's vulnerability with transport costs and o's production capacity.

3. **Competitive exposure** (T_d): the total threat d faces from all other counties, aggregated across origins and crops.

4. **Technological Disruption Exposure** (ΔT_d): the change in competitive exposure driven solely by the reduction in transport costs between 1870 and 1890.

[2]The Union Pacific itself would file for bankruptcy in 1893, one year after the convention, vindicating the Populists' critique of railroad mismanagement and speculative overexpansion.

Figure 3: Building TDE: from pairwise vulnerability to county-level exposure.



We define the set of nodes as $N = \{1, \ldots, n\}$, where n is the number of U.S. counties. The network is directed and complete: each county has directed links to all other counties. The (o, d) directed link w_{od} represents the *competitive threat* that origin county o poses to destination county d. For a given crop j, the network can be represented by the competitive threat matrix W_j, where the sum of each column d $\left(\sum_{o \neq d} w_{odj}\right)$ represents the total competitive exposure of county d to all other counties:

$$W_j = \begin{bmatrix} 0 & w_{12j} & \cdots & w_{1nj} \\ w_{21j} & 0 & \cdots & w_{2nj} \\ \vdots & \vdots & \ddots & \vdots \\ w_{n1j} & w_{n2j} & \cdots & 0 \end{bmatrix} \tag{1}$$

W_j can be interpreted as a graph with n nodes, with the weights of the directed edges given by w_{odj}. The *competitive threat* w_{odj} is defined as:

$$w_{odj} = \frac{1}{\tau_{odj}} \cdot \frac{a_{oj}}{a_{dj}} \cdot \frac{y_{oj}}{N_o} \tag{2}$$

where τ_{odj} is the *iceberg transport cost* for crop j between county o and county d, a_{oj} is the productivity of county o in crop j, y_{oj} the production value of crop j in county o, and N_o the population of county o. The ratio a_{oj}/a_{dj} captures county d's *competitive vulnerability*: the larger o's productivity edge, the more d is exposed to being undercut. The competitive threat o poses to d is greater whenever: (1) d's competitive vulnerability is larger—o has a greater productivity edge in crop j, (2) the transport costs between the two counties are lower, and (3) o has greater per-capita production to ship. Each of these three components draws on a distinct data source; we introduce them in turn.

The first component is the iceberg transport cost τ_{odj}. Hornbeck and Rotemberg (2024) calculate freight transportation costs per ton between each pair of counties (t_{od}) using the available transportation routes in each decade between 1860 and 1900, building on the transportation network database originally assembled by Donaldson and Hornbeck (2016). The database maps where freight could move along each transportation mode—railroad, canal, and wagon—and computes the lowest-cost freight route between any two counties for given cost parameters.[3] Transportation costs are symmetric, i.e., $t^t_{od} = t^t_{do}$ $\forall o, d \in N$. Table 1

[3]Railroad rates are set at 0.63 cents per ton-mile, waterway rates at 0.49 cents per ton-mile, and wagon rates at 23.1 cents per ton-mile. Transshipment costs amount to 50 cents per ton and are incurred whenever goods are transferred from one mode of transportation to another.

shows that the average cost of transporting one ton of goods from one county to another in the network (i.e. $\bar{t}_{od} = \frac{\sum_{o\in N}\sum_{d\in N} t_{od}}{n(n-1)}$) dropped from 23.45 in 1870 to 12.32 in 1890, a decrease of 47.5%.

Table 1: Descriptive statistics – transportation costs.

	count[4]	**mean**	**sd**	$\mathbf{P}_5$	$\mathbf{P}_{95}$
t_{od}^{1870}	7753440	23.45	19.03	6.06	64.02
t_{od}^{1890}	7753440	12.32	7.08	4.53	26.40

The parameter τ_{odj} represents the *iceberg transport cost*, which normalizes the measured per-ton county-to-county transportation cost t_{od} by the price per ton of the transported crop j: $\tau_{odj} = 1 + t_{od}/P_j$.[5] Prices are taken from "Historical, Demographic, Economic, and Social Data: The United States, 1790-2002 (ICPSR 2896-0046)", Haines (2010), by computing the national average price per crop for the year 1860.[6] For example, on average the iceberg transport cost for barley decreased by 22.7% in the period under consideration.

The second component is crop productivity a_{oj}. County-level crop productivity data come from the Food and Agriculture Organization of the United Nations (FAO) Global Agro-Ecological Zones (GAEZ) agro-climatic potential yield database. This measure describes the agronomically possible upper limit to produce individual crops under given agro-climatic, soil, and terrain conditions. Though based on climatic records for 1961–1990, these data provide good proxies for historical conditions (see Nunn and Qian, 2011). The data for each crop consist of a raster image whose every pixel represents the potential yield of the given crop in a grid cell of about 9×9 km at the equator. We follow the procedure described in Fiszbein (2017) to recover the potential yield for U.S. historical counties: overlaying the raster image with 1890 U.S. county boundaries using GIS software and assigning to each county a value equal to the weighted average of all the grid cells that fall within its boundaries. We consider 14 crops: barley, buckwheat, cane sugar, corn, cotton, flax, hay, oats, potato, rice, rye, sweet potato, tobacco, and wheat. Tables A7–A9 in the Appendix report descriptive statistics for potential yields, population, crop production, and production

[4] The network considered by Donaldson and Hornbeck (2016) is composed of 2785 U.S. counties; therefore, there are a total of $2785 \cdot 2784 = 7753440$ links.

[5] Note that, for a given crop j, the average iceberg transport cost is equal to $\bar{\tau}_{odj} = 1 + \frac{\bar{t}_{od}}{P_j}$.

$$\begin{aligned}\bar{\tau}_{odj} =& \frac{\sum_{o\in N}\sum_{d\in N}(1 + \frac{t_{od}}{P_j})}{n(n-1)} \\ =& \frac{n(n-1) + \frac{\sum_{o\in N}\sum_{d\in N} t_{od}}{P_j}}{n(n-1)} \\ =& 1 + \frac{\sum_{o\in N}\sum_{d\in N} t_{od}}{n(n-1)\cdot P_j} \\ =& 1 + \frac{\bar{t}_{od}}{P_j}\end{aligned}$$

[6] Section A.5 provides robustness checks using an average of prices between 1866 and 1870.

value. Figure A2 in the Appendix shows the distribution of potential yield per crop across U.S. counties. To guarantee that the ratio $\frac{a_{oj}}{a_{dj}}$ is tractable (always defined and positive), we apply the following transformation to the productivity variable A with domain $A \geq 0$: $\hat{A} = \ln(A + e)$.

The third component consists of production value y_{oj} and population N_o. County-level census data are drawn from *Historical, Demographic, Economic, and Social Data: The United States, 1790-2002 (ICPSR 2896-0047)* (Haines, 2010). Since some county boundaries changed over the period under consideration (1870–1890), the data are adjusted to hold the 1890 geographical units constant. We follow the procedure originally proposed by Hornbeck (2010) and also used by Hornbeck and Rotemberg (2024). Using historical U.S. county boundary files from the *National Historical Geographic Information System*, county borders in 1870 are intersected with county borders in 1890 using GIS software. When 1890 counties fall within more than one 1870 county, data for each piece are calculated by multiplying the earlier county data by the share of its area in the 1890 county. For the year 1870, each 1890 county is then assigned the sum of all pieces falling within its area. This procedure assumes that data are evenly distributed across the county area. The sum is left missing when data for any piece are missing. Following Hornbeck and Rotemberg (2024), counties are dropped when they result from more than four significant pieces after adjustment. With all three components in hand, we aggregate to construct the county-level measure. The competitive exposure of county d in the network for crop j is:

$$T_{dj} = \frac{\sum_{o \neq d} w_{odj}}{(n-1)} \tag{3}$$

i.e., the average competitive threat from all other counties. This captures the overall competitive exposure of county d for a given crop. When counties produce multiple crops, we aggregate across crops by weighting by production shares:

$$T_d = \sum_j T_{dj} \cdot \frac{y_{dj}}{y_d} \tag{4}$$

In other words, T_d is computed by weighting the competitive exposure of county d on each crop j by the relative production value of that crop.

This framework allows us to quantify the county-level Technological Disruption Exposure induced by the expansion of the railroad network. By substituting the transportation costs at time t with those at time $t+1$—while leaving everything else unchanged—we obtain the TDE measure:

$$\begin{aligned} \Delta T_d &= T_d^{t+1} - T_d^t \\ &= \frac{1}{(n-1)} \cdot \sum_j \frac{y_{dj}^t}{y_d^t} \cdot \sum_{o \neq d} \left(\frac{1}{\tau_{odj}^{t+1}} - \frac{1}{\tau_{odj}^t} \right) \cdot \frac{a_{oj}}{a_{dj}} \cdot \frac{y_{oj}^t}{N_o^t} \end{aligned} \tag{5}$$

Only transport costs τ change between t (1870) and $t+1$ (1890). Crop productivity from FAO GAEZ is time-invariant, determined by geology and climate. Production and population are held at their 1870 values. TDE therefore isolates the competitive shock arising from railroad expansion, separate from any contemporaneous changes in agricultural activity or demographics. Because the change in bilateral transport costs $\Delta\tau_{odj}$ varies at the county-pair level—determined by where new railroad lines were built relative to existing routes—TDE captures county-specific variation in competitive exposure rather than a uniform national shock. The only time-varying input is the transport network; all other components (productivity, production, population) are held at their 1870 values. This approach follows the tradition of gravity-based models of bilateral flows, as in Eaton and Kortum (2002) and Donaldson (2018).

At the crop level, TDE for a single crop j is obtained by disaggregating equation (5). In the implementation, we replace raw productivity a_{oj} with its log-transformed counterpart $\hat{a}_{oj} = \ln(a_{oj} + e)$, as described above:

$$\Delta T_{dj} = \frac{y^t_{dj}}{y^t_d} \cdot \frac{1}{(n-1)} \cdot \sum_{o \neq d} \left(\frac{1}{\tau^{t+1}_{odj}} - \frac{1}{\tau^t_{odj}} \right) \cdot \frac{\hat{a}_{oj}}{\hat{a}_{dj}} \cdot \frac{y^t_{oj}}{N^t_o} \tag{6}$$

Figure 4 illustrates how the barley competitive network densifies between 1870 and 1890 for a randomly selected county labeled as 1. The width of each arrow pointing from county o to county d is proportional to $w_{od\,barley}$. Rather than plotting all N counties, panel (a) shows only those counties whose competitive threat to the selected county exceeds a given threshold in 1870. Keeping the threshold constant, the number of counties that surpass it in 1890 is much higher—the county moved from relative isolation to membership in a dense network of competitors, exposing it to greater competitive pressure. In practice, for a given crop network j and county d, TDE captures the change in the average size of all arrows pointing to d between 1870 and 1890.

Figure 4: Impact of the railroad on the network for one county and crop.

(a) 1870 (b) 1890

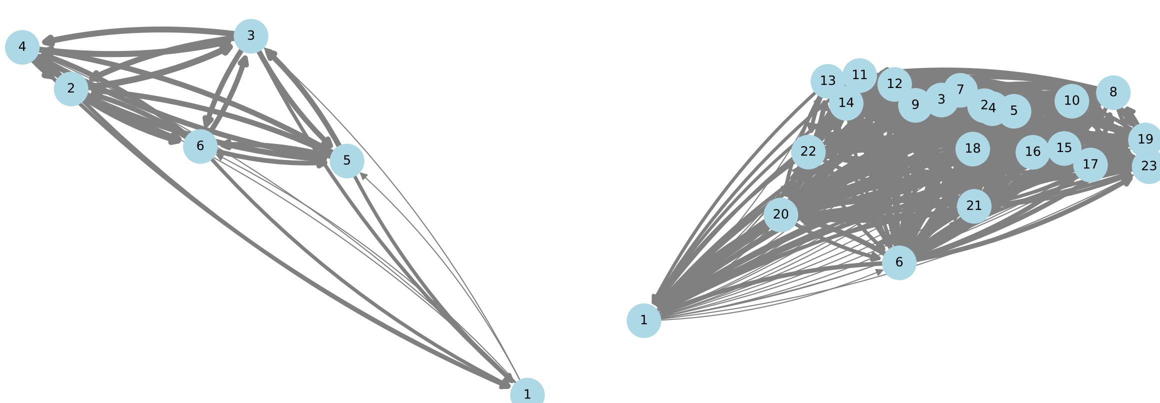
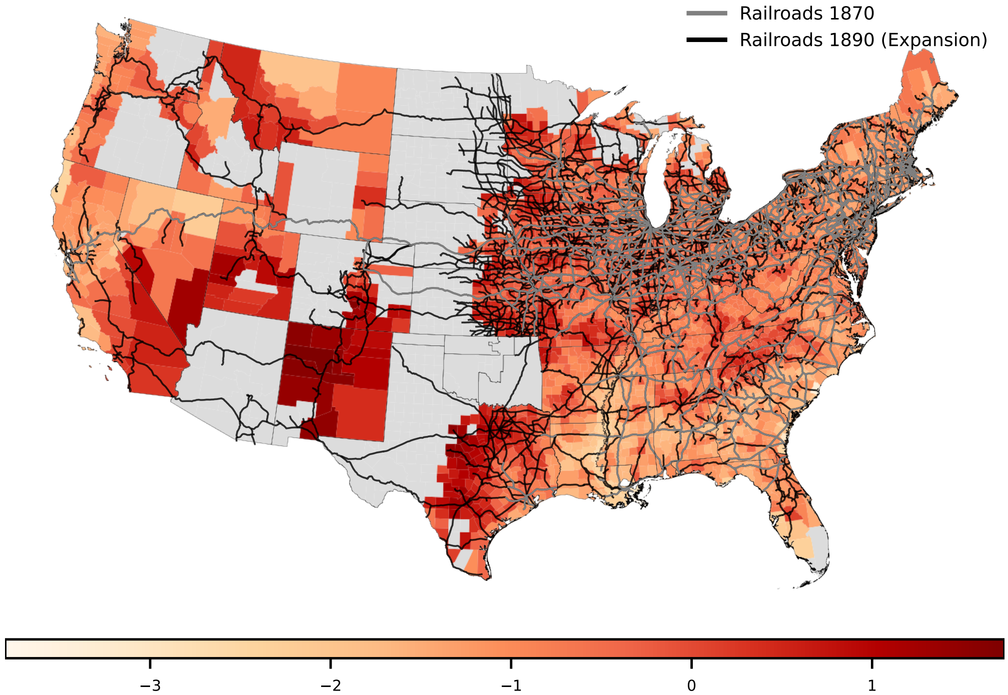


Table A10 in the Appendix reports descriptive statistics for TDE at the crop level and overall (note that $\Delta T_d = \sum_j \frac{y^t_{dj}}{y^t_d} \Delta T_{dj}$). The mean of $\ln(\Delta T_d)$ is -0.704 with a standard deviation of 0.701.

Figure 5 maps the geographic distribution of $\ln(\Delta T_d)$ across all U.S. counties, overlaid with the railroad network: routes already in place by 1870 (grey) and lines added during the 1870–1890 expansion (black). The highest-TDE counties are concentrated precisely in areas newly reached by the expansion-era railroad—the Great Plains, parts of the West and South—where previously isolated agricultural communities were suddenly exposed to competition from distant, more productive regions. Figure A1 in the Appendix shows the within-state variation that our regressions exploit.

Figure 5: Technological Disruption Exposure and railroad expansion. Counties with the highest TDE (darkest shading) are concentrated in areas reached by the 1890 expansion (black lines) but not served by the 1870 network (grey lines).



As a validation exercise, we test whether crop-level TDE predicts actual changes in production patterns. If the measure captures real competitive displacement, counties more exposed to competitive pressure on a given crop j should reduce their relative production of that crop. Table 2 confirms this: regressing the change in the share of production value of crop j on $\ln(\Delta T_{dj})$, all coefficients are negative and statistically significant at the 1% level, with state fixed effects included. Counties facing greater TDE on a given crop did reduce their specialization in that crop between 1870 and 1890. Table A11 in the Appendix shows the same results for the remaining crops.

Table 2: Change in share of production value, $\frac{y_{dj}^{1890}}{y_d^{1890}} - \frac{y_{dj}^{1870}}{y_d^{1870}}$.

	Barley	Corn	Cotton	Oats	Irish potatoes	Rice	Tobacco
$ln(\Delta T_{dj})$	-0.014***	-0.081***	-0.040***	-0.029***	-0.035***	-0.010***	-0.010***
	(0.004)	(0.005)	(0.006)	(0.003)	(0.003)	(0.002)	(0.003)
Constant	-0.002***	-0.011***	0.026***	0.008***	-0.009***	-0.000	0.001
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)
Mean of dep. variable	-0.002	-0.011	0.026	0.008	-0.009	-0.000	0.001
R^2_{adj}	0.411	0.551	0.317	0.470	0.423	0.280	0.066
Observations	2322	2321	2318	2321	2322	2323	2323
State FE	✓	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

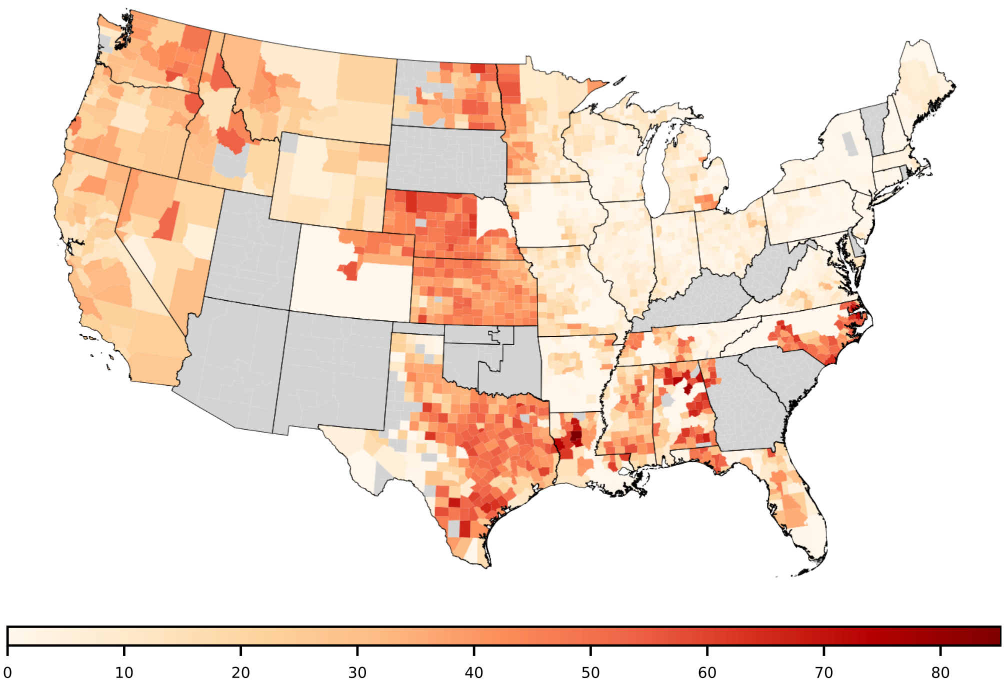
A central question in the results that follow is whether TDE captures a distinct distributional effect or merely proxies for improved market integration. To address this, we control for the change in market access (ΔMA), constructed following Donaldson and Hornbeck (2016). Market access for county d in year t is defined as:

$$MA_{dt} = \sum_{o \neq d} \tau_{odt}^{-\theta} N_{ot} \tag{7}$$

where τ_{odt} is the transportation cost between counties o and d in year t, θ is the trade elasticity, and N_{ot} is county o's population. Market access depends only on transportation costs and population—the size of the markets a county can reach, weighted by proximity. It captures the aggregate benefit of integration: a county's MA rises when transportation costs fall or when nearby counties grow, regardless of what those counties produce or how competitive they are. We compute $\Delta \text{MA}_d = MA_{d,1890} - MA_{d,1870}$ and enter $\ln(\Delta \text{MA}_d)$ as a control. The conceptual distinction from TDE is sharp. Market access measures a county's *opportunity*—the size and proximity of markets it can sell to. TDE measures a county's *vulnerability*—the competitive pressure it faces from other counties that can now undercut it, given their relative crop productivity and production capacity. A county can simultaneously gain market access (larger markets to sell to) and suffer technological disruption (more competitors able to undercut it); separating the two is what allows us to identify the distributional channel.

The main political outcome is the People's Party vote share in the 1894 U.S. House elections. These data come from *ICPSR 8611: Electoral Data for Counties in the United States: Presidential and Congressional Races (1840–1972)* (Clubb et al., 2006). The 1894 election is the cycle in which the People's Party gained the greatest number of votes. Figure 6 shows the geographic distribution of Populist vote share across counties.

Figure 6: 1894 U.S. House Election: Populist Vote Share (%).



We close this section with a discussion of identification. Why should TDE be plausibly exogenous to county-level political outcomes? Three features of the measure support this claim. First, crop productivity from FAO GAEZ is time-invariant, determined by geology and long-run climate patterns rather than by any contemporaneous economic or political conditions. Second, production and population are held at their 1870 values, so the measure is not contaminated by post-treatment changes in the local economy. Third, the only time-varying component is τ, driven by the expansion of the national railroad network—a process determined by route choices and construction decisions largely outside any single county's control (Atack, 2013; Donaldson and Hornbeck, 2016). Because the transport cost reductions vary at the county-pair level—determined by railroad route placement—identification comes from variation in the spatial pattern of network expansion, interacted with pre-determined local crop composition, rather than from county-level characteristics that might independently predict populist voting. We acknowledge potential threats to this identification strategy—including the possibility that railroad placement responded to local economic or political conditions—and address them through robustness checks reported in Section 4 and the Appendix.

4. Results

Counties more exposed to railroad-driven competitive pressure show significantly higher support for the People's Party in the 1894 congressional elections. Table A6 reports our main estimates. Across all specifications, the dependent variable is the county-level vote share of the People's Party in 1894, all models include state fixed effects, and the main independent variable and controls are standardized.

Column (1) presents the baseline specification. A one standard deviation increase in $\ln(\Delta T_d)$ is associated with an increase of approximately 1.5 percentage points in Populist vote share ($p < 0.01$), relative to a baseline mean of roughly 15 percentage points. The effect is economically meaningful: it represents a 10% increase relative to the mean. To put this in perspective, moving a county from the 25th to the 75th percentile of TDE exposure would increase its Populist vote share by roughly 2 percentage points—comparable in magnitude to the effects of trade shocks on political polarization documented in the modern literature (Autor et al., 2020).

When we control in Column (2) for the change in market access (ΔMA), constructed following Donaldson and Hornbeck (2016), the TDE coefficient nearly doubles to 2.9 ($p < 0.01$) while the market-access coefficient turns negative (-1.5, $p < 0.10$). The magnitude shift is striking: a one standard deviation increase in TDE now predicts a nearly 3 percentage point increase in Populist vote share—a 19% increase relative to the mean. Importantly, these results reveal that existing studies attributing populist voting to market integration are likely confounding two opposing forces. The aggregate benefit of improved market access—captured by ΔMA—actually reduces populist support once the distributional harm from technological disruption—captured by TDE—is separated out. It is the competitive displacement generated by internal transportation improvements, not market integration per se, that drives the populist vote. Because separating these two channels is essential to our argument, all subsequent specifications include ΔMA as a control.

Columns (3) through (6) test whether this result survives a battery of identification threats, always conditioning on ΔMA. The most immediate concern is that TDE might correlate with pre-existing political preferences. Column (3) controls for the Democratic vote share in the 1868 presidential election. The TDE coefficient remains positive and significant, while the 1868 Democratic share is a strong positive predictor of 1894 Populist support—consistent with the historical continuity between Democratic and Populist constituencies—but its inclusion does not eliminate the TDE effect. Column (4) performs the same test with the populist-party vote share in the 1870 congressional elections, the earliest available measure of anti-establishment agrarian sentiment.[7] The TDE coefficient remains significant, confirming that the effect is not an artifact of counties that were already inclined toward protest voting before the railroad shock materialized.

Column (5) addresses a natural alternative explanation: that railroads brought foreign-born migrants into exposed counties, and it is this demographic change—not competitive displacement—that triggered populist support through anti-immigrant sentiment. We control for the change in the foreign-born population share between 1870 and 1890. The TDE coefficient remains positive and significant, ruling out migration sorting as the driver. As we show in the robustness appendix, TDE actually *reduces* foreign-born inflows once ΔMA is controlled for, further undermining the "railroads bring foreigners" channel.

Column (6) addresses the concern that railroad placement may be endogenous to county-level political conditions—that is, the same local factors driving Populist support may have influenced whether and where railroads were built. Rather than using county d's own TDE,

[7] The populist-party classification follows Han and Milner (2024), who identify 69 parties as populist across 1870–1914 based on the criteria of Mudde (2004), drawing on ICPSR 1 county-level returns (Inter-university Consortium for Political and Social Research, 1999). For 1870, the classified parties are predominantly Greenback and related agrarian-protest tickets; the People's Party itself was not founded until 1892.

we substitute the average TDE of d's geographic neighbors, excluding d itself. Because neighbors' exposure depends on railroad routes reaching *other* counties, it is unlikely to reflect d's own political economy. The neighbors' TDE significantly predicts d's Populist vote share, supporting the interpretation that the effect operates through network-level competitive pressure rather than through county-specific railroad placement.

Across all six columns, the coefficient on TDE is positive and statistically significant. The baseline effect size (1.5 percentage points per standard deviation) is stable across specifications that address pre-existing politics, migration, and spatial structure. It roughly doubles when we separate TDE from market access, confirming that the two channels operate in opposite directions. The ΔMA coefficient is consistently negative in columns (2) through (6), reinforcing the interpretation that market integration per se is not the driver of populist mobilization.

Appendix A reports a comprehensive set of additional robustness checks; we summarize the main findings here. First, the result is robust to controlling for the 1868 Republican vote share, confirming that no pre-treatment partisan alignment drives the finding (Table A1). Second, migration sorting does not explain the result: once ΔMA is controlled for, TDE actually *reduces* foreign-born inflows, and the main political effect survives controlling for changes in the foreign-born share, manufacturing labor share, and Black population share between 1870 and 1890 (Table A2). Third, a falsification test confirms that 1870 competitive exposure—computed without transport costs—does not predict subsequent railroad construction, and the main result is robust to controlling for railroad presence and mileage within varying buffer distances in 1870 (Tables A3–A4). Fourth, the TDE coefficient remains significant when interacted with a battery of demographic and human capital controls, with the notable finding that the populist response is amplified in counties with higher illiteracy rates (Table A5).

Table 3: Technological Disruption Exposure and Populist Vote Share, 1894.

	Populist Vote Share – 1894					
	(1) Baseline	(2) + ΔMA	(3) + Dem 1868	(4) + Populist 1870	(5) + Δ Foreign born	(6) Neighbors' TDE
$ln(\Delta T_d)$	1.498***	2.931***	2.497**	3.670***	3.146***	
	(0.532)	(1.056)	(1.133)	(1.119)	(1.044)	
$ln(\Delta \hat{T}_d)$						1.410*
						(0.738)
$ln(\Delta\text{MA})$		-1.525*	-1.294	-2.069**	-2.024**	0.086
		(0.850)	(0.892)	(0.875)	(0.849)	(0.507)
Dem. vote share 1868			2.601***			
			(0.475)			
Pop. vote share 1870				1.325***		
				(0.337)		
ln(ΔForeign-born)					1.649***	
					(0.406)	
Constant	15.191***	15.173***	14.617***	14.478***	15.217***	15.224***
	(0.301)	(0.300)	(0.313)	(0.307)	(0.300)	(0.302)
Mean of dep. variable	15.260	15.260	14.399	14.652	15.260	15.292
R^2_{adj}	0.477	0.478	0.493	0.479	0.481	0.475
Observations	1917	1917	1744	1793	1917	1913
State FE	✓	✓	✓	✓	✓	✓
ΔMA control		✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

Col. (5): additionally controls for Δ foreign-born share 1870–1890.

Col. (6): $ln(\Delta \hat{T}_d)$ is the average TDE of neighboring counties, excluding county d.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. A Simple Conceptual Framework

The main results establish that technological disruption exposure predicts populist voting, and that this effect is distinct from—and operates in the opposite direction of—market access. This section introduces a simple framework, adapted from Guiso et al. (2026), that organizes these findings and generates testable predictions for the heterogeneity analysis that follows.

Consider a citizen evaluating the status quo s. Her expected utility is

$$U(s) \;=\; p \;+\; (1-p)\,q, \tag{8}$$

where p is the perceived probability of being a market "winner" and q captures "trust"—the belief that, conditional on losing, existing institutions will compensate the loss. A winner receives a normalized payoff of 1; a loser receives 0 absent compensation but expects compensation with probability q.

In the context of 1870s–90s agricultural economy, p reflects a farmer's assessment of whether he can compete profitably given prevailing market conditions. A farmer with productive land, manageable debt, and access to credit and rail connections perceives a high p. A farmer in a county suddenly exposed to competition from distant, more productive regions perceives a lower p. Our TDE measure captures exactly this competitive shock: counties with a large ΔT_d are those where railroad expansion increased the intensity of competition from other counties, pushing p downward for incumbent producers.

The trust parameter q has two components (Guiso et al., 2026):

1. **Alignment**: the belief that policymakers share the interests of ordinary producers rather than being captured by railroads, banks, or "money power."

2. **Capacity**: even if aligned, the belief that institutions can actually deliver protection—through credit expansion, currency reform, price supports, or redistribution.

Both components were under pressure in the post-Civil War period. On alignment, repeated failures to regulate railroad rates and grain elevator monopolies updated farmers' beliefs that government served corporate rather than agrarian interests. The Omaha Platform opened by pledging to "restore the government of the Republic to the hands of 'the plain people'"—a direct statement that alignment had been lost. On capacity, the gold standard constrained the money supply, producing sustained deflation that raised the real burden of farm debt. Even a sympathetic government faced institutional limits: absent the power to expand currency or levy an income tax, the fiscal tools available for compensating losers were narrow.

A voter has the option of supporting a "commitment" politician—one who binds himself to a fixed policy platform rather than retaining discretion in office (Bellodi et al., 2025). Let r denote the expected utility from the protectionist commitment bundle. A voter prefers the commitment politician whenever

$$r \; > \; p \; + \; (1-p)\, q. \tag{9}$$

This condition is satisfied more easily when p is low (the voter expects to lose under the status quo) and when q is low (the voter does not trust that existing institutions will cushion the loss). Commitment politics emerge not from irrationality but from a rational calculation: when discretionary politicians cannot be trusted to act in losers' interests, voters prefer candidates who tie their own hands.

The Omaha Platform of 1892 is a textbook case. Its demands were hard, verifiable commitments: free coinage of silver at a fixed ratio of 16:1 relative to gold, government ownership of railroads, a national currency "issued by the general government only . . . without the use of banking corporations," direct election of senators, and the initiative and referendum. Each plank was designed to be observable and enforceable, minimizing the scope for post-election discretion. The platform was not a vague promise of reform; it was a binding contract offered to voters who had lost trust in mainstream politicians.

Anti-elite rhetoric is a natural complement to commitment politics. If a party proposes credible protectionist commitments, it is in its strategic interest to further reduce perceived q by emphasizing elite capture—reinforcing the voter's belief that discretionary politicians cannot be trusted. The People's Party's attacks on "money power," railroad barons, and the financial system served precisely this function: they lowered q in voters' minds, making the commitment condition in equation (9) easier to satisfy.

Not all commitment bundles are alike. Following Guiso et al. (2026), protectionist commitments can be *inclusive*—redistribution, welfare expansion, progressive taxation—or *exclusionary*—restrictions on immigration, alien land ownership, trade protection. Exclusionary commitments are “cheaper”: they do not require fiscal capacity and can be implemented even when government resources are constrained.[8]

The People’s Party platform bundled both types. Its inclusive demands—a graduated income tax, expanded currency, government ownership of railroads—required substantial fiscal and institutional capacity. Its exclusionary demands—support for the Chinese Exclusion Act, prohibition of alien land ownership, restrictions on contract labor—did not. This mixed bundle is exactly what the framework predicts when capacity constraints bind partially: inclusive commitments are offered where feasible, but exclusionary commitments fill the gap where fiscal space or state capacity are limited.

The distinction matters for understanding which counties respond most strongly to the populist appeal. In counties where agriculture dominates the local economy, the commitment bundle is more valuable: demands for railroad regulation, currency reform, and price stabilization speak directly to the livelihood at stake. Where farming constitutes a smaller share of economic activity, the same bundle offers less relief. More generally, the commitment condition is satisfied more easily when the voter’s exposure to the shock is concentrated—when there is no alternative sector to absorb displaced labor or offset lost income—and when the platform’s commitments address the specific source of distress.

The framework generates predictions that map directly to the heterogeneity tests in Section 6. Any county characteristic that lowers p conditional on TDE—such as crop specialization, which prevents farmers from diversifying away from competitive shocks—should amplify the populist response. Similarly, characteristics that raise the stakes of losing—such as greater dependence on agriculture—should strengthen the effect, since the absolute expected loss $(1-p)(1-q)$ is larger when more is at risk. On the demographic side, the composition of the local population may shape the populist response through multiple channels: the salience of exclusionary commitments, the availability of scapegoats, and the political participation of affected groups. Section 6 tests whether the data are consistent with this structure.

Inclusive reform commitments, when credible, induce voters to update upwards the institutional trust parameter q. In 1894 the People Party obtained 10 percent of the votes, and presumably no voter expected such a party to win majority in Congress and credibly implement the commitments. On the other hand, the Democratic party always has a probability of winning majority in Congress around 1/2, hence the adoption of part of the populist commitments in the 1896 Democratic platform obtained a higher credibility level, effectively shifting upward the belief q in the implementability of the macro reforms. This dynamic intuition is what we discuss in detail in section 7.

[8]They appeal asymmetrically. Let r^l and r^r denote the expected utility from exclusionary bundles, respectively, for a left vs right-leaning voter. The model assumes $r^r > r^l$: exclusionary commitments deliver higher utility to voters who do not value solidarity with outsiders. In the case of inclusive commitments the asymmetry can go the other way. These asymmetries play an important role in the analysis of the effects of the financial crisis in Guiso et al. (2026), but in our analysis they do not matter because we do not study turnout.

6. Heterogeneity Analysis

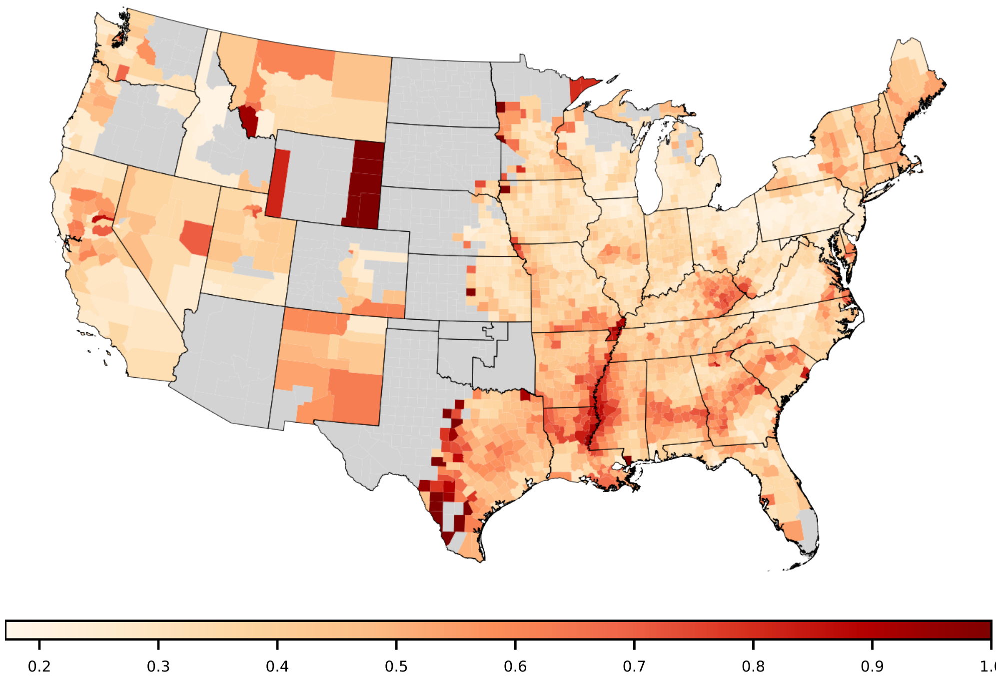
This section examines which economic and demographic characteristics mediate the political effect of TDE. We test whether the populist response is amplified by factors that lower p (crop specialization, agricultural dependence) or q (institutional capacity), and whether demographic composition shapes the appeal of the commitment bundle. All specifications include state fixed effects and control for ΔMA. Variables are standardized as in Table A6.

Table 4 reports interactions between TDE and county-level economic characteristics. Counties initially more specialized in crops for which they suffer the greatest competitive pressure are potentially the most affected. We investigate the role of crop specialization using the Herfindahl–Hirschman Index (HHI):

$$HHI_d = \sum_j \left(\frac{y_{dj}}{y_d} \right)^2$$

Higher values indicate greater concentration in a small number of crops. Column (1) interacts $\ln(\Delta T_d)$ with this HHI of crop concentration. Figure 7 maps its geographic distribution. The interaction is positive and highly significant (1.229, $p < 0.01$). Counties with a diversified crop portfolio can absorb competitive shocks across multiple margins and can more easily redirect specialization towards alternative crops; counties that depend on one or two crops cannot. The magnitudes are revealing: at one standard deviation above mean HHI, the total TDE effect is $1.117 + 1.229 = 2.3$ percentage points; at one standard deviation below, it is essentially zero ($1.117 - 1.229 \approx 0$). The entire political effect of competitive displacement is concentrated in specialized counties. The HHI interaction confirms that crop specialization amplifies the political effect of TDE, consistent with the prediction that specialization lowers p conditional on exposure.

Figure 7: HHI distribution.



Columns (3) and (4) interact TDE with farm value per square meter and farm output value per square meter, respectively. Both interactions are positive and significant (1.206 and 1.147, $p < 0.01$). In counties one standard deviation above the mean, the total TDE effect reaches nearly 5 percentage points—a third of the mean Populist vote share. These results indicate that the populist response to competitive pressure was strongest in counties most dependent on agriculture—where farming dominated the local economy and there was no alternative sector to absorb the shock. When the agricultural economy *is* the economy, competitive displacement translates directly into political mobilization.

Column (2) interacts TDE with bank density (number of banks per 1,000 people). The interaction is positive (0.587) but not statistically significant. The sign is consistent with the prediction that lower institutional capacity amplifies the populist response, but the evidence is not conclusive. One interpretation is that bank density is an imperfect proxy for the capacity component of q: in a period when the binding constraint was monetary policy (the gold standard) rather than local credit supply, variation in bank presence may not capture the relevant margin of institutional capacity. The currency-related demands of the Omaha Platform—free silver, expanded circulating medium—suggest that the capacity constraint operated at the national rather than the county level.

Table 5 tests whether demographic composition mediates the political response to TDE. A natural concern is that railroads brought foreign-born migrants into exposed counties, and it is this demographic change—not competitive displacement itself—that triggered backlash and drove populist support. The evidence rules out this alternative.

Column (5) examines the foreign-born population share. The main effect is strongly negative (-2.127, $p < 0.01$): counties with larger immigrant populations were substantially less supportive of the People's Party, regardless of TDE. This likely reflects a compositional effect: the foreign-born population in the 1890s—predominantly European immigrants—had low voter participation rates, mechanically diluting the Populist vote share in counties where they were concentrated. The interaction with TDE is positive but not statistically significant (0.624): in practical terms, even though one might expect that the arrival of more immigrants via railroads could have fueled nativist backlash and amplified the Populist response, we find no evidence that the presence of foreign-born residents strengthened or weakened the effect of competitive displacement on populist voting among native voters.

Columns (1) and (2) of Table 5 examine racial composition. The interaction between TDE and the Black population share is positive and highly significant (3.151, $p < 0.01$). In counties one standard deviation above the mean Black share, the total TDE effect reaches $0.544 + 3.151 = 3.7$ percentage points—nearly 25% of the mean Populist vote share. This result should not be interpreted as reflecting Black political mobilization. By 1894, systematic disenfranchisement was well underway across the South: Mississippi's 1890 constitution introduced literacy tests and poll taxes that effectively eliminated Black voting, and other states followed. The Populist vote share in these counties reflects predominantly *white* voters' preferences. Counties with large Black populations were the plantation belt—areas of intensive commercial agriculture (cotton, tobacco) with high land values and deep market exposure. The Black share is thus a proxy for the agricultural intensity and commercial vulnerability of the county. White farmers in these counties had the most to lose from competitive displacement, consistent with the amplified TDE effect.

Column (3) shows a contrasting pattern for the Chinese population share: the interaction is positive and significant (0.505, $p < 0.05$). Unlike European immigrants, the Chinese were a small, highly visible group against whom the Populist platform had *explicit* planks—the demand for Chinese exclusion, the prohibition of alien land ownership. The connection between Chinese labor and the railroads was direct: Chinese workers constituted roughly 80–90% of the Central Pacific Railroad's construction workforce (Chang, 2019; Saxton, 1971). After the transcontinental railroad's completion in 1869, thousands of these workers dispersed into western communities, where they became a visible presence in precisely the counties that the expanding railroad network subsequently connected (see also Long et al., 2024, who document the geographic dispersion of Chinese workers from railroad construction and the economic consequences of their subsequent exclusion). The technology that created the competitive shock had also deposited the target group against whom exclusionary politics could be mobilized. In counties where the Chinese presence made these exclusionary commitments salient and actionable, white voters found the Populist bundle more appealing when combined with economic displacement from TDE. The contrast with the null foreign-born interaction reinforces the centrality of technology. Both results operate on the supply side of exclusionary politics, but the key moderator is *association with the technology itself*. Chinese workers were directly linked to the railroad—they built it, and they remained in the communities it connected. When competitive displacement struck, white voters saw both the economic shock and its human symbol in the same county, amplifying the appeal of the exclusionary planks. European immigrants, by contrast, bore no connection to the railroad technology: they were farmers, workers, and shopkeepers unrelated to the source of the competitive shock. Their presence did not make the technology-driven grievance more salient, producing no marginal reaction through the immigration channel. It is the technology, not immigration per se, that drives the populist response.

Column (4) interacts TDE with the urban population share. The interaction is positive and marginally significant (0.406, $p < 0.10$), suggesting that the populist response to technological disruption was not confined to rural areas. Even in more urbanized counties, competitive pressure from railroad-driven market integration translated into political mobilization.

If TDE captures a real competitive shock, it should leave traces in the agricultural economy. Table 6 tests this by regressing changes in agricultural outcomes between 1870 and 1890 on TDE and MA, interacting both variables with HHI. The dependent variables are changes in farm output, number of farms, small-farm share, farm value, equipment value, and improved acreage.

The interaction between TDE and HHI is negative and significant across all outcomes except for farm output. In specialized counties, greater competitive exposure reduced the number of farms (−73.7, $p < 0.01$), farm values (−173,617, $p < 0.05$), equipment investment (−4,526, $p < 0.1$), and improved acreage (−6,691, $p < 0.01$), while also reducing the small-farm share (−0.06, $p < 0.01$) — indicating consolidation at the expense of smallholders. The main effect of TDE in diversified counties shows no significant impact on output, farm numbers, share of small farms, and equipment investment. Instead, it had a positive and significant effect on farm value (+490,128, $p < 0.05$) and improved acreage (+12,664, $p < 0.01$). This suggests that the competitive shock forced diversified farmers to adapt - they improved their land and likely shifted to higher-value crops, driving up overall farm values. Finally, the inclusion of MA isolates the benefits of market integration. In diversified counties, the main effect of MA drove pure expansion, significantly increasing farm output, the number of farms, and farm investment. However, this opportunity was unevenly distributed: the positive effect of MA on farm output was significantly lower in more specialized counties (−48,656, $p < 0.05$). Overall, this confirms that the competitive shock was real and concentrated precisely where the framework predicts — in specialized counties where farmers could not diversify away from the losses.

This pattern closes the causal chain. Railroad expansion increased competitive pressure (TDE). In specialized counties, this pressure reduced agricultural output, investment, and the number of farms. These economic losses translated into political mobilization: the same counties that experienced the greatest structural damage showed the strongest support for the People's Party.

Table 4: Heterogeneity: Economic Characteristics.

	Populist Vote Share – 1894			
	(1) × HHI	(2) × Banks	(3) × Farm val.	(4) × Farm out.
$ln(\Delta T_d)$	1.117	3.100***	3.721***	3.477***
	(1.112)	(1.063)	(1.080)	(1.072)
$ln(\Delta MA)$	-0.249	-1.593*	-2.053**	-1.686**
	(0.887)	(0.865)	(0.853)	(0.845)
HHI	-1.127***			
	(0.425)			
$ln(\Delta T_d)$ × HHI	1.229***			
	(0.307)			
N. banks per 1000 people		-0.277		
		(0.370)		
$ln(\Delta T_d)$ × N. banks per 1000 people		0.587		
		(0.453)		
Log farm value per sq. meter			-2.268***	
			(0.547)	
$ln(\Delta T_d)$ × Log farm value per sq. meter			1.206***	
			(0.345)	
Log farm output value per sq. meter				-1.303***
				(0.504)
$ln(\Delta T_d)$ × Log farm output value per sq. meter				1.147***
				(0.342)
Constant	15.179***	15.265***	15.498***	15.494***
	(0.299)	(0.311)	(0.318)	(0.322)
Mean of dep. variable	15.260	15.270	15.260	15.260
R^2_{adj}	0.484	0.478	0.485	0.482
Observations	1917	1915	1917	1917
State FE	✓	✓	✓	✓
ΔMA control	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Heterogeneity: Demographic Composition.

	Populist Vote Share – 1894				
	(1) × White	(2) × Black	(3) × Chinese	(4) × Urban	(5) × Foreign
$ln(\Delta T_d)$	0.623	0.544	3.063***	2.846***	2.595**
	(1.140)	(1.115)	(1.064)	(1.060)	(1.071)
$ln(\Delta MA)$	0.596	0.761	-1.686**	-1.443*	-1.481*
	(0.900)	(0.878)	(0.855)	(0.853)	(0.856)
Share of white population	-0.466				
	(0.725)				
$ln(\Delta T_d)$ × Share of white population	-3.208***				
	(0.411)				
Share of black population		0.380			
		(0.815)			
$ln(\Delta T_d)$ × Share of black population		3.151***			
		(0.421)			
Share of chinese population			0.714**		
			(0.302)		
$ln(\Delta T_d)$ × Share of chinese population			0.505**		
			(0.236)		
Share of urban population				0.128	
				(0.198)	
$ln(\Delta T_d)$ × Share of urban population				0.406*	
				(0.225)	
Share of foreign-born population					-2.127***
					(0.487)
$ln(\Delta T_d)$ × Share of foreign-born population					0.624
					(0.388)
Constant	16.542***	16.485***	15.185***	15.226***	15.220***
	(0.361)	(0.365)	(0.301)	(0.304)	(0.297)
Mean of dep. variable	15.260	15.260	15.260	15.260	15.260
R^2_{adj}	0.499	0.499	0.478	0.478	0.482
Observations	1917	1917	1917	1917	1917
State FE	✓	✓	✓	✓	✓
ΔMA control	✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Structural Change: TDE, Crop Specialization, and Agricultural Outcomes (1870–1890).

	(1) Δ *farm out.*	(2) Δ *N. farms*	(3) Δ *sm. farms share*	(4) Δ *farm val.*	(5) Δ *equip. val.*	(6) Δ *N. impr. acres*
$ln(\Delta T_d)$	-43871.22	8.05	-0.01	490127.75**	3880.08	12664.31***
	(31890.75)	(44.29)	(0.01)	(206093.59)	(5068.73)	(3669.19)
HHI	-10073.78	-14.19	0.02***	-231708.26***	-6811.39***	-5097.34***
	(14120.84)	(15.28)	(0.01)	(71220.36)	(2139.27)	(1493.93)
$ln(\Delta T_d) \times$ HHI	24819.90	-73.68***	-0.06***	-173616.66**	-4526.18*	-6691.24***
	(19822.09)	(23.51)	(0.01)	(83462.02)	(2663.19)	(1892.69)
$ln(\Delta\text{MA})$	170626.64***	147.62***	-0.03**	34934.49	16772.10***	3716.51
	(28949.40)	(38.91)	(0.01)	(176612.47)	(4919.12)	(3627.18)
$ln(\Delta\text{MA}) \times$ HHI	-48656.01**	2.96	0.03**	-3138.69	1403.68	2327.02
	(21455.88)	(21.16)	(0.01)	(84579.70)	(3167.72)	(2036.52)
Constant	-39065.13***	709.43***	-0.28***	1455463.43***	52012.43***	57793.51***
	(10886.47)	(12.29)	(0.00)	(57621.56)	(1755.35)	(1185.71)
Mean of dep. variable	-45891.34	712.96	-0.27	1463162.34	52392.80	58378.16
R^2_{adj}	0.453	0.287	0.464	0.456	0.299	0.503
Observations	2323	2320	2320	2323	2323	2323
State FE	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

7. Why Populism Was Reabsorbed

The People's Party effectively dissolved within a decade of its peak. By 1900, the party had ceased to field independent candidates, and its electoral base had been absorbed into the Democratic coalition. This outcome is not obvious. The economic shock that generated populist mobilization—railroad-driven competitive displacement—was real and large, as the structural-change results in Table 6 confirm. Why, then, did the political response prove transient? The conceptual framework of Section 5 provides a precise answer: mainstream parties raised q. But the mechanism through which they did so—strategic, selective adoption of Populist demands—is more complex and more instructive than a simple story of platform convergence.

To understand what mainstream parties absorbed, we must first be precise about what the People's Party offered. The Omaha Platform of 1892 was not a vague protest document; it was a structured bundle of hard commitments, each designed to be observable and verifiable, minimizing the scope for post-election discretion. The platform's demands can be organized into four categories that map directly onto the model's parameters:

1. **Monetary and credit reform** (raising capacity-q): free and unlimited coinage of silver and gold at a ratio of 16:1; a national currency "issued by the general government only . . . without the use of banking corporations"; expansion of the circulating medium to "not less than \$50 per capita." These demands addressed the capacity constraint directly: the gold standard limited the government's ability to ease credit and reduce the real burden of farm debt.

2. **Anti-monopoly and infrastructure** (raising alignment-q): "the railroad corporations will either own the people or the people must own the railroads"; government ownership and operation of telegraph and telephone systems. These demands signaled that a Populist government would not be captured by railroad and financial interests.

3. **Political reform** (raising alignment-q): direct election of senators, the initiative and referendum, the secret ballot. These institutional reforms aimed to reduce elite capture of the political process itself.

4. **Redistributive and exclusionary commitments** (raising r): a graduated income tax to shift the revenue burden from tariffs to accumulated wealth (inclusive); prohibition of alien land ownership and restriction of "undesirable" immigration and contract labor (exclusionary). The Populist bundle mixed both types, exactly as the framework predicts when capacity constraints bind partially.

The absorption of Populism was not a wholesale adoption of the Omaha Platform. It was a strategic, selective process in which the Democratic Party adopted specific planks when electorally useful and dropped them when conditions changed. Tracking the evolution of the Democratic platform from 1896 through 1904 reveals this pattern with striking clarity.

In 1896, with agrarian discontent at its peak and the People's Party at the height of its electoral strength, the Democratic convention nominated William Jennings Bryan on a platform that adopted the core Populist demands almost verbatim. On monetary policy: "We demand the free and unlimited coinage of both silver and gold at the present legal ratio of 16 to 1." On railroads: stricter federal regulation via the Interstate Commerce Commission to "protect the people from robbery and oppression"—a weaker version of the Populists' demand for outright government ownership, but a clear alignment signal. On money creation: "Congress alone has the power to coin and issue money." On immigration: "We hold that the most efficient way of protecting American labor is to prevent the importation of foreign pauper labor to compete with it in the home market." On taxation: the platform condemned the Supreme Court's 1895 decision to strike down the income tax and vowed to reinstate it, aiming to shift the federal revenue burden from tariffs to accumulated wealth. Bryan's "Cross of Gold" speech crystallized the alignment signal: the Democratic Party was choosing the side of "the plain people" against Eastern financial interests.

The People's Party, facing the choice between running an independent candidate and cross-nominating Bryan, chose the latter. The strategic logic was transparent: Bryan's nomination moved the reform demand into a major-party vehicle with a realistic chance of winning. But the decision was also fatal to the party's organizational independence.

In 1900, with Bryan again the Democratic nominee, the platform reiterated support for all the themes presented in 1896. Free silver was restated. Congressional control over money creation was reaffirmed. On immigration, the platform went further, explicitly endorsing the Chinese Exclusion Act. A new demand appeared: "We favor an amendment to the Federal Constitution, providing for the election of United States Senators by direct vote of the people"—a plank taken directly from the Omaha Platform. However, explicit references to railroad regulation disappeared from the platform, replaced by more general language on monopoly and trust regulation. And the income tax, despite the 1896 platform's strong condemnation of the Supreme Court, received no explicit mention.

By 1904, the strategic abandonment was nearly complete. Free silver was dropped. Money creation was no longer mentioned. Railroad and railway references were absent, though general anti-monopoly language remained. Immigration references disappeared. The progressive income tax was again absent. The Populist demands that had animated the 1896 and 1900 platforms had been quietly shelved.

This pattern—adopt when the threat is live, abandon when it recedes—is consistent with the model predictions. The Democratic Party did not need to implement the Populist program; it needed to raise q enough that the commitment condition (9) was no longer satisfied. This required credible *signals* of alignment and capacity, not permanent policy change.

The monetary planks (free silver, congressional money creation) served as alignment signals: by endorsing the Populist position on the most visible and emotionally charged issue of the era, the Democrats communicated that they were not captured by "money power." These planks were also the cheapest to adopt, since they required no fiscal expenditure—only a change in monetary policy that had strong support in the party's Western and Southern base. Once the political threat receded and gold discoveries eased deflation after 1896, the electoral benefit of the silver plank diminished, and it was dropped.

The railroad regulation plank was adopted in weakened form (regulation rather than ownership) and then abandoned entirely. This is consistent with the alignment logic: the signal value of opposing railroad monopolies was high in 1896, but by 1904 the political salience of the railroad issue had declined as the Progressive movement shifted attention to broader trust regulation.

The exclusionary planks followed a different trajectory. The 1896 platform's anti-immigration language was strengthened in 1900 with explicit endorsement of the Chinese Exclusion Act, then dropped in 1904. This pattern reflects the framework's distinction between inclusive and exclusionary commitments: exclusionary planks are cheap to adopt (requiring no fiscal capacity) but appeal to a narrow constituency. The Democrats adopted them when electorally useful and discarded them once the Populist coalition had been absorbed.

The most striking absence is the progressive income tax. Despite the passionate language of the 1896 platform—condemning the Supreme Court and vowing reinstatement—the income tax disappeared from subsequent platforms. This is paradoxical only if one expects platform consistency. In the model's terms, the income tax was the most expensive inclusive commitment: it required a constitutional amendment and would fundamentally alter the fiscal structure of the federal government. As an alignment signal in 1896, it was powerful precisely because it was ambitious. But as a platform commitment to maintain across election cycles, it was too costly and too uncertain. The actual enactment of the income tax came not through the Democratic platform but through the constitutional amendment process, culminating in the 16th Amendment in 1913—seventeen years after the initial platform commitment.

Political strategy was reinforced by exogenous changes in economic conditions. The severe deflation that had amplified agrarian grievances throughout the 1880s and early 1890s began to reverse after 1896, driven in part by major gold discoveries in South Africa, the Klondike, and Australia. The expansion of the gold supply eased credit conditions, reduced the real burden of farm debt, and moderated the price declines that had made the gold standard a focal point of populist anger. In the language of the model, these developments raised p directly: farmers' probability of being market winners improved as commodity prices stabilized and credit became cheaper. The irony is rich: the Populists demanded free silver to expand the money supply, but the money supply expanded anyway through gold discoveries, undermining the urgency of their central demand.

The timing was fortuitous for the political establishment. Had gold discoveries occurred a decade later, the alignment and capacity signals from mainstream parties might not have been sufficient to neutralize the populist challenge. The interaction between deliberate political strategy (raising q through platform adoption) and favorable economic shocks (raising p through monetary easing) produced a rapid demobilization of the populist coalition.

Although the Democratic Party's platform commitments proved transient, the institutional legacy of the Populist movement was durable. Over the following two decades, much of the Omaha Platform became law through legislative and constitutional channels that operated independently of any single party's platform. The Interstate Commerce Act of 1887 had already established the principle of railroad rate regulation; the Hepburn Act of 1906 gave the Interstate Commerce Commission real enforcement power. The Sherman Act (1890) and the Clayton Antitrust Act (1914) addressed monopolistic practices. The 16th Amendment (1913) introduced the federal income tax. The 17th Amendment (1913) established the direct election of senators. President Theodore Roosevelt's trust-busting campaigns and railroad regulation further institutionalized the Populist agenda.

As Eichengreen (2018) observes, "although Bryan was defeated in 1896, the Populists' complaints did not go unheeded. Mainstream politicians had understood since the 1880s that they had to address the concerns of farmers, miners, and workers or risk losing out to more radical political elements." The institutional response was comprehensive enough to raise q durably: voters could observe concrete policy changes that addressed their grievances, reducing the appeal of commitment politicians who promised to bypass the establishment entirely.

The distinction between platform absorption (short-lived, strategic) and institutional absorption (durable, structural) is important. The Democratic Party's platform signals served to defuse the immediate electoral threat of the People's Party, buying time for the slower process of institutional reform. By the time the income tax and direct election of senators were enacted in 1913, the populist coalition had long since dissolved. The platform signals raised q temporarily; the institutional reforms raised q permanently.

The nineteenth-century episode suggests that populist movements are reabsorbed when mainstream parties can credibly raise q—both by signaling alignment with the losers of structural change and by demonstrating the institutional capacity to deliver compensation. Both conditions were met in the 1890s. The alignment signal was cheap: adopting the silver platform cost the Democratic Party nothing in fiscal terms. The capacity signal was credible: no federal income tax yet existed, public debt was low, and the fiscal space for new inclusive commitments was vast.

The contrast with the present is stark. In the early twenty-first century, top marginal tax rates in advanced economies are already high relative to their historical range, public debt is substantial, and the political difficulty of expanding redistributive programs is well documented. The capacity component of q is structurally constrained: even an aligned government faces binding limits on its ability to compensate losers through inclusive means (Guiso et al., 2026). When inclusive commitments lose credibility, the model predicts that exclusionary alternatives—immigration restriction, trade protection, nativist rhetoric—fill the gap, because they do not require fiscal capacity (Rodrik, 2018). This may help explain why modern populism has proven both more persistent and more right-leaning than its nineteenth-century predecessor.

The vicious circle is self-reinforcing. Low trust in institutions (q low) generates support for commitment politicians who, once in office, may further erode institutional capacity—through norm violations, institutional degradation, or fiscal profligacy—keeping q low and sustaining demand for their own continuation (Bellodi et al., 2025). In the 1890s, this circle was broken by a combination of political strategy, institutional reform, and economic good fortune. Whether it can be broken again depends on whether the conditions that made absorption possible—untapped fiscal capacity, a reform-ready political establishment, favorable economic tailwinds—can be approximated in a fundamentally different fiscal and institutional environment.

Today's technological disruption from automation and artificial intelligence shares the structural feature of the railroad shock: it creates identifiable losers whose probability p of being market winners declines sharply. But it differs in one critical respect. In the 1890s, the losers were geographically concentrated in identifiable counties, making political organization straightforward and the policy response targetable. Today, the losers from AI and automation are harder to identify geographically and more dispersed across occupations, industries, and skill levels. This makes both the political mobilization and the institutional response more diffuse—and potentially less effective at raising q for any specific group.

The railroad episode thus offers both hope and caution. Hope, because it demonstrates that populist waves can be absorbed through deliberate institutional response. Caution, because the conditions that made absorption possible may not be replicable—and because the selective, strategic nature of the 1890s absorption, visible in the evolving Democratic platforms, suggests that mainstream parties' commitment to reform was always instrumental rather than principled.

8. Conclusion

The People's Party is the only major populist movement in American history that was fully reabsorbed by the mainstream. This paper has studied one of the triggers of its rise—technological disruption from railroad expansion—and discussed its dissolution through the lens of the commitment-politics framework developed and tested empirically here. We constructed a novel county-level measure of Technological Disruption Exposure (TDE) that captures the change in competitive pressure each county faced from all other counties, driven solely by railroad-induced reductions in transportation costs between 1870 and 1890. TDE positively and significantly predicts People's Party vote share in the 1894 congressional elections; when we control for the change in market access, the TDE coefficient strengthens and the market-access effect turns negative, confirming that it is competitive displacement, not market integration, that drives populist voting. Heterogeneity analysis supports this interpretation: the effect is concentrated in counties with high crop specialization, where the competitive shock translated into concentrated losses, amplified where bank access was scarce and institutional capacity weakest, and attenuated in counties with larger foreign-born populations, where the exclusionary elements of the populist bundle were less appealing. The commitment-politics framework organizes these patterns: railroads lowered the probability of being a market winner for exposed counties, and where institutional trust was also low, voters shifted from discretionary to commitment politicians. But unlike today's populist movements, the nineteenth-century episode proved transitory—because mainstream parties could credibly raise institutional trust through platform adoption, and favorable economic shifts reinforced the political response.

The paper makes three contributions. First, it provides the first causal identification of the distributional effects of railroad technology on political outcomes, constructing TDE and showing that railroad-driven competitive displacement drove People's Party support. Second, heterogeneity analysis organized by the commitment-politics framework (Guiso et al., 2026; Bellodi et al., 2025) provides evidence consistent with the roles of p, q, and bundle value in determining the populist response. Third, the 1890s episode is uniquely informative because we observe the full populism cycle: the rise mirrors today's pattern, but unlike today, there was fiscal and institutional room to raise q—mainstream parties adopted populist demands, and durable reforms followed. The conditions under which populism was reabsorbed illuminate why the nineteenth-century wave proved transient in ways that its twenty-first-century counterpart may not.

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Appendices

A. Additional Robustness Checks

This appendix reports robustness checks that complement the main results in Table A6.

A.1 Pre-treatment party shares

Table A1 reports specifications controlling for county-level party shares before the railroad shock. Column (1) reproduces the baseline. Column (2) controls for the Democratic vote share in 1868, column (3) for the Republican vote share in 1868, and column (4) for the populist-party vote share in the 1870 congressional elections (classified following Han and Milner, 2024; predominantly Greenback and related agrarian-protest tickets). The TDE coefficient remains positive and significant in all cases. The 1868 Democratic share enters positively and significantly, consistent with historical continuity between Democratic and Populist constituencies; the Republican share is the mirror image. The 1870 populist-party share is a strong positive predictor, but its inclusion does not eliminate the TDE effect, confirming that the result is not an artifact of counties predisposed to protest voting.

Table A1: Robustness: Pre-Treatment Party Shares.

	Populist Vote Share – 1894			
	(1) Baseline	(2) + Dem 1868	(3) + Rep 1868	(4) + Populist 1870
$ln(\Delta T_d)$	1.705***	2.497**	2.441**	3.799***
	(0.596)	(1.133)	(1.133)	(1.153)
$ln(\Delta \text{MA})$		-1.294	-1.270	-2.257**
		(0.892)	(0.892)	(0.904)
Dem. vote share 1868*		2.601***		
		(0.475)		
Rep. vote share 1868*			-0.124***	
			(0.0220)	
Populist vote share 1870				1.324***
				(0.343)
Constant	14.40***	14.62***	20.84***	14.20***
	(0.311)	(0.313)	(1.215)	(0.309)
Mean of dep. variable	14.40	14.40	14.40	14.40
R^2_{adj}	0.480	0.493	0.494	0.484
Observations	1744	1744	1744	1744
State FE	✓	✓	✓	✓
ΔMA control		✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

* Mississippi, Texas, and Virginia (three former Confederate states) were not yet restored to the Union and thus did not vote in 1868. Due to the state of Reconstruction, no election was held in Florida either. For these four states, we consider the 1872 presidential elections.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.2 Migration and compositional change

A threat to identification is that counties experiencing greater competitive pressure also experienced differential migration flows, so that the estimated political effect reflects compositional change rather than the response of incumbent residents. Table A2 addresses this concern.

Columns (1) and (2) regress the change in the foreign-born population share (1870–1890) on TDE, without and with the ΔMA control. Without the control, TDE is positively associated with foreign-born inflows (0.130, $p < 0.01$)—counties experiencing greater competitive pressure also attracted more immigrants, likely because both TDE and immigration responded to railroad expansion. Once ΔMA is included, the sign reverses: TDE reduces foreign-born inflows (-0.110, $p < 0.05$), while ΔMA is strongly positive (0.256, $p < 0.01$). This decomposition mirrors the main political result: market access attracts immigrants, but competitive pressure—holding market access constant—deters them. Column (3) shows that the main political result survives controlling for the change in foreign-born share.

Columns (4) and (5) examine the change in the manufacturing labor share. TDE has no effect (0.001, n.s.), with or without ΔMA. The competitive shock was specific to agriculture and did not generate offsetting sectoral reallocation into manufacturing. Column (6) confirms that the political result is unchanged when controlling for the change in manufacturing labor.

Columns (7) and (8) examine the change in the Black population share. TDE is associated with a reduction in the Black population share (-0.020, $p < 0.01$), an effect that strengthens with the ΔMA control (-0.095, $p < 0.01$), consistent with selective outmigration of the most economically vulnerable group from TDE-exposed counties.

Table A2: Migration and Compositional Change.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ln(Δ*Foreign-born*)	ln(Δ*Foreign-born*)	Pop. Vote %	Δ *Mfg labor*	Δ *Mfg labor*	Pop. Vote %	ln(Δ*Black pop.*)	ln(Δ*Black pop.*)
$ln(\Delta T_d)$	0.130***	-0.110**	1.248**	0.001	0.001	1.332**	-0.020***	-0.095***
	(0.021)	(0.047)	(0.544)	(0.001)	(0.002)	(0.546)	(0.007)	(0.016)
$ln(\Delta MA)$		0.256***			-0.001			0.080***
		(0.048)			(0.002)			(0.015)
Constant	-0.528***	-0.525***	14.891***	-0.001	-0.001	14.656***	-0.037***	-0.034***
	(0.013)	(0.013)	(0.302)	(0.001)	(0.001)	(0.306)	(0.004)	(0.004)
Mean of dep. variable	-0.522	-0.522	14.963	-0.001	-0.001	14.707	-0.038	-0.038
R^2_{adj}	0.395	0.415	0.480	0.101	0.101	0.473	0.241	0.265
Observations	1917	1917	1864	1864	1864	1803	1803	1803
State FE	✓	✓	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.3 Railroad exogeneity and spatial structure

A concern specific to our setting is that TDE may capture the mechanical effect of having a railroad line through the county rather than exposure to a broader competitive network. Table A3 reports two tests.

Column (1) reproduces the baseline for reference. Column (2) substitutes the average TDE of neighboring counties (excluding county d itself) for county d's own TDE. The neighbors' measure is significant (1.475, $p < 0.05$), indicating that the effect reflects network-level competitive pressure rather than local railroad placement. Column (3) reports a falsification test: regressing an indicator for whether a county gained any railroad between 1870 and 1890 on the county's 1870 competitive exposure computed *without* transport costs—a measure that captures only geographic and productivity fundamentals. The coefficient is small and insignificant (0.015, n.s.), confirming that pre-existing competitive structure did not predict subsequent railroad construction.

Table A3: Railroad Exogeneity.

	(1) Populist Vote Share – 1894	(2) Populist Vote Share – 1894	(3) Δ any railroad
$ln(\Delta T_d)$	1.486***		
	(0.532)		
$ln(\Delta \hat{T}_d)$		1.475**	
		(0.612)	
T_d 1870 No Trans. Costs			0.015
			(0.014)
Constant	15.220***	15.220***	0.321***
	(0.302)	(0.302)	(0.010)
Mean of dep. variable	15.290	15.290	0.320
R^2_{adj}	0.476	0.475	0.190
Observations	1913	1913	1906
State FE	✓	✓	✓

Robust standard errors in parentheses.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

$\Delta \hat{T}_d$: average TDE of neighboring counties, excluding d.

Table A4 further shows that the main result is robust to controlling for the presence of any railroad in 1870 and for railroad mileage within varying buffer distances (10, 20, 30, 40 miles). The TDE coefficient remains positive and significant across all specifications, declining only modestly as controls for pre-existing railroad infrastructure are added.

Table A4: Robustness: Controlling for Railroad Presence in 1870.

	Populist Vote Share – 1894					
	(1) Baseline	(2) Any RR	(3) RR 10mi	(4) RR 20mi	(5) RR 30mi	(6) RR 40mi
$ln(\Delta T_d)$	1.579***	1.026*	1.121**	1.117**	1.263**	1.439***
	(0.529)	(0.565)	(0.561)	(0.569)	(0.569)	(0.550)
Any railroad in 1870		-2.437***				
		(0.857)				
Any railroad ≤ 10mi in 1870			-2.420**			
			(1.118)			
Any railroad ≤ 20mi in 1870				-3.060**		
				(1.335)		
Any railroad ≤ 30mi in 1870					-2.696*	
					(1.416)	
Any railroad ≤ 40mi in 1870						-1.565
						(1.336)
Constant	15.180***	16.560***	16.900***	17.580***	17.400***	16.520***
	(0.300)	(0.587)	(0.880)	(1.123)	(1.221)	(1.188)
Mean of dep. variable	15.250	15.250	15.250	15.250	15.250	15.250
R^2_{adj}	0.483	0.485	0.485	0.485	0.484	0.483
Observations	1906	1906	1906	1906	1906	1906
State FE	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.4 Additional demographic and human capital controls

Table A5 reports interaction specifications with additional county-level characteristics measured in 1870. All specifications include state fixed effects and the ΔMA control. The TDE coefficient remains positive in all specifications and statistically significant in five of seven. It is significant when interacted with the native-born share (column 1; interaction -1.330, $p < 0.05$, indicating an attenuated effect in counties with more native-born residents), the share of population with foreign-born parents (column 3; interaction n.s.), school enrollment (column 4; interaction n.s.), and the voting-age male share (column 7; interaction n.s.). In the illiteracy specifications (columns 5–6), the main TDE effect is absorbed into the interaction term, which is positive and significant for both reading (interaction 1.738, $p < 0.01$) and writing (interaction 1.365, $p < 0.01$). The literacy interactions suggest that the populist response was amplified in counties with lower human capital, consistent with greater economic vulnerability to competitive shocks.

Table A5: Robustness: Additional Demographic and Human Capital Controls.

	Populist Vote Share – 1894						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	× Native	× Female	× For. par.	× School	× Illit. (R)	× Illit. (W)	× Males 21+
$ln(\Delta T_d)$	2.834***	2.820***	2.539**	3.088***	0.655	1.173	2.692**
	(1.085)	(1.071)	(1.055)	(1.095)	(1.074)	(1.055)	(1.055)
$ln(\Delta MA)$	-1.865**	-1.516*	-1.447*	-1.774*	0.220	-0.153	-1.437*
	(0.862)	(0.855)	(0.850)	(0.907)	(0.894)	(0.889)	(0.840)
Share of native born in state	0.238						
	(0.870)						
$ln(\Delta T_d)$ × Native born	-1.330**						
	(0.534)						
Share of female population		0.468					
		(0.737)					
$ln(\Delta T_d)$ × Female		-0.345					
		(0.355)					
Share with foreign-born parents			-2.561***				
			(0.416)				
$ln(\Delta T_d)$ × For. parents			0.246				
			(0.377)				
Share in school				-1.658***			
				(0.627)			
$ln(\Delta T_d)$ × School				-0.771			
				(0.541)			
Share who cannot read					-1.956***		
					(0.674)		
$ln(\Delta T_d)$ × Cannot read					1.738***		
					(0.393)		
Share who cannot write						-2.013***	
						(0.686)	
$ln(\Delta T_d)$ × Cannot write						1.365***	
						(0.410)	
Share of male citizens 21+							-0.707
							(0.688)
$ln(\Delta T_d)$ × Males 21+							0.528
							(0.349)
Constant	14.807***	15.134***	15.316***	15.451***	15.489***	15.277***	15.165***
	(0.345)	(0.302)	(0.297)	(0.307)	(0.324)	(0.320)	(0.300)
Mean of dep. variable	15.260	15.260	15.260	15.260	15.260	15.260	15.260
R^2_{adj}	0.480	0.478	0.485	0.482	0.487	0.484	0.478
Observations	1917	1917	1917	1917	1917	1917	1917
State FE	✓	✓	✓	✓	✓	✓	✓
ΔMA control	✓	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.5 Alternative price measures

Table A6: Technological Disruption Exposure and Populist Vote Share, 1894. Price for each crop is computed as the average price between 1866 and 1870.[9]

	Populist Vote Share – 1894					
	(1) Baseline	(2) + ΔMA	(3) + Dem 1868	(4) + Populist 1870	(5) + Δ Foreign born	(6) Neighbors' TDE
$ln(\Delta T_d)$	1.426***	2.833**	2.285*	3.438***	2.934***	
	(0.535)	(1.119)	(1.209)	(1.196)	(1.108)	
$ln(\Delta \hat{T}_d)$						1.410*
						(0.738)
$ln(\Delta\text{MA})$		-1.472	-1.148	-1.917**	-1.867**	0.086
		(0.898)	(0.953)	(0.936)	(0.893)	(0.507)
Dem. vote share 1868			2.644***			
			(0.476)			
Pop. vote share 1870				1.323***		
				(0.338)		
ln(ΔForeign-born)					1.574***	
					(0.404)	
Constant	15.189***	15.164***	14.652***	14.517***	15.208***	15.224***
	(0.302)	(0.301)	(0.313)	(0.307)	(0.300)	(0.302)
Mean of dep. variable	15.260	15.260	14.399	14.652	15.260	15.292
R^2_{adj}	0.477	0.477	0.493	0.478	0.480	0.475
Observations	1917	1917	1744	1793	1917	1913
State FE	✓	✓	✓	✓	✓	✓
ΔMA control		✓	✓	✓	✓	✓

Robust standard errors in parentheses. All variables standardized.

Col. (5): additionally controls for Δ foreign-born share 1870–1890.

Col. (6): $ln(\Delta \hat{T}_d)$ is the average TDE of neighboring counties, excluding county d.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.6 Descriptive statistics

Table A7: Potential yields (kg dry weight per hectare[10]).

	count	mean	sd	min	max
a_{barley}	2785	2054.24	586.08	0.00	2847.53
$a_{buckwheat}$	2785	767.67	175.43	0.00	1166.31
$a_{canesugar}$	2785	484.63	1103.60	0.00	3941.40
a_{corn}	2785	3251.76	1327.83	0.00	4790.87
a_{cotton}	2785	130.23	111.41	0.00	308.75
a_{flax}	2785	356.49	93.01	0.00	546.56
a_{hay}	2785	1167.61	388.47	51.19	1808.36
a_{oats}	2785	1199.37	271.17	0.00	1489.90
a_{potato}	2785	2880.90	700.00	0.00	4266.19
a_{rice}	2785	1072.70	1360.80	0.00	3391.82
a_{rye}	2785	1421.84	379.41	0.00	1913.80
$a_{sweetpotato}$	2785	864.58	1514.64	0.00	4101.34
$a_{tobacco}$	2785	577.47	218.70	0.00	817.29
a_{wheat}	2785	2150.85	569.38	0.00	2847.53

Table A8: Descriptive statistics – population and crop production (units of measure in parenthesis) in 1870.

	count	mean	sd	min	max
Population	2388	16107.05	34306.76	0.00	946429.83
Barley (bushels)	2353	301.94	1388.78	0.00	24875.99
Buckwheat (bushels)	2353	100.14	477.04	0.00	9181.94
Cane sugar (hogsheads of 1000 lbs.)	2353	18.50	220.23	0.00	4779.00
Corn (bushels)	2353	9048.96	12415.83	0.00	122885.36
Cotton (bales of 400 lbs.)	2353	255.89	684.11	0.00	6486.80
Flax fiber (pounds)	2353	5.77	70.09	0.00	2325.90
Hay (tons)	2353	11585.67	24077.11	0.00	269250.00
Oats (bushels)	2353	1914.20	3489.83	0.00	31097.23
Irish potatoes (bushels)	2353	1824.02	4151.10	0.00	64243.92
Rice (pounds)	2353	15.65	194.45	0.00	4404.03
Rye (bushels)	2353	201.18	587.29	0.00	11939.42
Sweet potatoes (bushels)	2354	253.52	654.62	0.00	21617.97
Tobacco (pounds)	2353	55.82	253.17	0.00	3300.25
Wheat (bushels)	2353	3661.34	7189.77	0.00	76075.68

[9] For canesugar, flax, and rice these data are not available so we consider only prices in 1870.

[10] Except for hay, which is measured in 10 kg dry weight per hectare.

Table A9: Descriptive statistics – crop production value in 1870.

	price	count	mean	sd	min	max
Barley	25.56	2353	7717.37	35495.87	0.00	635804.00
Buckwheat	21.65	2353	2167.77	10326.14	0.00	198755.50
Cane sugar	155.58	2353	2877.49	34262.11	0.00	743502.12
Corn	19.27	2353	174358.03	239231.91	0.00	2367791.25
Cotton	252.68	2353	64657.99	172863.04	0.00	1639103.62
Flax fiber	274.15	2353	1580.47	19214.95	0.00	637636.50
Hay	9.66	2353	111931.70	232614.29	0.00	2601283.50
Oats	22.10	2353	42310.89	77138.11	0.00	687362.62
Irish potatoes	14.63	2353	26693.02	60747.83	0.00	940154.94
Rice	56.22	2353	879.66	10931.78	0.00	247592.52
Rye	24.96	2353	5020.79	14656.69	0.00	297965.59
Sweet potatoes	18.04	2354	4573.47	11809.28	0.00	389986.25
Tobacco	181.95	2353	10157.18	46065.48	0.00	600485.06
Wheat	33.84	2353	123890.27	243282.97	0.00	2574203.00

Table A10: Descriptive statistics – Technological Disruption Exposure: ΔT_{dj} and ΔT_d.

	count	mean	sd	min	max
$\Delta T_{d\,barley}$	2324	0.001	0.005	0.00	0.097
$\Delta T_{d\,buckwheat}$	2324	0.000	0.000	0.00	0.002
$\Delta T_{d\,canesugar}$	2324	0.000	0.000	0.00	0.005
$\Delta T_{d\,corn}$	2324	0.394	0.497	0.00	4.946
$\Delta T_{d\,cotton}$	2324	0.013	0.031	0.00	0.303
$\Delta T_{d\,flax}$	2324	0.000	0.000	0.00	0.000
$\Delta T_{d\,hay}$	2324	0.106	0.174	0.00	1.804
$\Delta T_{d\,oats}$	2324	0.012	0.017	0.00	0.214
$\Delta T_{d\,potato}$	2324	0.006	0.016	0.00	0.449
$\Delta T_{d\,rice}$	2324	0.000	0.000	0.00	0.001
$\Delta T_{d\,rye}$	2324	0.000	0.000	0.00	0.005
$\Delta T_{d\,sweetpotato}$	2324	0.002	0.010	0.00	0.457
$\Delta T_{d\,tobacco}$	2324	0.000	0.001	0.00	0.008
$\Delta T_{d\,wheat}$	2324	0.112	0.215	0.00	2.853
ΔT_d	2324	0.646	0.599	0.02	5.919
$ln(\Delta T_d)$	2324	-0.704	0.701	-3.83	1.778

Figure A1: Within-state variation of $\ln(\Delta T_d)$.

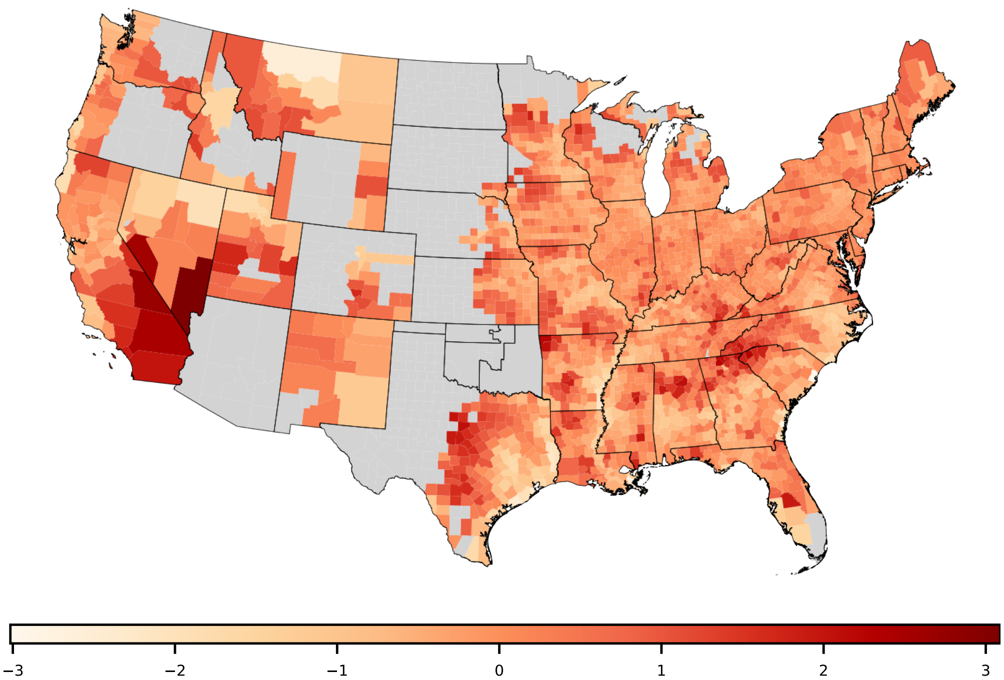


Figure A2: Potential yields for key crops (1890 U.S. county boundaries). Maps for the remaining ten crops are available upon request.

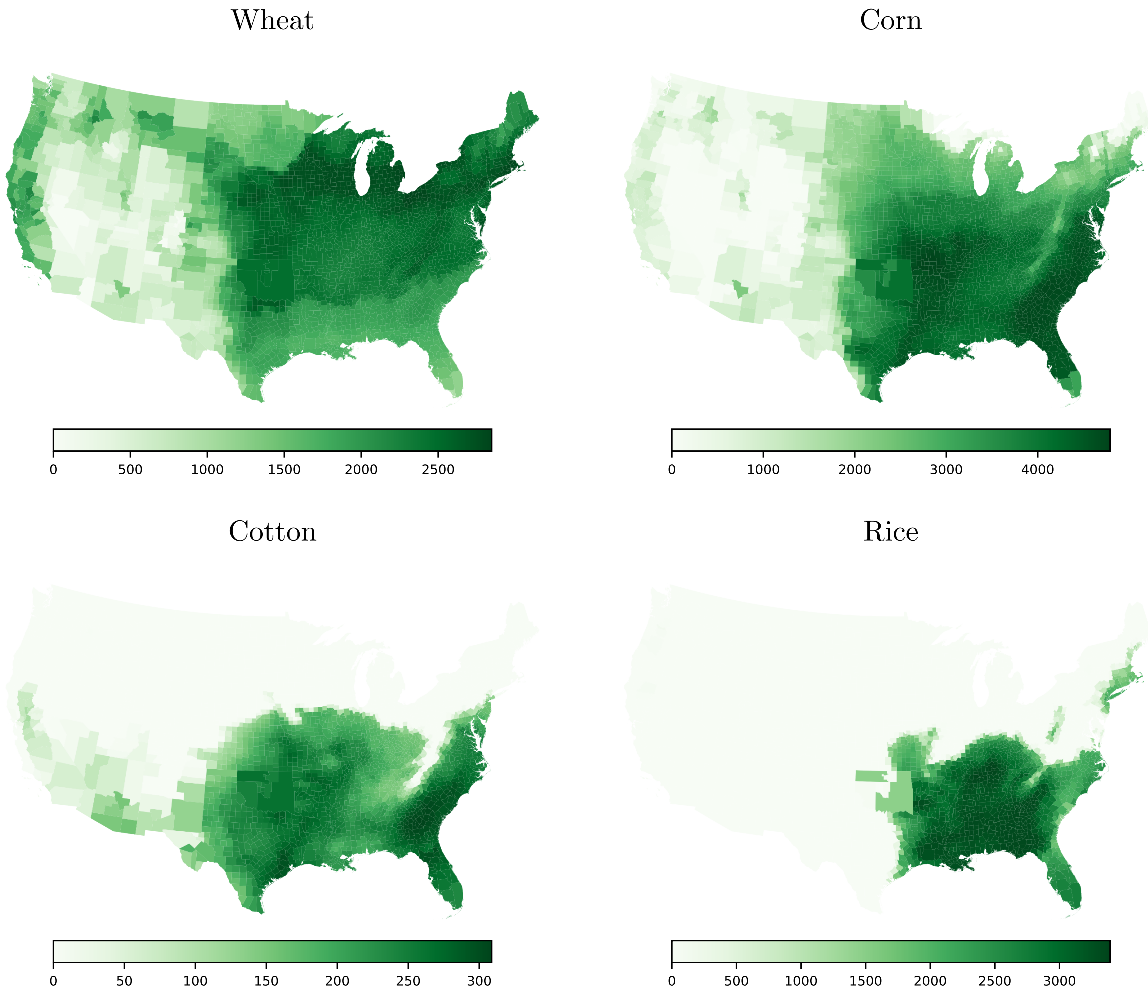


Figure A3: Distribution of ΔT_{dj} for key crops (1890 U.S. county boundaries). Maps for the remaining ten crops are available upon request.

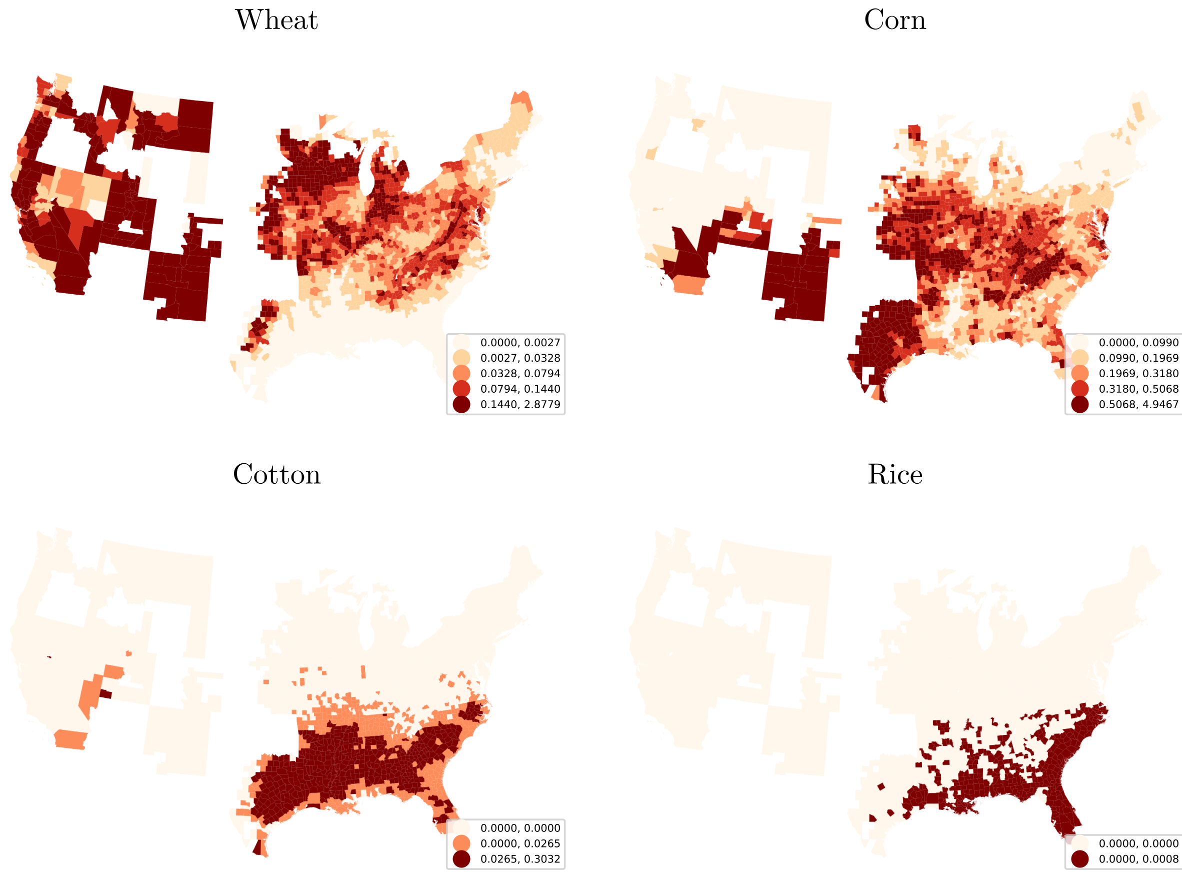


Table A11: Change in share of production value, $\frac{y_{dj}^{1890}}{y_d^{1890}} - \frac{y_{dj}^{1870}}{y_d^{1870}}$.

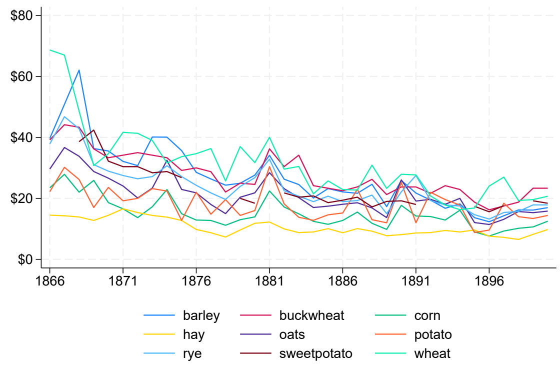
	Buckwheat	Cane sugar	Flax	Hay	Rye	Sweet potatoes	Wheat
$ln(\Delta T_{dj})$	-0.003***	-0.000	-0.011***	-0.080***	-0.008***	-0.020***	-0.065***
	(0.000)	(0.002)	(0.001)	(0.005)	(0.001)	(0.003)	(0.005)
Constant	-0.000***	0.001	-0.001***	0.048***	-0.002***	0.001	-0.058***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.001)	(0.002)
Mean of dep. variable	-0.000	0.001	-0.001	0.048	-0.002	0.001	-0.058
R^2_{adj}	0.310	0.018	0.851	0.591	0.495	0.310	0.426
Observations	2321	2318	2310	2321	2321	2322	2321
State FE	✓	✓	✓	✓	✓	✓	✓

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure A4: Crop prices (1866-1900).

(a)



(b)