Trains, Trade, and Transformation

A Spatial Rogowski Theory of America's 19th Century Protectionism

Kenneth Scheve
Yale University
kenneth.scheve@yale.edu

Theo Serlin
Stanford University
tserlin@stanford.edu*

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Abstract

We study the effect of expanding trade on societal coalitions through its impact on development. We combine a majoritarian political model with a spatial model of trade to argue that trade-induced economic change—by bringing new workers to locations closer to world markets—can lead to losses rather than gains in political power by the factors of production advantaged by increased trade. We study how this phenomenon explains rising protectionism in the US from 1880 to 1900. Using county-level changes in transportation costs induced by railroad expansion, our estimates indicate that falling costs increased population and land values but reduced the proportion employed in agriculture. Reduced transportation costs caused a reduction in vote shares for the Democratic party, which favored liberal trade policies, and an increase in an original newspaper-based measure of protectionist sentiment. Expanding trade alters not only political interests but also the geographic distribution of those interests.

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1 INTRODUCTION

In the late 19th century, falling transportation costs integrated US agriculture into the global economy. Steam-powered railways and ships made it possible for American farmers to export to Europe, and collapsed price spreads between European and American markets. These developments brought profound economic and political change to Europe, but their apparent effects on American politics were counterintuitive (Gourevitch, 1977). While falling trade costs should have benefitted farmers and other supporters of free trade, those elements were politically marginalized. The Republican Party, which was committed to high tariffs, became increasingly dominant over the period. This fact is counterintuitive because a large body of work in political science and economics works from the assumption that economic changes that make a group richer, also make it more powerful and increase the likelihood that it will be able to implement its preferred policy. Rogowski (1987, 1123) states "those who enjoy a sudden increase in (actual or potential) wealth and income will thereby be enabled to expand their political influence as well." Acemoglu, Johnson and Robinson (2005) and Puga and Trefler (2014) both consider cases in which expanding international trade increased the power of merchants and enabled them to implement institutional change.

This paper asks why falling transportation costs, and an associated export boom, empowered protectionist elements in the US. We use county-level data on transportation costs, economic change, and voting, and develop a new measure of protectionism from newspapers. It was not just at the national level that the success of protectionists accompanied falling transportation costs. Counties that experienced decreases in the cost of accessing ports due to the expansion of the rail network shifted towards the Republican Party, and their newspapers became more protectionist. Our focus on county-level transportation costs allows us to rule out simpler solutions to the puzzle of rising protectionism. A theory in which the negative effects of import competition drive protectionism cannot explain why areas which saw large increases in land prices and population due to trade shifted towards protectionism. These

positive economic effects also rule out a theory in which the economic rents from export opportunities are entirely captured by intermediaries. Though developments unrelated to trade may have driven voters towards the Republican Party, there is no reason to expect these developments to be correlated with changing access to world markets, or with protectionism.

We argue that trade altered the spatial distribution of economic activity, economic factors, and economic interests. Drawing on recent developments in urban and trade economics, we develop a spatial equilibrium trade model with two factors of production: land and labor. We assume that labor is mobile between regions, and so inter-regional differences in real wages are arbitraged away by migration. Local economic changes do not benefit local workers, rather, the preferences of workers over policy are determined at the national level. As the US exported agricultural goods, and agriculture was the less labor-intensive sector, workers had an economic interest in protectionism. In this context, decreases in transportation costs increase the price received by agricultural exporters, pushing up land prices in regions specializing in agriculture. Facing higher prices for their products, farmers hire more workers causing migration into the regions with falling transportation costs. The in-migration of protectionist workers dilutes the political power of landowners.

Our argument draws on Rogowski's (1987; 1990) seminal model of the effect of changing exposure to trade on political cleavages. Rogowski combines a Heckscher-Ohlin trade model in which factors of production are mobile across sectors, with a model of politics in which wealth and income increase political power. The Heckscher-Ohlin model generates the sharp prediction that relatively abundant factors will favor trade, and relatively scarce factors will oppose it. Rogowski argues that in periods of rising international trade, conflict between trade's domestic winners and losers should become more important to domestic politics, and that the power of the winners should increase. While our account shares the Stolper-Samuelson logic of Rogowski's, the spatial dimension of our theory suggests a different set of results.

Our findings are relevant to scholarship on the effects of trade on domestic politics. Some scholars have extended Rogowski's framework by adopting alternative assumptions about the

economic model that describes who wins and loses from increased trade. Others have studied how variation in political institutions influences both the importance of trade to broader political cleavages in a society and the way trade interests influence policy outcomes (on the later point see Alt and Gilligan (1994) and Milner and Kubota (2005)). An important alternative economic model emphasizes that in practice it is costly for factors to move across industries, making industries not factors the relevant cleavage for trade politics. Within this framework, scholars argue that intersectoral factor mobility varies across countries and time, influencing whether and how trade influences national political cleavages (Hiscox, 2002*a*,*b*; Ladewig, 2006). Another perspective holds that heterogeneity in productivity among firms within industries means that firms, not factors or industries, should be expected to have systematically different preferences over trade, with implications for how trade may or many not shape domestic political cleavages (Kim, 2017; Kim and Osgood, 2019).

This research, and the large body of survey work inspired by it, answers a lot of important questions about how trade shapes national politics. What it does not have much to say about is that in all but the smallest countries in the world, conflict over trade is fought across space as well as across factors, industries, and firms. Broz, Frieden and Weymouth (2021) argue that how trade affects communities may be most consequential for how it is politicized and how it influences national politics. Researchers have primarily studied the geography of trade politics by taking the spatial distribution of economic activity as given and investigating how a given change in exposure to trade differentially affects political outcomes across locations within a country. This approach is well represented in the large and expanding literature on the political consequences of China's integration into the world economy (Autor et al., 2017; Feigenbaum and Hall, 2015; Che et al., 2016; Colantone and Stanig, 2018*a*,*b*,*c*; Ballard-Rosa et al., 2021; Baccini and Weymouth, 2021; Milner, 2021). Other scholars have emphasized how the geographic distribution of economic activity affects the ability of firms in industries to solve their collective action problems and influence politics, and how the spatial distribution of trade interests interacts with political institutions to determine the effect of trade on

national politics (Busch and Reinhardt, 1999, 2000; McGillivray, 2004; Rickard, 2018).

While this broad approach to the political economy of geography in trade politics provides important insights into how the spatial distribution of economic activity affects national politics and policy outcomes, it largely ignores or assumes away a likely consequential adjustment mechanism to changing exposure to trade—the geographic location decisions of workers. A large literature in trade and urban economics has emerged over the last two decades that provides a theoretical and empirical framework for understanding how space influences the geographic distribution of economic activity (Fajgelbaum and Redding, 2014; Donaldson and Hornbeck, 2016; Donaldson, 2018). One key element of this framework is that the gravity dynamics that shape the flow of goods and people between countries also apply within countries. While this research has explored how the possibility of migration affects the impact of trade on the economy, it has not investigated its consequences for the effect of trade on political cleavages and policymaking.

In this paper, we take steps in this direction by adopting a spatial model of international trade in which workers are mobile across regions within a country. The core insight of our model is that increased exposure to trade in the agricultural hinterland induces economic development and structural change and, in doing so, alters the composition of those who gain and those who lose from free trade across regions. Trade, development, and mobility combine to alter not only the interests of different economic actors but also their spatial distribution.

We argue that decreased trade costs induced new workers to move to regions growing because of greater trade. While falling internal transportation costs increased labor demand in the agricultural periphery, high tariffs increased labor demand in the industrial core, and so the workers who migrated into the periphery still favored protectionism. Development and mobility explain why trade can lead to the loss of political power by the factors of production most advantaged by increased trade, in this case landowners and the Democratic Party.

To test our argument empirically, we primarily study two political outcome variables: the two-party vote for the Democrats and support for protectionism. To measure the latter, we

develop a new county-by-decade measure. We constructed the variable using data from 5,601 newspapers in 1,246 counties, from the Newspapers.com database over the 1860 to 1900 period. The measure is based on the frequency of terms predictive of support for protectionism, which we identify by comparing texts of known protectionist and free trade publications.

Our model also predicts that increasing exposure to trade in agricultural regions will increase population, land values, and agricultural production. We construct county-level measures of these variables from the US population census and census of agriculture. Under additional assumptions about the inelasticity of demand between traded goods and non-traded services, our model also predicts that exposure to trade should cause a reduction in the share of the population employed in agriculture and an increase in the share employed in non-traded services. We use complete-count data from the 1880 and 1900 censuses to calculate these sector shares.

To estimate the effect of increasing exposure to trade on our economic and political outcomes, we construct the variable log port access, defined as the natural log of one over the iceberg cost of transportation to the nearest port. We compute this measure at ten-year intervals, using the transportation network database created by Donaldson and Hornbeck (2016) and updated by Hornbeck and Rotemberg (2019). This variable measures exposure to trade for each county and changes in this measure over time are driven by the expansion of the US rail network.

Following Donaldson and Hornbeck (2016), we estimate the effect of changes in the rail network in a difference-in-differences framework. We regress each outcome variable on the variable log port access with county and state-by-year fixed effects. Further, all specifications control for a third-degree polynomial in the length of railway within 40 miles of the county centroid. This means that our estimates of the effect of port access depend on changes in the network distant from and likely unrelated to the counties affected. This increases the plausibility of the parallel trends assumption necessary to give the estimate a causal interpretation.

We find that falling transportation costs increased farm output, land values, and population density but reduced the portion of the population employed in agriculture. We show that reduced transportation costs caused a reduction in county vote shares for the Democratic Party, which at this time represented the interests of agriculture and advocated liberal trade policies. We also find that increased exposure to trade caused an increase in support for protectionism. This pattern of results is consistent with our model that emphasizes the importance of trade attracting new workers and changing the spatial composition of societal actors for and against protectionism.

Our analysis of the puzzle of America's 19th century protectionism links to foundational international political economy scholarship on the topic. Goldstein (1993) argues that the Republican Party's intellectual commitment to the tariff explains the persistence of protectionism even as the country's comparative advantage changed. Lake (1988) argues that Britain's commitment to free trade allowed exporting industries to support protectionism at home without losing export opportunities through retaliation abroad. These analyses—and others that link the success of protectionism in this context to the size and growth of import-competing manufacturing interests (for instance, Frieden 1988 makes this argument with respect to the interwar period)—focus on the interests and attitudes of industrialists. This article focuses on agriculture, and uses within-country variation in trade costs and protectionist sentiment to explore a different puzzle: that free trade supporters in agriculture lost out politically even at the local level despite gaining from falling transportation costs. It relates more closely to Gourevitch (1977) and Rogowski (1990), who argue that while falling transportation costs should have empowered farmers, the Democrats' fusion with the Populists alienated industrial workers from that rising coalition. In relation to those analyses, this article addresses changes in voting and attitudes in the agricultural regions affected by changing trade costs, and documents stronger effects before the emergence of the 1890s realignment.

The rest of the paper proceeds as follows: we first introduce our new measure of protec-

tionist trade opinion for US counties from 1860 to 1900. We then present a sketch outline of our theoretical model and main hypotheses. Next we describe our data measuring port access and other economic and political outcomes. This section also presents our research design and estimation strategy. The following section presents our estimates for the effect of lower trade costs on our main outcomes. It further provides evidence of our preferred mechanism by showing that the results are driven entirely by counties with relatively high levels of agricultural activity. There is no evidence that trade costs mattered in counties unlikely to export agricultural goods to the rest of the world. We conclude by discussing potential extensions that would explore how trade's impact on development and the role of mobility as an adjustment mechanism can be applied in other settings.

2 TRADE EXPANSION AND RISING PROTECTIONIST OPINION IN THE LATE 19TH CENTURY UNITED STATES

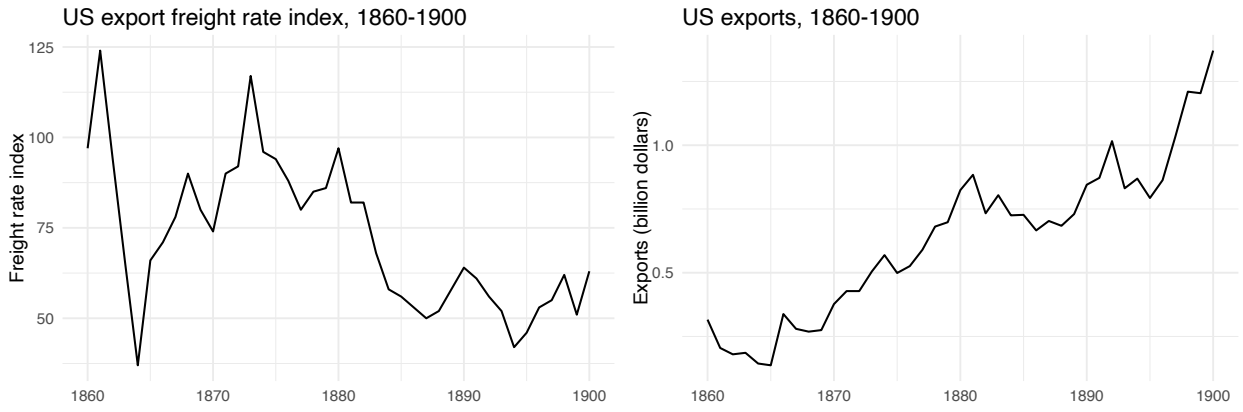

Figure 1: Late nineteenth-century decline in shipping costs and expansion of exports

We develop a new measure of relative support for protectionism at the newspaper level, over the 1860–1900 period, which we validate against plausible proxies for protectionism. We find that protectionist sentiment increased over the period, and did so in previously agricultural parts of the Midwest and South, that should have gained from decreasing transportation costs. These results are important for establishing that the puzzle of America's 19th century

protectionism was genuinely puzzling. One might think that the Republican party's electoral success, and thus it's ability to institute high tariffs, was due to reasons other than its stance on tariff policy. That newspaper readers and editors also became more protectionist suggests that the party's victories were part of a larger shift in public opinion towards protectionism, despite falling trade costs benefitting exporters.

The basis of our measure is the frequency of terms predictive of support for protectionism, in 5,601 newspapers in 1,246 counties, from the Newspapers.com database. A simple measure of the frequency of terms related to trade risks picking up the salience of trade, and not specific pro- and anti-trade attitudes, and can be sensitive to the arbitrary choice of terms. To avoid these problems we use a two-step process to identify the relevant terms, and the correct functional form. In the first step, we use the full text of the publications of protectionist and tariff-reform organizations, after excluding all references to cities, the publication titles, or publishers.[1] We train a Lasso model to predict, based on the frequency of each one- or two-word phrase, whether a page is from a protectionist or free trade publication. This first stage selects around 300 plausibly distinguishing terms.

In the second stage, we use these 300 terms to predict whether a newspaper is protectionist relative to others published in the same place at the same time. We identify newspapers approvingly quoted in *American Economist* which also appear in the Newspapers.com database. These newspapers were generally quoted for expressing protectionist sentiments, for instance, in 1899 the Philadelphia *Inquirer* was quoted "on the Tariff Responsible for the Mills," and the Philadelphia *Item* was quoted: "Prosperity a Complete Vindication for the

[1]On the protectionist side, we use the *American Economist*, published by the American Protective Tariff League, and the *Protectionist*, published by the Boston Home Market Club. On the free trade side, we use the *People's Cause: A Journal of Tariff Reform, Ballot Reform, Civil Service Reform*, the *Free Trade Broadside* published by the American Free Trade League, and *Tariff Reform*, published by the New York Reform Club.

Tariff." We pair these quoted newspapers with other newspapers published in the same city in the same year, with the assumption that the newspapers quoted in *American Economist* will on average be more protectionist than those not quoted. There are 110 such newspapers quoted in *American Economist*, which we pair with 505 others. We scrape the number of articles mentioning each of the 400 terms from the first stage, at the newspaper-year block level, restricting attention to articles which use one of the terms "protectionist," "protectionism," "imports," "exports," "importing", "exporting," "tariff," "foreign trade" or "international trade." We scale the number of hits for each term by the number of articles using any of the trade-related terms, and then use these term-frequencies to train another Lasso to predict whether the newspaper is one quoted in *American Economist*. By ensuring that each quoted newspapers is paired with others, we minimize the risk that features specific to the places which had protectionist newspapers bias our estimates. This Lasso then gives a set of around 60 terms and coefficients which we use to create our newspaper-year score. The second stage prevents us from over-fitting the idiosyncratic features of the small number of specialized newspapers used in the first stage; the first stage provides a principled way to identify terms which would plausibly predict protectionism.

We verify that our measure of protectionism is negatively correlated with county-level Democratic voteshare, and positively correlated with pro-tariff Congressional voting (Tables A-1, A-2). It also passes more basic plausibility tests: it is positively correlated with references to "American Economist," and with terms considered by Hirano and Snyder (2021) to be pro-tariff, and it is negatively correlated with those considered anti-tariff (Table A-3). These exercises increase our trust that this measure does capture genuine protectionism, and suggests that the newspapers in the Newspapers.com database were reasonably representative of the areas in which they were located. Our measure is also not correlated with references to the tariff, suggesting it picks up attitudes to the tariff, and not the issue's salience.

In addition, we use Random Forests to create an imputed measure of protectionism for all counties over the 1860–1900 period. We train a series of Random Forest models to predict

our newspaper protectionism scores at the county-year level, using data on county political, economic, religious and immigrant composition.[2] This method allows us to estimate the average protectionism of the country over time—weighting our imputed measure by county population—and to visualize the spatial distribution of protectionism.

Figure 2 shows that over the 1860–1900 period the country became more protectionist. Our training data is relatively heavily weighted towards the end of the period, and so we have less confidence in the figures for 1860 and 1870, but there is still strong evidence of a shift towards protectionism over the 1880–1900 period. Figure 3 shows the spatial distribution of protectionism in 1880 and 1900, and shows, consistent with historical accounts of the issue, that the Northeast was solidly protectionist, the South free trade, and the Midwest divided between the protectionist industrial north and more free-trade south and west. Comparing the 1880 and 1900 maps, one can see that protectionism made substantial inroads into the Midwest and parts of the South, areas that were predominantly agricultural during this period. This evidence suggests that, at the same time that parts of the US became integrated into the world economy and agricultural exports surged, the exporting regions became more protectionist. In section 5 we more precisely test the relationship between trade access and protectionism, using both newspaper and voting data.

3 TRADE, DEVELOPMENT, AND A SPATIAL ROGOWSKI THEORY OF LATE 19TH CENTURY AMERICAN PROTECTIONISM

This section sketches an outline of a spatial equilibrium model that provides the foundation for our argument about how development and mobility influence the effect of trade on political cleavages. We present the full model in Appendix B. The trade side of the model draws on Coşar and Fajgelbaum (2016) and Fajgelbaum and Redding (2014). In integrating a model of trade with majoritarian politics, the model draws on Mayer (1984) and Rogowski (1987).

Our model begins with an economy with multiple regions. There are two sets of actors,

[2]We iteratively drop variables according to the degree of missingness.

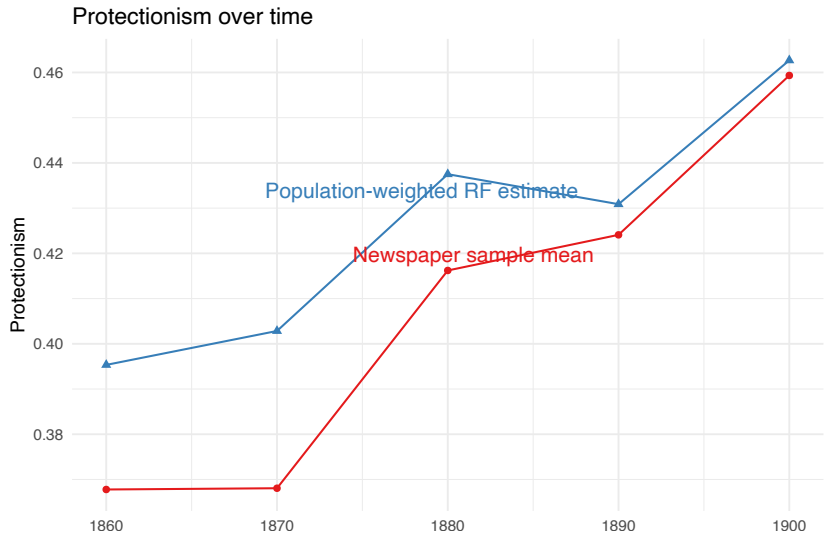

Figure 2: Average protectionism in Newspapers.com sample and in Random Forest estimates weighted by population

workers and landowners, who each supply a factor: labor and land. Perfectly competitive firms hire these factors and produce agricultural or manufactured goods. Perfect competition serves two functions here. First, it ensures that factors are paid their marginal product. Second, it ensures that firms make zero profits in all cases and do not influence politics. We assume that agriculture is sufficiently more land-intensive than manufacturing that if the country shifts production from agriculture to manufacturing, it will increase demand for labor and decrease demand for land. This difference in factor intensities between sectors generates Stolper-Samuelson type effects. If the country exports agricultural goods, reductions in trade costs will benefit agricultural landowners and harm labor.

Where our model departs from Mayer's and Rogowski's is in considering migration between multiple regions. Drawing on a long tradition in urban and spatial economics dating back to Rosen (1979) and Roback (1982), we assume that labor can costlessly migrate between regions. This assumption implies a spatial equilibrium condition: in equilibrium, the real wage for workers should be equalized across regions. If wages were higher in a given region, other workers would migrate there, increasing the local supply of labor and pushing wages down.

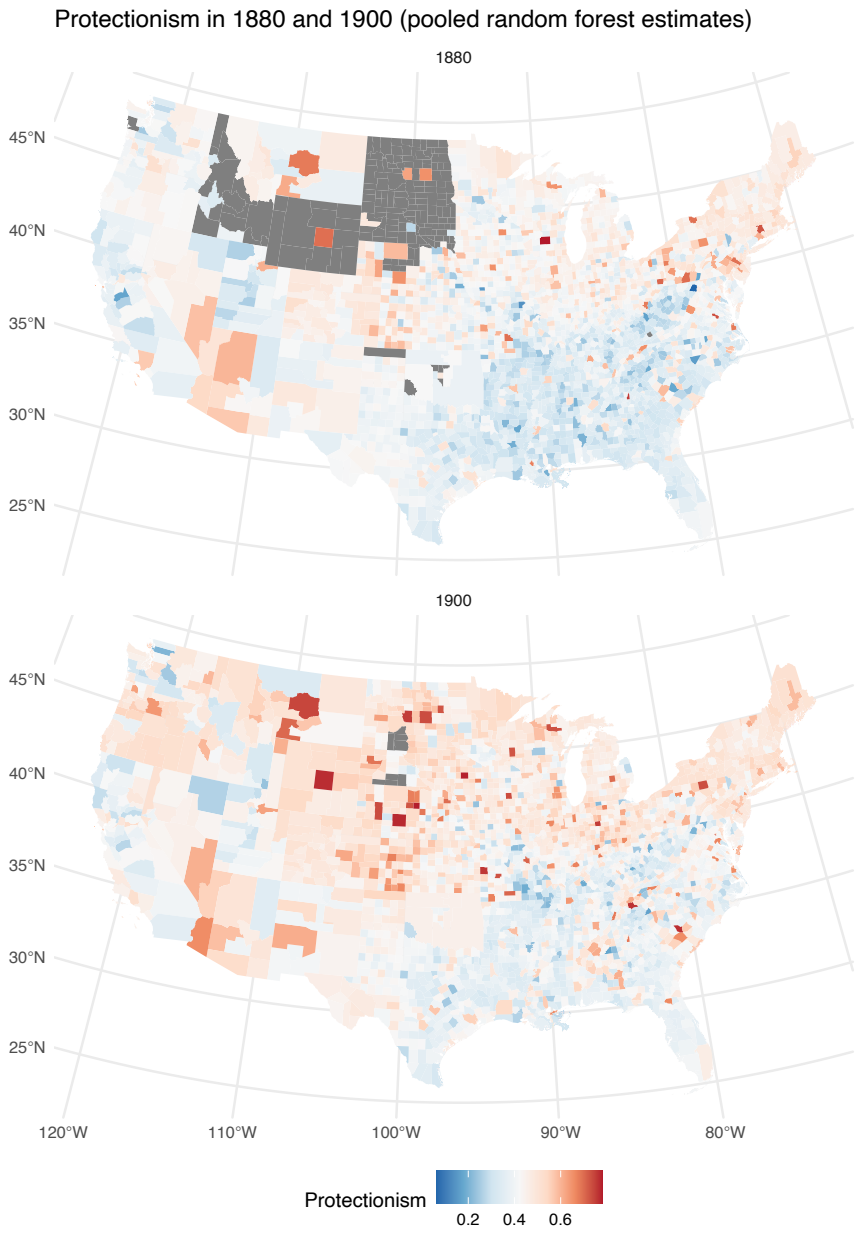

Figure 3: Geographical distribution of protectionism

The spatial equilibrium assumption has important implications for the local effects of economic change. Positive productivity or export shocks to a region have large effects on the rents paid to land, but much smaller effects on wages, because workers respond elastically to wages. The benefits of such positive shocks are mostly felt by landowners. Yet these shocks increase the share of workers relative to landowners.

Spatial equilibrium also affects the level at which policy preferences are formed. A policy which affects a given region positively but others negatively should be supported by landowners in that region, but not necessarily by workers in that region. If the positive shock to the region is offset by a negative shock to other regions, workers in that region are made worse off, as migration will equalize wages between regions. Workers' policy preferences, as in Rogowski's account, should be set at the national level.

Our main empirical results concern the effects of declining transportation costs at the local level on population, agricultural output, the share of labor relative to landowners in the population, and the share of voters supportive of protectionism, in agricultural regions. To illustrate more concretely the mechanism driving these results, consider the following simplified version of the model in the appendix.

We study the effects of changing transportation costs on economics and politics in a given region. There is a single unit of land in the region, and a continuum of firms. Firms rent land at rental rate r and hire labor at wage rate w, and take wages, rents, and prices for the manufactured and agricultural goods P_M and P_A as given.

Firms produce goods using technology of the form

$$q_i = z_i n_i^{1-\alpha_i}, i \in \{A, M\}$$

where q_i is production per unit of land in sector i, z_i is productivity, n_i is employment per unit of land, and $\alpha_i \in (0, 1)$ is the land intensity of the sector. The firm's problem is

$$\max_{n_i} P_i q_i - w n_i$$

which is maximized at

$$n_i = \left(\frac{P_i z_i}{w}\right)^{\frac{1}{\alpha_i}} (1-\alpha_i)^{\frac{1}{\alpha_i}}$$

Landowners rent land to the firms willing to pay the highest rents, and perfect competition

by firms ensures that rent per unit of land, r_i, equals the difference between the value of output and labor costs:

$$r_i = \max_{n_i} P_i q_i - w n_i$$

which combined with the solution for labor demand, n_i, gives

$$\frac{r_i}{w} = \frac{\alpha_i}{1-\alpha_i}\left(\frac{P_i z_i}{w}\right)^{\frac{1}{\alpha_i}}(1-\alpha_i)^{\frac{1}{\alpha_i}} = \frac{\alpha_i}{1-\alpha_i} n_i$$

Individual preferences for consumption of agricultural and manufactured products (c_A and c_M) are Cobb-Douglas, with consumers spending fraction γ of their budgets on agricultural goods:

$$v = \left(\frac{c_A}{\gamma}\right)^{\gamma}\left(\frac{c_M}{1-\gamma}\right)^{1-\gamma}$$

These preferences imply indirect utility for workers of

$$u = \frac{w}{P_A^{\gamma} P_M^{1-\gamma}}$$

In equilibrium, the following conditions must hold for the local economy:

i Workers migrate freely to regions with higher real wages, and so if the region has positive population $\frac{w}{P_A^{\gamma} P_M^{1-\gamma}} = u^*$, where u^* is the national real wage

ii The land market clears. Landowners rent all land to the sectors which are prepared to pay the highest rents for land, and so for all sectors i, j with positive production in the region, $r_i = r_j$, and for all sectors k that do not produce, $r_k < r_i$.

iii Firms choose labor to maximize profits, $n_i = \arg\max_{n_i} P_i q_i(n_i) - w n_i$.

iv The country is open to trade, imports the manufactured good and exports the agricultural good. These trade dynamics and arbitrage ensure that the price of the agricultural good is its price in world markets P_A^*, divided by δ, the iceberg cost of exporting finished goods to world markets. The price of manufactured goods is its price in world markets

P_M^* multiplied by the cost of importing it from those markets, which includes both transportation costs δ and tariffs τ.

Given these equilibrium conditions, regions specialize in the more profitable sector. Rents in agriculture and industry are functions of the wage and industry-specific productivity, prices, and labor shares. As the real wage is pinned down by mobility across regions, rents will not, except in certain knife-edge cases, balance across sectors. Thus regions with greater relative productivity in agriculture, and lower costs of accessing global markets, will specialize in the agricultural sector. We consider the effects of decreasing transportation costs on regions specializing in agriculture.

Substituting the expressions for the real wage from (i) and for prices from (iv) into the expression for demand in the agricultural sector gives local population n:

$$n = n_A = \left(\frac{1}{u^*} \left(\frac{P_A^*/\delta}{P_M^* \delta \tau} \right)^{1-\gamma} \right)^{\frac{1}{\alpha_A}} (1-\alpha_A)^{\frac{1}{\alpha_A}}$$

This expression for n is decreasing in δ. Reducing trade costs raises the price received by exporters, increasing demand for labor in the region.

That n is decreasing in trade costs for regions specializing in agriculture accounts for the other important local effects. Recalling that agricultural production, q_A, is $z_A n_A^{1-\alpha_A}$, it follows that reducing δ increases agricultural production. Similarly, as the ratio of land rents to wages r/w is n multiplied by a positive constant, reducing δ also increases both relative and real rents. Further, as the number of landowners is fixed, increasing the population also increases the share of workers in the region's population.

To consider how these local economic changes affect politics at the local level, we need to consider workers' preferences over national-level trade policy. While decreasing the tariff τ increases labor demand in regions specializing in agriculture, it decreases labor demand in regions specializing in manufacturing. Denoting employment at the national level in manufacturing by N_M, and employment at the national level in agriculture by N_A, we show

that decreasing τ reduces the welfare of workers if

$$\frac{\gamma}{1-\gamma}\frac{\alpha_A}{\alpha_M} > \frac{N_A}{N_M}$$

This inequality implies that workers will be protectionist if they spend a large part of their income on agricultural goods (γ is large), if agriculture is more land-intensive than manufacturing (α_A is large relative to α_M), or if agriculture employs few workers (N_A) relative to manufacturing (N_M). In the context we study, as in many developing countries, food and agricultural produce made up a large share of consumption, and the labor share in agriculture was lower than in other sectors.

If this inequality holds, and workers are protectionist, then a decrease in internal transportation costs that increases population and thus the share of workers in the local population will increase the share of voters favoring protectionism.

We discuss three extensions to our baseline model in Appendix B. First, we add a non-traded sector. Assuming Dixit-Stiglitz preferences, with inelastic demand between the traded and non-traded sectors generates Fajgelbaum and Redding (2014)'s result that trade access in agricultural regions leads to an increase in the share employed in the non-traded sector and a decreased share in the agricultural sector. This result reinforces our main claim that increased trade access may reduce the share of voters with free trade interests in the region. Second, we add international population mobility. Our base assumption is that national population is fixed, but all our results hold allowing for national population to be an increasing function of the real wage. Increasing export opportunities for agricultural regions thus increases the share of workers relative to landowners at the national level as well as at the local. Given each group's trade preferences, this extension is particularly useful as it predicts the national trend toward greater protectionism documented in Section 2 as opposed to a regional one. Third, we show that if voting is probabilistic, local reductions in trade costs in agricultural regions increase support for the more protectionist party even if the inequality that ensures that

labor gains from tariff increases does not hold. The intuition for this result is that workers in agricultural regions gain less from free trade than landowners in those regions do, and so are more likely than landowners to be protectionist.

4 DATA AND EMPIRICAL STRATEGY

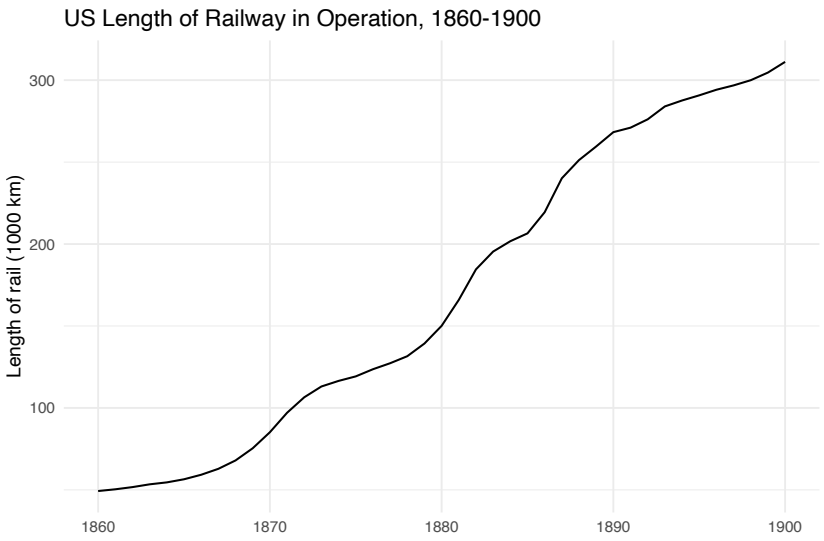

Figure 4: Length of railway in operation

We study the effects of changes in the transportation network on county-level economic development and support for protectionism. Our main independent variable is log port access, defined as the natural log of one over the iceberg cost of transportation to the nearest port. We compute this measure at ten-year intervals, using the transportation network database created by Donaldson and Hornbeck (2016) and updated by Hornbeck and Rotemberg (2019). Donaldson and Hornbeck combined shapefiles of America's rivers, canals and railroads with estimates of mode-specific transportation costs and of wagon and sea shipping routes, to estimate the cost of shipping goods between any two US counties. We focus on the cost of shipping goods from all counties to the eleven largest ports, which in 1880 accounted for 93% of US exports.[3] Changes in this measure over time are driven by the expansion

[3]These ports are Baltimore, Boston, Charleston, Galveston, New Orleans, New York,

of the US rail network. In the 1880–1900 period, expansion in the railway network mainly affected agricultural regions in the interior; manufacturing hubs in the Northeast already had rail connections to ports in 1880. We focus on the inverse of transportation costs as these costs declined during the period we study, and it is more intuitive to discuss the independent variable increasing, rather than decreasing. We also use the shapefiles from the Donaldson-Hornbeck database to calculate the length of railroad within 40 miles of each county's centroid.

Our formal model suggests that increases in port access should increase population, land values, and agricultural output in agricultural counties. We use county-level data on these variables from the US population census and census of agriculture (Haines and Research, 2005), which we harmonize to 1890 boundaries following Hornbeck (2010).

If we assume inelastic demand between the traded and non-traded sectors, our model, following Fajgelbaum and Redding (2014), predicts that port access should cause a reduction in the share of the population employed in agriculture, and an increase in the share employed in non-traded services. We use complete-count data from the 1880 and 1900 censuses (the 1890 records were destroyed in a fire) to calculate these sector shares (Ruggles et al., 2021).

Our primary dependent variable is the share of the two-party vote won by the Democratic Party. The parties were sharply polarized on the issue of the tariff, with the Republicans advocating for protectionism and the Democrats free trade (Epstein and O'Halloran, 1996). We use county-level presidential election returns from Clubb, Flanigan and Zingale (1987). We begin our analyses in 1880, after the end of Reconstruction, in order to avoid accidentally capturing changes in voting patterns related to the Civil War. We end our analyses in 1900 as US comparative advantage began to shift away from agriculture, and comparative advantage in agriculture is a necessary condition for our theory.

Norfolk, Philadelphia, Portland ME, San Francisco, and Savannah (*Statistical Abstract of the United States 1892*, 1893, 66)

Our preferred empirical specification is of the form

$$Y_{ist} = \beta \ln(\text{port access})_{ist} + f\left(\text{rail length}_{ist}\right) + \gamma_{is} + \delta_{st} + \varepsilon_{ist}$$

where Y_{ist} is an outcome of interest for county i in state s at time t, log port access is defined as above, $f\left(\text{rail length}_{ist}\right)$ is a third-degree polynomial in the length of railway within 40 miles of the country centroid, γ_{is} is a county fixed effect, and δ_{st} is a state-by-year fixed effect.

The coefficient β identifies the causal effect of port access on Y_{ist} provided that counties which experienced greater increases in port access in a given year were not otherwise following different trajectories to counties in the same state which experienced smaller changes in port access. Flexibly controlling for local railroad access, following Donaldson and Hornbeck (2016) and Hornbeck and Rotemberg (2019), makes this identification assumption more plausible. While local changes in railroad access are likely endogenous to economic and political developments, distant changes in the transport network which increase access for some counties but not others are less plausibly related to the counties affected.

In addition to these controls, we employ traditional difference-in-differences checks, examining whether 1880–1900 changes in port access correlate with trends in voting over the 1860–1880 period, estimating models controlling for county time trends, and controlling for a range of plausible confounding factors interacted with year dummies.

5 RESULTS

5.1 *Economic Effects*

Table 1 documents the effects of expanding port access on economic development and structural transformation. Consistent with the literature on transportation infrastructure and development, we find large positive effects on log population (1), farm output (2), and land values (3). A 0.1 log unit increase in port access, around a standard deviation, is associated with a roughly 9 percent increase in population, and has larger effects still on agricultural

	pop	farm output	land value	% agric	% Mf	% services
	(1)	(2)	(3)	(4)	(5)	(6)
ln port access	0.85***	2.06**	1.61**	−28.44***	15.30***	18.87***
	(0.30)	(0.78)	(0.69)	(8.83)	(3.76)	(4.80)
DV mean	9.43	13.19	14.54	63.63	6.74	26.26
R^2	0.99	0.95	0.96	0.98	0.97	0.98
N	7776	7754	7754	5169	5169	5169

This table shows the results of regressions of county level economic variables on port access, defined as the log of the inverse of transportation costs to the nearest major port. All models include county and state-by-election fixed effects and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. In models 1–3, the dependent variables are in logs, in 4–6 in percentages of total employment. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 1: Effects of port access on population, agriculture, and sector shares, 1880–1900

production and values. These results make sense if improved transportation infrastructure made it possible for farmers to participate in global markets, creating incentives for increased production, bidding up land values and increasing labor demand. Yet we also find evidence of a relative shift in employment away from agriculture and towards manufacturing and services, in models 4–6. These results are broadly consistent with a spatial Balassa-Samuelson effect (Fajgelbaum and Redding, 2014), in which opportunities to export lead to increased labor demand in exporting industries, which bids up population and then due to inelastic demand across sectors requires greater employment in the non-traded sector.[4]

[4]The shift towards manufacturing runs appears inconsistent with our model's prediction; we would expect trade access to cause a shift away from import-competing sectors. In Table A-5 we study the effect of port access on different industries, and find that the shift towards manufacturing is largely driven by durable goods and in particular the logging and wood processing industries. Those industries were land-intensive and produced products that the US exported during this period.

5.2 *Political Effects*

We then move to study the effects of these economic changes on voting behavior. Table 2 shows the results of regressions of the Democratic share of the two-party vote on port access. Models (1) and (2) implement our base specification—with fixed effects and controls for local railroad access in (2)—and find that a 0.1 unit increase in port access is associated with a 5 percentage point reduction in the Democratic vote. Models (3)–(6) add controls. Model (3) controls for log market access to counties within 50 miles, defined as in Donaldson and Hornbeck (2016) as a weighted sum of county populations, weighted by the inverse of transportation costs. Models (4) and (6) control for the percentage of white inhabitants in 1880, interacted with year dummies. While we start our analyses after the end of Reconstruction, it is possible that changes in voting patterns related to the disenfranchisement of African Americans correlate with changes in port access. Models (5) and (6) add controls for 1880 log population density interacted with year dummies. This control addresses the concern that differential trends related to initial density, which might influence which counties gained port access and experienced growth in population density, account for our results. Across these specifications, controlling for local market access and race-by-year does attenuate our results somewhat, but they remain substantively large and statistically significant.[5] While we estimate our models for the 1880–1900 period, our results are not sensitive to this decision. We find similar magnitudes and patterns of significance for the 1860–1900 period (Table A-8), and note that those results are robust to the inclusion of county time trends, which increases our confidence that differential trends do not account for our results. We also find no evidence of an effect of 1880–1900 changes in port access in voting in the 1860–1880 period (Table A-9), which provides additional evidence against parallel trend violations. Our results

[5]Additionally, in Table A-7, we show that controlling for 1880 employment in manufacturing interacted with election fixed effects does not change our estimates, implying that differential trends related to initial manufacturing do not account for our results.

	(1)	(2)	(3)	(4)	(5)	(6)
ln port access	-59.48^{***}	-51.45^{***}	-36.74^{**}	-19.34^{**}	-51.21^{***}	-20.78^{**}
	(12.14)	(11.47)	(14.94)	(8.09)	(10.17)	(8.05)
Railroad controls		x	x	x	x	x
ln MA within 50 miles			x			
1880 % white x election				x		x
1880 ln density x election					x	x
DV mean	53.75	53.75	53.75	53.75	53.75	53.75
R^2	0.90	0.90	0.91	0.92	0.91	0.92
N	9878	9878	9878	9878	9878	9878

This table shows the results of regressions of county level Democratic share of the two-party vote on port access, defined as the log of the inverse of transportation costs to the nearest major port. All models include county and state-by-election fixed effects. Models 2–6 control for a third degree polynomial in the length of railroad within 40 miles of the county centroid, 3 controls for log market access to counties within 50 miles of the county centroid, 4 controls for 1880 % white interacted with election fixed effects, 5 controls for 1880 log population density interacted with election fixed effects, and 6 controls for both 1880 % white and log density interacted with election fixed effects. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 2: Effects of port access on Democrat share of two-party vote, 1880–1900

are also robust to dropping any single year from the 1880–1900 period (Table A-10). This robustness check should also address concerns related to negative weights in multi-period difference-in-differences designs, which do not apply to two-period models.

Port access did not just increase support for the protectionist Republican Party; it also increased protectionism. Table 3 shows the results of regressions of newspaper-level protectionism on port access. Increasing log port access by 0.1 units was associated with a 4.4 percentage point increase in our Lasso measure of protectionism, equivalent to around 0.2 standard deviations. We find similar magnitudes and patterns of significance using an alternative measure based on pro- and anti-tariff terminology suggested by Hirano and Snyder (2021). This evidence makes it less plausible that factors unrelated to the tariff account for the shift away from the Democrats.

5.3 *Evidence for the Mechanism*

Our preferred explanation for these results is that increased trade access led to increased population density and diluted the share of farmers and landowners who gained from freer

	2 step lasso		Hirano-Snyder	
	(1)	(2)	(3)	(4)
ln port access	37.75**	44.43***	34.15**	35.42*
	(15.92)	(16.45)	(14.63)	(19.55)
Railroad controls		x		x
DV mean	43.75	43.75	63.91	63.91
R^2	0.84	0.84	0.83	0.83
N	6776	6776	5945	5945

This table shows the results of regressions of newspaper-level protectionism on county-level port access, defined as the log of the inverse of transportation costs to the nearest major port. All models include newspaper and state-by-election fixed effects. Models 2 and 4 control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. In models 1 and 2 the dependent variable is a data-driven measure of protectionism based on terms predictive of pro-tariff newspapers, in 3 and 4 the measure proposed by Hirano and Snyder (2021), which compares the usage of pro- and anti-tariff terminology. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 3: Effects of port access on newspaper protectionism, 1880–1900

trade. A range of county and individual-level evidence supports this interpretation.

At the county level, we show in Table 4 that both the economic effects—the increase in population density and shift out of agriculture—and the anti-Democrat voting effects are driven entirely by more agricultural counties. We estimate precise null results for the effects of port access in counties with percent agricultural employment below their state's average in 1880. This finding supports our preferred mechanism in two ways. First, the economic processes driving the result, in which trade access increases the opportunities for agricultural exporters, should only apply to agricultural areas, and so these results are consistent with our theory.[6] Second, if we found a null effect on the economic variables for some counties,

[6]We would expect a negative effect on population in regions specializing in manufacturing. However, there are relatively few such regions during this period, and those regions experienced fairly small changes in port access, and so it is likely that the odd-numbered columns in 4 pool data from agricultural counties, for which the effect on population should be positive, and manufacturing counties, for which the effect should be negative.

	ln pop		% agric		% Democrat	
	(1)	(2)	(3)	(4)	(5)	(6)
ln port access	0.14	1.10***	5.53	−35.01***	−7.74	−64.41***
	(0.63)	(0.23)	(16.00)	(9.44)	(19.59)	(13.03)
1880 Agriculture	1H	2H	1H	2H	1H	2H
DV mean	9.63	9.26	51.91	74.11	52.81	54.65
R^2	0.99	0.97	0.98	0.96	0.85	0.89
N	3867	3870	2578	2579	4919	4926

This table shows the results of regressions of county-level log population, percent employed in agriculture, and Democratic share of the two party vote, subset according to whether the county fell in the bottom or top half of the state in the percent employed in agriculture in 1880. Models 1, 3, and 5 are restricted to less agricultural counties, 2, 4, and 6 to more agricultural ones. All models include county and state-by-year fixed effects, and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 4: Moderating effects of 1880 agricultural employment

and a positive effect on the political effect in those same counties, it would imply that some mechanism other than the economic one specified is driving the results. We find no such evidence of an alternative mechanism.[7]

We verify the assumption that increased population density and a shift out of agriculture reduced the share of voters who were landowners using census data. While there is not consistent data on landownership, the 1870 census reported the value of real estate owned by each individual, and the 1900 census reported whether each individual lived on a farm and owned his or her dwelling. Figure 5 shows a strong negative cross-sectional relationship in 1870 between county-level population density and the proportion of inhabitants owning any real estate, and a similarly strong and negative relationship in 1900 between population

[7]In addition, Table A-6 shows that the change in port access had a similar effect on the share in manufacturing in both less and more agricultural counties. This result, combined with the null effect of port access on voting in less agricultural counties, supports our interpretation that the shift out of agriculture, and not local industrialization, accounts for our political results.

density and the proportion owning farms. Figure 6 shows the rate of property ownership in 1870 and farm ownership in 1900 by industry group, calculated from census microdata. In both censuses, those in agriculture were far more likely to own real estate, and in 1900 over half of those employed in agriculture owned farms. Table A-11 presents regression results that show that these patterns hold when comparing individuals across industry groups within the same county.

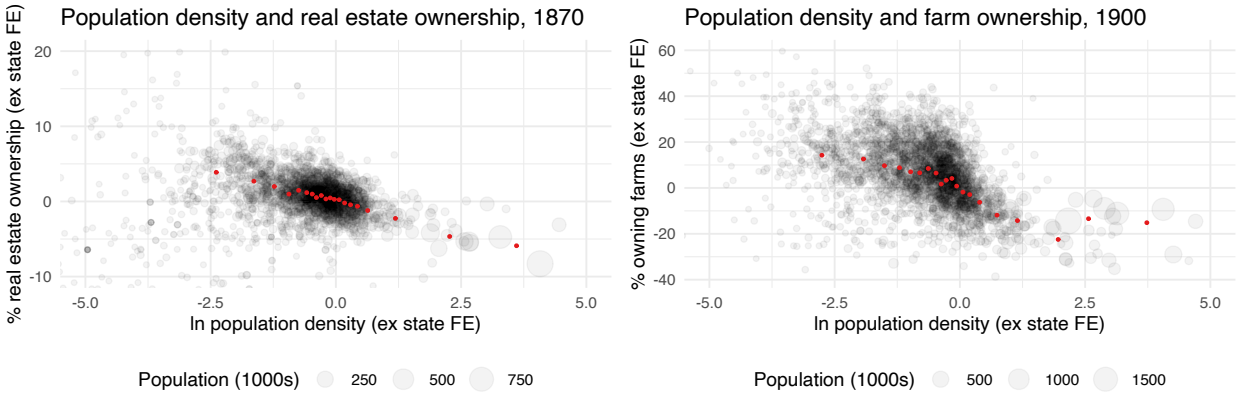

Figure 5: Relationship between population density and percentage owning real estate, 1870, and farms, 1900

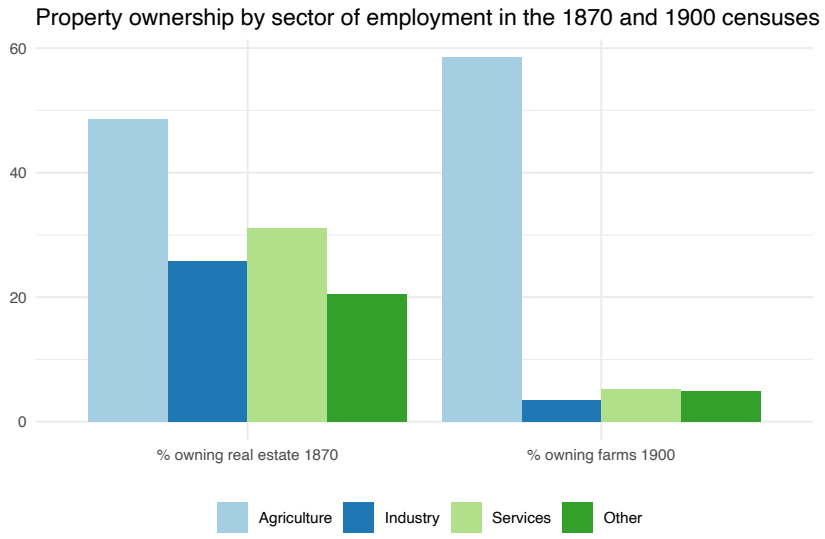

Figure 6: Property and farm ownership by sector of employment in the 1870 and 1900 censuses

We also verify the assumption that agricultural interests tended to vote Democrat using individual-level data from county directories and voter registers. The *People's Guide* directories to several Indiana counties in 1874 listed individuals' party affiliation. Hammarberg (1984) digitized this data, which also contains information on occupations, religion, and age. The California Great Register of voters also contains information from the 1910s on individuals' occupations and party affiliations. This data has been digitized by genealogists for Mariposa and Shasta counties in 1912 and Sacramento county in 1914.[8] Table 5 shows the results of regressions of Democratic affiliation, restricted to Democrats and Republicans, on employment in agriculture, across these two samples. In both samples agricultural workers were more likely to be Democrats, an association that holds within-county. Of course, these samples are not necessarily representative of American voters as a whole, but do provide suggestive evidence in support of the idea that farmers tended to be Democrats.

5.4 *Alternative Explanations*

We next consider four alternative if largely complementary explanations. First, population growth in regions affected by increased port access may have caused culturally-Republican voters to migrate to previously Democratic districts. Second, new immigrants may have been more likely to settle in districts which had recently gained port access, and more likely to vote Republican. Third, the increased importance of trade to local economies may have caused voters to ascribe greater importance to the gold standard, which the Republicans strongly supported. Fourth, agricultural exporters may have gained from trade but become more susceptible to holdup, which stoked a political backlash. In Table A-12, we do find evidence supportive of the first two explanations: increased port access did induce in-migration from Republican-voting areas, and by immigrants. Both explanations are complementary to our

[8]We access this data at `http://www.mariposafootprints.org/voters/Generalnew.htm`, `http://freepages.rootsweb.com/~npmelton/genealogy/prct.htm`, and `http://freepages.rootsweb.com/~shastaca/genealogy/1912voters.html`.

	Indiana 1874				California 1910s	
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture	0.17***	0.17***	0.15***	0.12***	0.08***	0.04***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)
Age controls		x	x	x		
Gender controls					x	x
County FE		x				x
Township FE			x	x		
Religion FE				x		
DV mean	0.39	0.39	0.39	0.39	0.39	0.39
R^2	0.03	0.12	0.26	0.34	0.00	0.02
N	1005	1005	1005	1005	18533	18533

This table shows the results of regressions of individual-level political affiliation on occupations, using data from Indiana county directories in 1874 compiled by Hammarberg (1977), and the California voter registers in Mariposa and Shasta counties in 1912, and Sacramento county in 1914. The dependent variable is coded as 1 if the individual is listed as a Democrat, 0 if not. The independent variable is coded as 1 if the individual is employed in agriculture, 0 otherwise. Models 2–4 control for third-degree polynomials in the individual's age and time lived in Indiana, 2 and 6 add county fixed effects, 3 and 4 more granular township fixed effects, 4 adds fixed effects for 17 religious denominations, and 5 and 6 control for gender. Robust standard errors in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table 5: Individual-level correlates of Democrat affiliation, Indiana 1874 and California, 1912–1914

argument. Areas that voted Republican were dominated by the manufacturing interests the party favored, and so migrants from those areas likely had economic interests in voting Republican. Similarly, it is unlikely that people immigrated to America already owning land there. Rather, immigrants likely derived income from selling labor, and their political preferences may have ultimately stemmed from their factor endowments. In Table A-13 we find that port access was associated with if anything less attention to the gold standard, and had no effect on a Lasso-derived measure of populism, suggesting that those factors do not explain our results. These results are consistent with the effect being stronger in the 1880–1890 decade, before the Democrats embraced populism, than after (see Table A-10).

6 CONCLUSION

During the last decades of the 19th century, US trade policy became increasingly protectionist. This policy outcome seems to have broadly reflected the policy opinions of voters who gave Republicans advocating protectionist policies resounding electoral victories. These outcomes are puzzling because falling transportation costs integrated US agriculture into the global economy as never before and many existing accounts of the political consequences of export shocks suggest that the economic winners are often able to translate those gains into political power (Rogowski, 1987, 1990; Acemoglu, Johnson and Robinson, 2005; Puga and Trefler, 2014). We show not only that the nation became more protectionist but that the places that gained the most from falling transportation costs became more protectionist.

We combine a majoritarian model of politics with a spatial model of international trade to argue that the extent to which decreased trade costs induce workers to move to locations closer to world markets can lead to the loss of political power by the factors of production advantaged by increased trade. Our paper provides causal evidence that increased trade increased farm output, land values, and population density but reduced the proportion of workers in agriculture. This economic transformation meant that there were more voters—workers—with an interest in trade protection and our paper provides evidence that increased

trade lead to a reduction in voting for the Democratic Party, which supported free trade, and an increase in protectionist opinion, as measured by local newspapers.

Our theoretical framework suggests a number of extensions for future research. Societal coalition models of economic policymaking typically specify the economic interests and policy preferences of a fixed set of actors in a given location and then map the institutions that aggregate those preferences into policy outcomes. In assessing the consequences of economic change for politics, adjustment mechanisms are through the reallocation of economic activity among this fixed set of actors. These models have provided insights about a wide range of political economy outcomes. Our theoretical framework, however, highlights the potential importance of economic growth and internal migration in changing the composition of societal coalitions and, in doing so, altering how economic change shapes politics.

While incorporating geographic mobility into political economy models may be productive across many areas of economic policymaking, we highlight two directly related to our paper. In our model, workers are perfectly mobile across space and this assumption assures that they have common interests and reactions to increased exposure to trade from falling transportation costs. We think this is a useful assumption in the context of the late 19th century United States economy. Nonetheless, barriers to geographic mobility are undoubtedly important in other settings and may even be important in ours. Barriers to mobility will generate conflict among workers and across regions that may be critical for understanding political responses to changing exposure to trade. Future research should focus on theoretically and empirically identifying the importance of such barriers, which ones matter, and how specifically they influence politics. This idea is implicit in much of the recent literature on the consequences of negative import shocks with a focus on the "left behind." Our paper suggests that explicitly modeling political economy outcomes in a spatial trade model which allows workers to adjust by moving may provide new theoretical insights on the phenomenon and help guide new empirical studies.

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Online Appendix for "Trains, Trade, and Transformation: A Spatial Rogowski Theory of America's 19th Century Protectionism"

list of tables

A validation for newspaper measure of protectionism

	(1)	(2)	(3)	(4)
Protectionism	-9.21^{**}	-3.47^{**}	-1.91^{*}	-3.31^{*}
	(3.52)	(1.52)	(1.13)	(1.80)
Election FE	x	x		x
State FE		x		
State-by-election FE			x	
Newspaper FE				x
DV mean	36.91	36.91	36.91	36.91
R^2	0.10	0.62	0.82	0.83
N	10445	10445	10445	10445

This table shows the results of regressions of county-level vote-share for the Democratic party on newspaper-level protectionism. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-1: Correlations between newspaper measure of protectionism and county-level Democratic share of presidental vote, 1860–1900

B a model of the effects of trade openness in a multi-region agricultural economy

This section provides a more complete description and derivation of the spatial equilibrium model described in the paper. The model draws on Coşar and Fajgelbaum (2016) and Fajgelbaum and Redding (2014). The basis of the model is a multi-region economy with free internal movement of labor and a comparative advantage in agriculture, which is land intensive. The agents in this model are immobile landowners, who rent land to perfectly competitive firms, and mobile workers, who sell their labor. Relative to the rest of the world, the country is relatively abundant in land and relatively scarce in labor, and so it enjoys a comparative advantage in agriculture. Provided that the difference in land intensity between the two sectors is large enough, workers lose out from decreases in trade costs, which decrease labor demand in the import-competing manufacturing sector more than they increase labor demand in the exporting agricultural sector. In contrast, landowners in regions with greater productivity in agriculture gain from decreased trade costs, and landowners in regions with greater productivity in manufacturing lose.

Regions trade with the world economy subject to internal transportation costs. Reducing these costs in a given region increases the opportunities to export, raising agricultural production, labor demand and thus population, and land prices. These changes increase the welfare of landowners in more agricultural regions: increased export opportunities are capitalized into land prices. Yet an increase in local labor demand increases the ratio of workers to landowners. As workers are protectionist relative to landowners, increasing port access increases the share of voters who prefer protectionism.

	(1)	(2)	(3)	(4)
Protectionism	0.29*	0.09*	0.10*	0.74***
	(0.16)	(0.04)	(0.06)	(0.18)
Congress FE	x	x	x	x
Party FE		x	x	x
State FE			x	x
Newspaper FE				x
DV mean	0.11	0.11	0.11	0.11
R^2	0.10	0.39	0.40	0.64
N	13155	13155	13155	13155

This table shows the results of regressions of congressional voting on newspaper-level protectionism. The dependent variable is protectionist voting in Congress on tariff bills, coded as 1 if the MC voted for a bill raising tariffs, or against a bill reducing tariff, −1 if they voted against a bill raising tariffs or for a bill reducing tariffs, and 0 if they abstained, using bills listed in Bensel (2000). Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-2: Correlations between newspaper measure of protectionism and Congressional voting on tariff bills, 1877–1897

	"tariff"	"american economist"	negative tariff	positive tariff	% positive
	(1)	(2)	(3)	(4)	(5)
Protectionism	0.25	0.50***	−2.88***	0.71***	0.30***
	(0.87)	(0.15)	(0.57)	(0.19)	(0.02)
DV mean	9.03	0.11	0.86	1.26	0.62
R^2	0.90	0.81	0.81	0.84	0.83
N	8090	8090	8090	8090	6915

This table shows the results of regressions of at the newspaper level of references to tariffs on protectionism. In model (1) the dependent variable is references to tariffs, in (2), references to "American Economist," the publication of the American Protective Tariff League, in (3) references to "high tariff", "monopoly tariff," "trust tariff," or "tariff tax," in (4), references to "protective tariff" or "tariff protection," in (5) the number of references to the terms in (4) divided by the number of terms in (3) and (4). References are scaled by references to "and" and multiplied by 100. All models include newspaper and state-by-year fixed effects. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-3: Correlations between newspaper measure of protectionism and references to tariffs, 1860–1900

In this section we first set out the model primitives and characterize the equilibrium with trade, focusing on the local effects of increased trade access. We then consider the welfare effects of changing tariffs on workers and landowners. As workers are mobile throughout the country, local changes in port access should not affect the welfare of workers in the places which gain port access. Rather, worker utility should be affected by national-level policies, such as openness to trade.

B.1 *Agents*

There are two types of agents: N workers and L landowners. Workers choose locations from L regions, provide labor and receive a place-specific wage $w(l)$, where (l) indicates a region-specific realization of a variable. In each region there is a unit mass of landowners who own one unit of land in total and receive rents $r(l)$.

Agents have Cobb-Douglas utility of the form

$$v(c_A, c_M) = \left(\frac{c_A}{\gamma}\right)^{\gamma} \left(\frac{c_M}{1-\gamma}\right)^{1-\gamma}$$

where c_A is consumption of the agricultural good, c_M, consumption of the manufactured good, and γ is the share of the budget spent on agricultural produce. Agents take prices $P_A(l)$ and $P_M(l)$ as given.

These preferences imply indirect utility for workers of the form

$$u(l) = u(w(l); P_A(l), P_M(l)) = \frac{w(l)}{E(l)}$$

where $E(l) = P_A(l)^{\gamma} P_M(l)^{1-\gamma}$ is the price-index. The indirect utility of landowners is

$$\frac{r(l)}{E(l)} = \frac{r(l)}{w(l)} \frac{w(l)}{E(l)}$$

B.2 *Firms*

In each region the landowners rent land to perfectly-competitive firms in different sectors, which hire workers and produce goods subject to production technology of the form

$$q_i(n_i(l)) = z_i(l) n_i(l)^{1-\alpha_i}, \; i \in \{A, M\}$$

where $q_i(l)$ is production per-unit of land in sector i, $n_i(l)$ is employment per unit of land, $z_i(l)$ is productivity, and α_i is the land-intensity of production. By assumption, $0 < \alpha_M < \alpha_A < 1$, so agriculture is the more land-intensive sector.

Firms take wages $w(l)$ and land rents $r(l)$ as given. The firm's labor demand problem is thus

$$\max_{n_i(l)} P_i(l) q_i(n_i(l)) - w(l) n_i(l)$$

which is maximized at

$$n_i(l) = \left(\frac{P_i(l) z_i(l)}{w(l)} \right)^{\frac{1}{\alpha_i}} (1 - \alpha_i)^{\frac{1}{\alpha_i}} \tag{1}$$

Employment density in each sector is an increasing function of the relative price $P_i(l)/w(l)$.

Perfect competition by firms ensures zero profits, and so rents per unit of land equal the difference between the value of output and labor costs.

$$r_i(l) = \max_{n_i(l)} P_i(l) q_i(n_i(l)) - w(l) n_i(l)$$

and so

$$\frac{r_i(l)}{w(l)} = \frac{\alpha_i}{1 - \alpha_i} \left(\frac{P_i(l) z_i(l)}{w(l)} \right)^{\frac{1}{\alpha_i}} (1 - \alpha_i)^{\frac{1}{\alpha_i}} = \frac{\alpha_i}{1 - \alpha_i} n_i(l) \tag{2}$$

That is, the ratio of rents to wages in any sector is an increasing function of employment per unit of land in that sector.

We refer to the fraction of land in region l used by sector i as $\lambda_i(l)$.

B.3 *Equilibrium*

An equilibrium is a set of local land allocations $\lambda_i(l)$, employment densities $n_i(l)$, prices $P_i(l)$, rents $r_i(l)$ and wages $w(l)$, and a common real wage u^*, such that

i Workers migrate freely to regions with higher real wages, and so in equilibrium for all regions l, l' with positive population, $\frac{w(l)}{E(l)} = \frac{w(l')}{E(l')} = u^*$.

ii Landowners rent to the sectors which are prepared to pay the highest rents for land, and so for all sectors i, j with positive production in region l, $r_i(l) = r_j(l)$, and for all sectors k that do not produce, $r_k(l) < r_i(l)$.

iii Firms choose labor to maximize profits, $n_i(l) = \arg\max_{n_i(l)} P_i(l) q_i(n_i(l)) - w(l) n_i(l)$.

iv The land market clears, $\sum_i \lambda_i(l) = 1$.

v The country is open to trade, and world prices and trade costs pin down the prices of the tradable goods. If i is exported, then $P_i(l) = P_i^*/\delta(l)$, where P_i^* is the price of i in world markets and $\delta(l)$ is the iceberg cost of shipping goods from region l to global ports. If i is imported, then $P_i(l) = P_i^* \delta(l) \tau$, where τ is an iceberg import tariff.

vi The real wage adjusts such that national labor markets clear, that is, that total labor demand across regions equals the number of workers, $\sum_l \sum_i \lambda_i(l) n_i(l) = \sum_l n(l) = N$.

We first characterize the local equilibrium, considering the effects of changes in transportation costs in a small region, taking the national real wage u^* as exogenous. After establishing the key local effects of reducing transportation costs, we consider how openness to trade affects the welfare of workers and landowners across regions.

We denote the ratio of the price of the agricultural good to the manufactured good in autarky by $P_A^a(l)/P_M^a(l)$. By autarky, we mean that equilibrium conditions (i)–(iv) and (vi)

hold, but the prices of the tradable goods are determined by domestic supply and demand. We assume that

$$\frac{P_A^*/\delta(l)}{P_M^*\delta(l)} > \frac{P_A^a(l)}{P_M^a(l)}$$

This assumption means that the country has a comparative advantage in agriculture, the more land-intensive good, relative to more labor-intensive manufacturing. From equilibrium condition (v), if the country is open to trade and exports the agricultural good, $P_A(l) = P_A^*/\delta(l)$, and $P_M(l) = P_M^*\delta(l)\tau$. Compared to autarky, trade raises the relative price of the exported good and decreases the price of the imported good.[9]

With worker mobility (i), optimization by landowners (ii), and international trade (v), prices set in global markets ensure that in each region only one sector produces. Condition (ii) implies that if a sector produces, its profit per unit of land must equal that of the most productive sector. From (2), we have that profit per unit of land in agriculture is

$$r_A(l) = \frac{\alpha_A}{1-\alpha_A}\left(\frac{(1-\alpha_A)P_A(l)z_A(l)}{w(l)^{1-\alpha_A}}\right)^{\frac{1}{\alpha_A}}$$

and profit per unit of land in manufacturing is

$$r_M(l) = \frac{\alpha_M}{1-\alpha_M}\left(\frac{(1-\alpha_M)P_M(l)z_M(l)}{w(l)^{1-\alpha_M}}\right)^{\frac{1}{\alpha_M}}$$

Given that $\alpha_A \neq \alpha_M$, and that from condition (i) $w(l)$ is pinned down by real wages in other regions, giving $w(l) = u^*E(l)$, profits per unit of land in agriculture and manufacturing will only equal one another under knife-edge conditions on productivities and prices. Substituting $w(l) = u^*E(l)$ into the expressions for $r_A(l)$ and $r_M(l)$, we have that $r_A(l) > r_M(l)$ when

$$\left(\frac{P_A(l)}{P_M(l)}\right)^{\frac{1-\gamma}{\alpha_A}+\frac{\gamma}{\alpha_M}} z_A(l)^{\frac{1}{\alpha_A}} z_M(l)^{-\frac{1}{\alpha_M}} > \frac{\alpha_M(1-\alpha_M)^{\frac{1-\alpha_M}{\alpha_M}}}{\alpha_A(1-\alpha_A)^{\frac{1-\alpha_A}{\alpha_A}}}(u^*)^{\frac{1}{\alpha_A}-\frac{1}{\alpha_M}}$$

This expression implies that regions specialize in agriculture, that is, $\lambda_A = 1$, if they have greater productivity in agriculture relative to manufacturing, or if due to low transportation costs they receive a greater relative price for the agricultural good.

Given specialization in the more profitable sector, we have that regional population is

[9]This setup assumes that regions that produce more of the manufactured good than they consume can sell the manufactured good to regions further inland at the price received if the good was imported in that region, and can buy the agricultural good from regions further inland at the price that would be received by exporters. This assumption is plausible given that areas specializing in manufacturing during this period were closer to the main ports in the Northeast. While we do not explicitly model transportation between regions, this assumption can be satisfied if regions are arranged by distance to the port, where that the iceberg cost of shipping goods to world markets from the nth furthest region is the cost of shipping goods from the next furthest region multiplied by the cost of shipping goods between the two regions, and if the ratio $z_M(l)/z_A(l)$ is decreasing in distance from the port.

given by

$$n(l) = \begin{cases} n_A(l) & \text{if } r_A(l) > r_M(l) \\ n_M(l) & \text{if } r_A(l) < r_M(l) \end{cases}$$

Substituting the definition of wages from condition (i) and prices from condition (v), into (1) gives

$$n_A(l) = \left(\frac{z_A(l)}{u^*}\right)^{\frac{1}{\alpha_A}} \left(\frac{P_A^*}{P_M^* \delta(l)^2 \tau}\right)^{\frac{1-\gamma}{\alpha_A}} (1-\alpha_A)^{\frac{1}{\alpha_A}} \tag{3}$$

and by the same process

$$n_M(l) = \left(\frac{z_M(l)}{u^*}\right)^{\frac{1}{\alpha_M}} \left(\frac{P_A^*}{P_M^* \delta(l)^2 \tau}\right)^{\frac{-\gamma}{\alpha_M}} (1-\alpha_M)^{\frac{1}{\alpha_M}}$$

B.4 *Local Effects of Decreasing Transportation Costs on Agricultural Regions*

We can now establish four predictions about the effects of decreasing transportation costs on the local economies of regions specializing in agriculture.

Proposition 1. *Decreasing transportation costs increases population density in region l, if $r_A(l) > r_M(l)$.*

Proof. Population is given by a unit mass of landowners and $n(l)$, which for $r_A(l) > r_M(l)$ is given by $n_A(l)$. The number of landowners is fixed and from (3) $n_A(l)$ is decreasing in $\delta(l)$. □

Proposition 2. *Decreasing transportation costs increases agricultural output in region l, if $r_A(l) > r_M(l)$.*

Proof. Agricultural output is given by $\lambda_A n_A^{1-\alpha_A}$. If $r_A(l) > r_M(l)$, $\lambda_A = 1$, and from (3), $n_A(l)$ is decreasing in $\delta(l)$ □

Proposition 3. *Decreasing transportation costs increases the value of land in region l, if $r_A(l) > r_M(l)$.*

Proof. From (2), the ratio of rents to wages, which captures the real value of land, is increasing in $n_A(l)$, which as shown in the proof for Proposition 2 is decreasing in $\delta(l)$ for $r_A(l) > r_M(l)$. □

Proposition 4. *Decreasing transportation costs decreases the share of landowners in region l, if $r_A(l) > r_M(l)$.*

Proof. As the mass of landowners is fixed at 1, the share of landowners in region l is $1/(1+n(l))$. From the proof for Proposition 1, $n(l)$ is decreasing in $\delta(l)$, and so the share of landowners is increasing in $\delta(l)$, for $r_A(l) > r_M(l)$. □

B.5 *Welfare and Politics*

We now model agents' preferences over tariff policy. We assume that there are two parties, D and R, which propose tariffs τ_D, τ_R, where $\tau_D < \tau_R$.

While we have previously modeled the local equilibrium in a given region, taking u^* as exogenous, we now use condition (vi) to implicitly solve for real wages. Denoting the set of locations for which $r_A(l) > r_M(l)$ by L_A, and the complement of that set by L_M, condition (vi) gives

$$N = \sum_{l \in L} n(l) = \sum_{l \in L_A} n_A(l) + \sum_{l \in L_M} n_M(l)$$

Writing $N_A = \sum_{l \in L_A} n_A(l)$ and $N_M = \sum_{l \in L_M} n_M(l)$, we have

$$N = N_A + N_M$$

This equation implicitly defines u^*. If we take N as fixed—that is, we assume there is no immigration—then implicitly differentiating $N_A + N_M$ gives

$$\frac{\partial u^*}{\partial \tau} = -\frac{\frac{\partial N_A}{\partial \tau} + \frac{\partial N_M}{\partial \tau}}{\frac{\partial N_A}{\partial u^*} + \frac{\partial N_M}{\partial u^*}}$$

From (3), and an analogous expression for $n_M(l)$, we have that $n_A(l)$ and $n_M(l)$ are decreasing in u^*—a higher real wage lowers the quantity of labor demanded—and therefore so are N_M and N_A. This expression is therefore positive—and so workers benefit from higher tariffs—if $\frac{\partial N_A}{\partial \tau} + \frac{\partial N_M}{\partial \tau} > 0$. Differentiating (3) and simplifying gives

$$\frac{\partial N_A}{\partial \tau} + \frac{\partial N_M}{\partial \tau} = \frac{1}{\tau}\left(\frac{\gamma - 1}{\alpha_A} N_A + \frac{\gamma}{\alpha_M} N_M\right)$$

which is positive for

$$\frac{\gamma}{1-\gamma}\frac{\alpha_A}{\alpha_M} > \frac{N_A}{N_M} \tag{4}$$

This inequality implies that labor will be protectionist if agricultural goods are a large part of the consumer's budget (γ is large), if agriculture is more land-intensive than manufacturing $\alpha_A > \alpha_M$, and if labor's employment in agriculture is not too large relative to manufacturing. We assume that this inequality holds in the period we study. This assumption is reasonable given economic history scholarship on the key parameters. According to an 1875 survey in Massachusetts, consumers spent 56% of their budgets on food, 15% on clothing, 17% on rent, 6% on fuel and lighting, and 6% on other categories. Classifying clothing and the "other" category as manufactured, and the food category as agricultural implies $\gamma = 0.73$. Budd (1960) estimates labor shares of 19.3% in agriculture and 50.9% in manufacturing in 1880, implying $\alpha_A = 0.807, \alpha_M = 0.491$. Taken together, the left-hand side of the inequality comes to 4.44. The 1880 census recorded 7,844,649 employed in agriculture,including property-owning farmers who should be classified as landowners, and 2,152,150 employed in the manufacturing sector, implying a right-hand side of 3.64.

Welfare for landowners is given by the larger of $\frac{r_A(l)}{E(l)}$ and $\frac{r_M(l)}{E(l)}$. Substituting (2) and

$w(l) = u^* E(l)$ into the identity $\frac{r_i(l)}{E(l)} = \frac{r_i(l)}{w(l)} \frac{w(l)}{E(l)}$ gives

$$\frac{r_i(l)}{E(l)} = \frac{\alpha_i}{1-\alpha_i} \left(\frac{P_i(l) z_i(l)}{E(l)} \right)^{\frac{1}{\alpha_i}} (1-\alpha_i)^{\frac{1}{\alpha_i}} (u^*)^{\frac{\alpha_i - 1}{\alpha_i}}$$

For landowners in agricultural regions, we have that $r_A(l)/E(l)$ is decreasing in τ, because $P_A(l)/E(l) = \left(\frac{P_A^*}{P_M^* \delta(l)^2 \tau} \right)^{1-\gamma}$ is decreasing in τ and u^* is increasing in τ.

For landowners in manufacturing regions, $r_M(l)/E(l)$ is increasing in τ. This result follows from totally differentiating $\frac{r_M(l)}{E(l)}$:

$$\frac{d\frac{r_M(l)}{E(l)}}{d\tau} = \frac{\partial \frac{r_M(l)}{E(l)}}{\partial \tau} + \frac{\partial \frac{r_M(l)}{E(l)}}{\partial u^*} \frac{\partial u^*}{\partial \tau}$$

$$= \frac{\gamma}{\alpha_M \tau} \frac{r_M(l)}{E(l)} + \frac{\alpha_M - 1}{\alpha_M u^*} \frac{r_M(l)}{E(l)} \frac{\partial u^*}{\partial \tau}$$

substituting in the identity

$$\frac{\partial u^*}{\partial \tau} = \frac{u^*}{\tau} \frac{\left[\frac{\gamma - 1}{\alpha_A} N_A + \frac{\gamma}{\alpha_M} N_M \right]}{\frac{N_A}{\alpha_A} + \frac{N_M}{\alpha_M}}$$

where the denominator is $\frac{\partial N_A}{\partial u^*} + \frac{\partial N_M}{\partial u^*}$, gives

$$\frac{d\frac{r_M(l)}{E(l)}}{d\tau} = \frac{r_M(l)}{\alpha_M E(l) \tau} \left(\gamma + (\alpha_M - 1) \frac{\left[\frac{\gamma - 1}{\alpha_A} N_A + \frac{\gamma}{\alpha_M} N_M \right]}{\frac{N_A}{\alpha_A} + \frac{N_M}{\alpha_M}} \right)$$

This expression is always positive: it is increasing in γ, and so takes its minimum value at $\gamma = 0$, and at that value it is positive.

We have that welfare for landowners in agricultural regions is always decreasing in the tariff, welfare for workers, if (4) holds, is increasing in the tariff, and welfare for landowners in manufacturing regions is increasing in the tariff.

We model elections by assuming that fraction ψ of voters vote based on trade policy, and fraction $1 - \psi$ vote based on non-trade factors. In region l, we assume that of those who vote based on non-trade factors, fraction $\varphi(l)$ vote for party D. One can think of $\varphi(l)$ as a place fixed effect, a set of issues specific to location l distinct from trade that influences voting.

In regions that specialize in agriculture, if (4) holds for the values N_A and N_M that are reached under both parties' tariffs, workers who vote based on trade vote for R, as their utility is always increasing in τ, and landowners who vote based on trade vote for D, as their utility is decreasing in τ. The share of the vote for party D is thus given by

$$s_D(l) = \frac{\psi}{1 + n_A(l)} + (1 - \psi) \varphi(l) \tag{5}$$

We can now establish our prediction about the effects of changing transportation costs on

voting

Proposition 5. *Decreasing transportation costs decreases the share of the vote for the free trade party in region l, if $r_A(l) > r_M(l)$ and (4) holds for both parties' tariffs.*

Proof. Given these assumptions, the share of the vote for party D is given by (5). From (3), decreasing $\delta(l)$ increases $n_A(l)$, which decreases $s_D(l)$. □

We show below that in a probabilistic voting framework, provided that the effects of changing any one region's transportation costs on workers' utility is small, we can produce the same comparative static result relaxing the assumption that (4) holds.

B.6 *Extension 1: Non-traded goods and Spatial Balassa-Samuelson Effects*

In the base example we do not model non-traded goods. Extending the model to assume Dixit-Stiglitz preferences with inelastic demand between the traded and non-traded sectors generates Fajgelbaum and Redding (2014)'s result that trade access leads to an increase in the share employed in the non-traded sector.

Suppose now that in addition to agriculture and manufacturing, there is a non-traded sector N, which produces with technology $q_N(n_N) = z_N(l)n_N(l)^{1-\alpha_N}$, where $\alpha_M < \alpha_N < \alpha_A$. Agents' preferences are given by

$$v(c_A, c_M, c_N) = \left[\left(\left(\frac{c_A}{\gamma} \right)^{\gamma} \left(\frac{c_M}{1-\gamma} \right)^{1-\gamma} \right)^{\frac{\sigma-1}{\sigma}} + c_N^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

where by assumption $\sigma < 1$, which ensures that demand is inelastic between the traded and non-traded sectors. Indirect utility for workers is then given by $u(l) = w(l)/E(l)$ where

$$E(l) = \left[\left(P_A(l)^{\gamma} P_M(l)^{1-\gamma} \right)^{1-\sigma} + P_N(l)^{1-\sigma} \right]$$

These preferences imply that demand for the non-traded good by an individual with income I is

$$c_N(l) = \frac{I}{E(l)} \left(\frac{P_N(l)}{E(l)} \right)^{-\sigma}$$

Note that these preferences ensure that the non-traded good is produced in all regions.

We label the share of land used by the non-traded sector $\lambda_N(l)$. In a region that specializes in agriculture, for the non-traded good to be produced, profit per unit of land must equal that of agriculture, so

$$\frac{\alpha_A}{1-\alpha_A} n_A(l) = \frac{\alpha_N}{1-\alpha_N} n_N(l)$$

which implies

$$\frac{P_N(l)}{w(l)} = \frac{1}{(1-\alpha_N) z_N(l)} \left(\frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} n_A(l) \right)^{\alpha_N}$$

The total supply of the non-traded good is given by

$$\lambda_N(l) z_N(l) n_N(l)^{1-\alpha_N} = \lambda_N(l) z_N(l) \left(\frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} n_A(l) \right)^{1-\alpha_N}$$

Total demand for the non-traded good is

$$\left(\lambda_N(l) n_N(l) + (1-\lambda_N(l)) n_A(l) + \frac{r(l)}{w(l)} \right) \frac{w(l)}{E(l)} \left(\frac{P_N(l)}{E(l)} \right)^{-\sigma}$$

substituting in $E(l) = \frac{w(l)}{u^*}$ and the expressions for $n_N(l)$ and $\frac{r(l)}{w(l)}$ in terms of $n_A(l)$, gives

$$\left(\lambda_N(l) \frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} + 1 - \lambda_N(l) + \frac{\alpha_A}{1-\alpha_A} \right) n_A(l) \left(u^*\right)^{1-\sigma} \left(\frac{P_N(l)}{w(l)} \right)^{-\sigma}$$

substituting in the definition for $P_N(l)/w(l)$ from above gives

$$\left(\lambda_N(l) \frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} + 1 - \lambda_N(l) + \frac{\alpha_A}{1-\alpha_A} \right) \left(u^*\right)^{1-\sigma} \left[(1-\alpha_N) z_N(l) \right]^{\sigma} \left(\frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} \right)^{-\sigma\alpha_N} n_A(l)^{1-\sigma\alpha_N}$$

Setting the expressions for supply and demand equal and solving for $\lambda_N(l)$ gives

$$\lambda_N(l) = \left[\frac{1-\alpha_A}{f(n_A(l))} - \frac{\alpha_A - \alpha_N}{\alpha_N} \right]^{-1}$$

where

$$f(n_A(l)) = \left(u^*\right)^{1-\sigma} (1-\alpha_N)^{\sigma} z_N(l)^{\sigma-1} \left(\frac{1-\alpha_N}{\alpha_N} \frac{\alpha_A}{1-\alpha_A} \right)^{(1-\sigma)\alpha_N - 1} n_A(l)^{(1-\sigma)\alpha_N}$$

For $\sigma < 1$, $f(n_A(l))$ is increasing in $n_A(l)$, and so $\lambda_N(l)$, the fraction of land allotted to the non-traded sector, is also increasing in $n_A(l)$. As labor density in the non-traded sector is equal to labor density in the agricultural sector multiplied by a constant, increasing the share of land alloted to the non-traded sector also increases the share of employment in the non-traded sector.

B.7 *Extension 2: Immigration*

In the base case, we assume zero immigration, that is, that N is exogenous. In this section we show that our results are robust to allowing for immigration. Suppose that population is an increasing function of the US real wage, $N(u^*)$.[10]

The local equilibrium results in propositions 1–4 take u^* as exogenous, and so do not change allowing for immigration.

[10]For instance, if the world population is $\bar{N}$, utility for workers in the rest of the world is $\bar{u}$, and individuals migrating to a destination receive utility $u\varepsilon_i$ where ε_i is an individual-by-destination utility shock drawn from a Fréchet distribution with shape parameter θ, then $N(u^*) = \frac{(u^*)^{\theta}}{(u^*)^{\theta} + (\bar{u})^{\theta}} \bar{N}$.

When solving for $\frac{\partial u^*}{\partial \tau}$ we now have to take into account how changes in tariff policy that increase real wages lead to increased immigration, which in turn reduces real wages. The equation implicitly defining u^* is now

$$N(u^*) = N_A + N_M$$

Implicitly differentiating with respect to τ gives

$$\frac{\partial u^*}{\partial \tau} = -\frac{\frac{\partial N_A}{\partial \tau} + \frac{\partial N_M}{\partial \tau}}{\frac{\partial N(u^*)}{\partial u^*} - \frac{\partial N_A}{\partial u^*} - \frac{\partial N_M}{\partial u^*}}$$

If (4) holds, the numerator is positive, and so provided that

$$\frac{\partial N_A}{\partial u^*} + \frac{\partial N_M}{\partial u^*} < \frac{\partial N(u^*)}{\partial u^*}$$

our conclusions about individuals' policy preferences are unchanged. This inequality is satisfied as $\frac{\partial N_A}{\partial u^*}$ and $\frac{\partial N_M}{\partial u^*}$ are both negative—labor demand is decreasing in the real wage—and $\frac{\partial N(u^*)}{\partial u^*}$ is positive, if increased real wages in the US induce immigration.

Accounting for immigration allows reductions in transportation costs to affect the national party vote totals. Setting $\psi = 1$, and so assuming voters only care about trade, the national vote share for party D is given by $\frac{|L_A|}{N+L}$, that is, landowners in regions specializing in agriculture vote for party D, while landowners in regions specializing in industry, and workers, vote for party R. If we allow for immigration, then a change in transportation costs that increases labor demand in agricultural regions and thus increases real wages u^* also increases immigration, as $N(u^*)$ is increasing in u^*.

B.8 *Extension 3: Probabilistic Voting*

Our analysis thus far assumes that (4) holds, and that workers' utility is therefore increasing in the tariff. In this section we show that we can relax that assumption and recover the same local equilibrium political effect of increases in port access on voting for the more protectionist party in agricultural areas. The intuition for this result is that landowners capture much more of the gains and losses created by trade policy, and therefore their voting decisions are more sensitive to trade policy. In agricultural regions in which landowners are very supportive of free trade, an increase in the population of workers due to decreasing transportation costs serves to dilute the free trade element. By local equilibrium, we mean that we consider the effects of changes in $\delta(l)$ that affect population and prices in region l, but not national aggregates like u^*. This amounts to assuming that region l is small in relation to the country as a whole.

As above, we assume that there are two parties, D, and R, which propose tariff policies τ_D, τ_R, where $\tau_D < \tau_R$. Denote the utility of a worker in region l from policy τ by $u^W(\tau, l)$, and the utility of a landowner in region l from policy τ by $u^L(\tau, l)$. Recall that workers' utility is given by $\frac{w(l)}{E(l)} = u^*$, and that landowners' utility is given by $\frac{r(l)}{E(l)}$. Suppose that a voter votes for the party that gives them the greatest utility, where utility is a combination of the direct payoff from the policy and an idiosyncratic preference shock. More formally, the utility

that a worker i in region l receives from voting for party R is $v_i^W(R, \tau_R, l) = u^W(\tau_R, l)\varepsilon_i$, where ε_i is a preference shock drawn from a distribution with strictly increasing cumulative distribution function F with support over the positive real numbers. The utility that worker i receives from voting for party D is $v_i^W(D, \tau_D, l) = u^W(\tau_D, l)$. The preferences of landowners are similarly specified.

The share of workers in region l voting for party D is given by

$$\sigma^W(l) = P\left(\varepsilon_i < \frac{u^W(\tau_D, l)}{u^W(\tau_R, l)}\right) = F\left(\frac{u^W(\tau_D, l)}{u^W(\tau_R, l)}\right)$$

By the same logic, the share of landowners in region l voting for party D is given by

$$\sigma^L(l) = F\left(\frac{u^L(\tau_D, l)}{u^L(\tau_R, l)}\right)$$

In all regions, $u^W(\tau_j, l) = u^*(\tau_j)$, where the parenthetical τ_j indicates that this is the equilibrium value of u^* at $\tau = \tau_j$. In regions specializing in agriculture, $u^L(\tau_j, l) = \frac{r_A(\tau_j, l)}{E(\tau_j, l)}$.

Given these preferences, in regions specializing in agriculture, a larger share of landowners than workers will vote for party D, the low tariff party.

As $F(\cdot)$ is an increasing function, the share of landowners voting for D is greater than the share of workers voting for D if

$$\frac{u^W(\tau_D, l)}{u^W(\tau_R, l)} < \frac{u^L(\tau_D, l)}{u^L(\tau_R, l)}$$

which is equivalent to

$$\frac{u^L(\tau_R, l)}{u^W(\tau_W, l)} < \frac{u^L(\tau_D, l)}{u^W(\tau_D, l)}$$

Note that

$$\frac{u^L(\tau, l)}{u^W(\tau, l)} = \frac{r(l)/E(l)}{w(l)/E(l)} = \frac{r(l)}{w(l)}$$

and so if $r_A(l) > r_M(l)$, $\frac{u^L(\tau, l)}{u^W(\tau, l)} = \frac{r_A(l)}{w(l)}$

From (2) we have

$$\frac{r_A(l)}{w(l)} = \frac{\alpha_A}{1 - \alpha_A} n_A(l)$$

and from (3) we have that $n_A(l)$ is decreasing in τ. Thus if $\tau_D < \tau_R$, then the value of $n_A(l)$ under τ_D will be greater than the value under τ_R, and consequently $\frac{u^L(\tau_D, l)}{u^W(\tau_D, l)}$ will be greater than $\frac{u^L(\tau_R, l)}{u^W(\tau_R, l)}$.

A decrease in transportation costs to region l, if l specializes in agriculture and is small, will decrease the share of the vote going to party D in region l.

Given the identities $\frac{r_A(l)}{E(l)} = \frac{r_A(l)}{w(l)}\frac{w(l)}{E(l)}$ and $\frac{w(l)}{E(l)} = u^*$, and (2) and (3), we obtain

$$u^L(\tau_j, l) = \frac{\alpha_A}{1 - \alpha_A}[z_A(l)(1 - \alpha_A)]^{\frac{1}{\alpha_A}} \left(\frac{P_A^*}{P_M^*}\frac{1}{\delta(l)^2}\frac{1}{\tau_j}\right)^{\frac{1-\gamma}{\alpha_A}} (u^*(\tau_j))^{\frac{\alpha_A - 1}{\alpha_A}}$$

Therefore the ratio of landowners' utilities under the two policies is

$$\frac{u^L(\tau_D, l)}{u^L(\tau_R, l)} = \left(\frac{\tau_R}{\tau_D}\right)^{\frac{1-\gamma}{\alpha_A}} \left(\frac{u^*(\tau_R)}{u^*(\tau_D)}\right)^{\frac{1-\alpha_A}{\alpha_A}}$$

substituting this expression into the expression for $\sigma^L(l)$ gives the voteshare for party D:

$$s_D(l) = \frac{n_A(l)}{1+n_A(l)} F\left(\frac{u^*(\tau_D)}{u^*(\tau_R)}\right) + \frac{1}{1+n_A(l)} F\left(\left(\frac{\tau_R}{\tau_D}\right)^{\frac{1-\gamma}{\alpha_A}} \left(\frac{u^*(\tau_R)}{u^*(\tau_D)}\right)^{\frac{1-\alpha_A}{\alpha_A}}\right)$$

If region l is small, then changes in l do not affect aggregate variables, that is $\frac{\partial u^*}{\partial \delta(l)} = 0$. If that is the case, then the only component of $s_D(l)$ affected by changing $\delta(l)$ is $n_A(l)$, and we have already established that $\sigma^W(l) < \sigma^L(l)$. Party D's voteshare is thus a convex combination σ^W and $\sigma^L(l)$, with the weight on σ^W, the smaller value, increasing in $n_A(l)$. As $n_A(l)$ is decreasing in $\delta(l)$, decreasing $\delta(l)$ also decreases $s_D(l)$.

C ADDITIONAL TABLES

Table A-4: Summary statistics

Variable	N	Mean	SD	q5	q95
ln port access	8,397	-0.19	0.11	-0.42	-0.07
railroad length within 40 miles	8,397	35.92	29.46	0.00	93.45
ln 1 + Market Access within 50 miles	8,397	10.33	3.47	2.04	14.15
ln 1 + population	7,776	9.43	1.26	7.26	10.96
ln 1 + farm output	7,754	13.19	1.78	10.61	14.90
ln 1 + land value	7,754	14.54	1.93	11.94	16.66
% in agriculture	5,169	63.63	22.03	18.13	90.74
% in manufacturing	5,169	6.74	7.93	0.65	23.69
% in services	5,169	23.19	12.24	7.06	45.72
% white, 1880	2,386	0.84	0.22	0.34	1.00
ln population density, 1880	2,386	2.99	1.39	0.10	4.50
% in agriculture, 1880	2,383	0.66	0.22	0.19	0.91
% Democrat of two-party vote	9,878	53.75	20.91	22.71	95.10
2-step Lasso Protectionism	6,776	43.75	23.39	7.62	85.84
Hirano-Snyder Protectionism	5,945	63.91	22.29	28.27	100.00

	Durables	Nondurables	Wood	Nonmetallics	Metals	Machinery	Other durables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln port access	10.96***	4.35	8.94***	1.66***	0.72	−0.85	0.48
	(2.49)	(2.76)	(2.33)	(0.51)	(0.74)	(0.56)	(0.74)
DV mean	3.67	3.07	1.81	0.36	0.58	0.6	0.31
R^2	0.93	0.97	0.82	0.84	0.94	0.93	0.94
N	5169	5169	5169	5169	5169	5169	5169

This table shows the results of regressions of the county level share of employment in manufacturing on port access, defined as the log of the inverse of transportation costs to the nearest major port. In model 1, the dependent variable is the share of employment in durable goods manufacturing, in 2, the share of employment in nondurable goods manufacturing. Models 3–7 examine groups of durable goods industries. In model 3 the dependent variable is the share of employment in logging, sawmills and wood products, in 4, employment in glass, cement, structural clay, pottery, and other nonmetallic mineral and stone products, in 5, employment in steel and metals industries, in 6, employment in industries producing machinery and transportation vehicles, and in 7 all other durable goods industries. All models include county and state-by-election fixed effects and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. In models 1–3, the dependent variables are in logs, in 4–6 in percentages of total employment. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-5: Breaking down the effects of port access on the share employed in manufacturing, 1880–1900

	(1)	(2)
ln port access	13.77*	8.17***
	(7.56)	(2.69)
1880 Agriculture	1H	2H
DV mean	9.43	4.08
R^2	0.97	0.95
N	2578	2579

This table shows the results of regressions of the share of the county population employed in manufacturing, subset according to whether the county fell in the bottom or top half of the state in the percent employed in agriculture in 1880. Model 1 is restricted to less agricultural counties, 2 to more agricultural ones. All models include county and state-by-year fixed effects, and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-6: 1880 agricultural employment does not moderate the effect on industrialization

	(1)	(2)	(3)	(4)
ln port access	−51.45***	−54.32***	−20.78**	−21.72**
	(11.47)	(11.00)	(8.05)	(8.22)
1880 % Mf x election		x		x
1880 % white x election			x	x
1880 ln density x election			x	x
DV mean	53.75	53.73	53.75	53.73
R^2	0.90	0.91	0.92	0.92
N	9878	9845	9878	9845

This table shows the results of regressions of county level Democratic share of the two-party vote on port access. All models include county and state-by-election fixed effects, and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. Models (2) and (4) control for the share of the population in 1880 employed in manufacturing interacted with election fixed effects, (3) and (4) also control for the 1880 % white and log population density interacted with election fixed effects. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-7: Effects of port access on Democrat share of two-party vote, 1880–1900, controlling for 1880 manufacturing employment

	(1)	(2)	(3)	(4)
ln port access	-17.85^{***}	-14.54^{***}	-15.12^{**}	-19.85^{***}
	(4.84)	(4.30)	(5.95)	(5.71)
Railroad controls		x		x
Linear time trends			x	x
DV mean	53.8	53.8	53.8	53.8
R^2	0.87	0.87	0.91	0.91
N	16019	16019	16019	16019

This table shows the results of regressions of county level Democratic share of the two-party vote on port access, defined as the log of the inverse of transportation costs to the nearest major port. All models include county and state-by-election fixed effects. Models 3–4 add linear county time trends, and 2 and 4 control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-8: Effects of port access on Democrat share of two-party vote, 1860–1900

	Pretrends		Actual	
	(1)	(2)	(3)	(4)
ln port access$_{t+2}$	-4.83	19.95		
	(26.53)	(21.77)		
ln port access			-59.48^{***}	-51.45^{***}
			(12.14)	(11.47)
Railroad controls		x		x
Period	1860–1880	1860–1880	1880–1900	1880–1900
DV mean	54.52	54.52	53.75	53.75
R^2	0.88	0.91	0.90	0.90
N	8210	8210	9878	9878

This table shows the results of regressions of the Democratic share of the county two-party vote on log port access 1880–1900. Models (1) and (2) test for pretrends, and use as the dependent variable Democratic voting in the 1860–1880 period. In the absence of parallel trends one would expect 1880–1900 port access to be orthogonal to 1860-1880 voting. Models (3) and (4) replicate the baseline results for the 1880–1900 period, and place the estimates from (1) and (2) in context. Models (2) and (4) also control for a third degree polynomial in the length of railroad (1880–1900) within forty miles of the county centroid. All models include county and state-by-year fixed effects. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-9: Pretrends checks for voting

	(1)	(2)	(3)
ln port access	−50.47***	−70.13***	−35.97**
	(12.01)	(17.39)	(15.55)
Y1	1880	1880	1890
Y2	1890	1900	1900
DV mean	54.34	52.96	53.69
R^2	0.93	0.90	0.93
N	7343	4921	7492

This table shows the results of regressions of county level Democratic share of the two-party vote on port access, subset to different two-year pairs from the 1880–1900 period. All models include county and state-by-election fixed effects, and a third degree polynomial in the length of railroad within 40 miles of the county centroid. Models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-10: Effects of port access on Democrat share of two-party vote, two-year pairs, 1880–1900

	Real estate value		Owns real estate		Owns farm	
	(1)	(2)	(3)	(4)	(5)	(6)
Industry (base category)	1136.56***		25.81***		3.37***	
	(35.32)		(1.46)		(0.28)	
Agriculture	734.39***	1219.54***	22.85***	16.27***	55.10***	45.69***
	(47.52)	(36.60)	(1.49)	(0.45)	(0.41)	(0.46)
Services	604.01***	624.10***	5.32**	5.72***	1.80***	0.93**
	(60.16)	(34.81)	(2.33)	(0.38)	(0.53)	(0.41)
Other	−295.46***	−51.69	−5.37***	−4.91***	9.65***	6.87***
	(65.27)	(96.89)	(1.63)	(0.88)	(0.82)	(0.47)
Year	1870	1870	1870	1870	1900	1900
County FE		x		x		x
DV mean	1204.09	1204.09	41.52	41.52	27.96	27.96
Individuals	7712872	7712872	7712872	7712872	21088376	21088376
R^2	0.08	0.78	0.41	0.89	0.84	0.95
N	8836	8836	8836	8836	11274	11274

This table shows the results of regressions of individual-level property ownership on sector of employment, using data from the 1870 and 1900 censuses. The dependent variable in models 1 and 2 is real estate wealth in 1870, in 3 and 4 a binary measure of whether the respondent's real estate wealth was non-zero, and in 5 and 6 a binary measure of whether the respondent lived on a farm and ownerd it in the 1900 census. Even-numbered models add county fixed effects. The base level in all models is employment in Industry. The sample is restricted to white men aged 16 and above. To improve computational efficiency, individual- level data is aggregated to the county-sector level, and then models are estimated weighted by county-sector size. Robust standard errors in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-11: Economic sector and property ownership, 1870 and 1900

D ALTERNATIVE EXPLANATIONS FOR EMPIRICAL RESULTS

We study the plausible mediating effects of trade-induced migration from different types of areas using census microdata. We use linked census microdata (Abramitzky, Boustan and Rashid, 2020) to compute for 1900 $p_{ij,1900}$, the share of inhabitants in county i who were in county j in 1880. We then use these weights to construct variables which capture the effects of different kinds of migration:

$$M_{it} = \sum_j p_{ijt} m_j$$

where m_j is some time-invariant variable measured in county j. Note that for 1880, $M_{i,1880} = m_i$. We use three different m_j variables: 1880 Republican share of the two-party vote, 1860 Republican vote share, and Union Civil War enlistment per capita (multiplied by 100), using data from Dippel and Heblich (2021). A positive within-county change in the aggregate variables is driven by people migrating from more Republican to less Republican counties. The first of these variables may capture both economic and cultural reasons for voting Republican. For instance, voters migrating from Republican counties may continue to vote Republican because their economic endowments and thus their interests do not change when they migrate. The latter two more plausibly capture cultural factors. The Republican party during this period was known to appeal to voters polarized by the Civil War by "waving the bloody shirt," and such appeals would have been stronger in counties which had been more supportive of the Civil War and Lincoln-era Republican Party.

Table A-12 shows reports the results of regressions of these variables, and the log share of immigrants, and immigrants from Protestant and Catholic countries, on port access. While there is evidence of internal migration from counties which were more Republican in 1880 being affected by port access, there is weaker evidence in support of more explicitly cultural migration mediators. We find no effect of port access on migration from 1860 Republican strongholds, and a marginally significant effect on migration from places with higher Union enlistment. We find stronger evidence in support of an immigration mechanism. Port access was associated with an increase in immigrants of all types. While it is plausible that increased port access led to increased immigration, and Protestant immigrants then voted Republican and Catholic immigrants perhaps galvanized erstwhile Republican voters, such a mechanism could be complementary to the economic mechanism outlined. It is unlikely that people immigrated to America already owning land there. Rather, immigrants likely derived income from selling labor, and their political preferences may have ultimately stemmed from their relative endowments. Table A-14 shows that immigrants were less likely than natives to own property or farms. Table A-13 examines the effects of port access on coverage of the gold standard and a Lasso-based measure of populism. It finds no evidence that increased trade caused an increase in attention to monetary policy or motivated populist grievances, perhaps by creating hold-up problems (Eichengreen et al., 2017).

	Internal migration			Immigration		
	(1)	(2)	(3)	(4)	(5)	(6)
ln port access	36.37***	5.46	3.40*	2.18***	2.38***	1.71**
	(8.69)	(7.83)	(1.97)	(0.60)	(0.69)	(0.71)
Variable	1880 Rep. migrants	1860 Rep. migrants	Union enlistment	% immig.	% Protestant immig.	% Catholic immig.
DV mean	46.39	24.37	3.11	-3.61	-4.16	-5.28
R^2	0.95	1.00	0.96	0.99	0.99	0.98
N	4918	4568	4712	7775	7776	7776

This table shows the results of regressions of mediating variables related to internal migration and immigration on port access. All models include county and state-by-year fixed effects, and control for a third degree polynomial in the length of railroad within 40 miles of the county centroid. All models are weighted by 1880 population. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-12: Effects of port access on internal migration and immigration, 1880–1900

	gold	silver	"gold standard"	"sound money"	"free silver"	populism
	(1)	(2)	(3)	(4)	(5)	(6)
ln port access	7.24	−12.74	−2.35**	−0.83***	−1.89	5.66
	(14.15)	(11.98)	(1.09)	(0.29)	(1.18)	(10.68)
DV mean	30.5	24.12	1.19	0.29	1.3	28.86
R^2	1.00	1.00	1.00	0.98	0.98	0.90
N	7065	7065	7065	7065	7065	7065

This table shows the results of regressions ofnewspaper references to the gold standard and populism on port access. In models 1–5, the dependent variable is the number of references to the term in the top row, scaled by the number of references to "and" and multiplied by 100. In model 6, the dependent variable is a measure of populism derived from a two-stage Lasso similar to that used to study protectionism. All models control for a third-degree polynomial in the length of rail within 40 miles of the county centroid, and county and state-by-year fixed effects. Standard errors clustered by state in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-13: Relationship between port access and attention to the gold standard and populism, 1880–1900

	Real estate value		Owns real estate		Owns farm		Owns home	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign-born	-474.56^{***}	-814.75^{***}	-3.88^{*}	2.24^{***}	-11.74^{***}	-1.82^{***}	-10.09^{***}	-2.59^{***}
	(48.82)	(64.30)	(2.20)	(0.53)	(2.05)	(0.27)	(3.33)	(0.54)
Year	1870	1870	1870	1870	1900	1900	1900	1900
County FE		x		x		x		x
DV mean	1026.92	1026.92	38.07	38.07	37.05	37.05	61.82	61.82
Individuals	10024851	10024851	10024851	10024851	21088376	21088376	21088376	21088376
R^2	0.07	0.86	0.02	0.89	0.07	0.98	0.06	0.95
N	4530	4530	4530	4530	5637	5637	5637	5637

This table shows the results of regressions of individual-level property ownership on an indicator for whether the individual, was born in a foreign country, using data from the 1870 and 1900 censuses. The dependent variable in models 1 and 2 is real estate wealth in 1870, in 3 and 4 a binary measure of whether the respondent's real estate wealth was non-zero, and in 5 and 6 a binary measure of whether the respondent lived on a farm and owned it in the 1900 census, in 7 and 8 a binary measure of whether the respondent owned his dwelling. Even-numbered models add county fixed effects. The sample is restricted to white men aged 16 and above. To improve computational efficiency, individual- level data is aggregated to the county-by-nativity level, and then models are estimated weighted by county-by-nativity size. Robust standard errors in parentheses. $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Table A-14: Nativity and property ownership, 1870 and 1900