European
Historical
Economics
Society

EHES Working Paper | No. 191 | July 2020

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Abstract

The reasons for the famous agrarian unrest in the United States between 1870 and 1900 remain debated. We argue that they are, at least in part, consistent with a simple economic explanation. Falling transportation costs allowed for the extension of the frontier, where farmers received the world price minus the transaction costs involved in getting their produce to market. Many perceived these costs to be unfairly large, owing to the perceived market power of rail firms and the discriminatory practices of middlemen, with farmers closer to the frontier most affected. Consistent with this, we find that the protest, as measured by vote shares for the Populists in the 1892 Presidential elections, is negatively related to wheat prices, transportation costs, and rail network density.

JEL Codes: F6, N51, N71

Keywords: Agriculture, globalization, Grain Invasion, populism, United States

[*] Paul Sharp would like to thank the Institute of Governmental Affairs at UC Davis for financing his visit to California, where he received inspiration for this study, and the European Commission for financial support through the Marie Curie Research Training Network 'Unifying the European Experience.' Thanks are also due to Philipp Ager, Dan Bogart, Karol Borowiecki, Gregory Clark, Nick Crafts, Irma Clots-Figueras, Tracy Dennison, Alfred Duncan, Barry Eichengreen, James Fearon, Giovanni Federico, Cormac Ó Gráda, Phil Hoffman, Peter Sandholt Jensen, J.M. (Morgan) Kousser, Bansi Malde, Alan Olmstead, Kevin O'Rourke, Gary Richardson, and J.R. Rosenthal, as well as to seminar and conference participants for their comments and suggestions. Thank you also to Andreea-Alexandra Maerean and Mekdim Regassa for very conscientious research assistance.

[1] Karl Gunnar Persson sadly passed away during the writing of this paper. He is greatly missed.

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1. Introduction

Recent developments around the world such as the rise of protectionism and immigration restrictions, and the success of 'populists'[4] at the polls justifies the off-repeated warnings by economists and economic historians (see for example O'Rourke and Williamson 1999) of the possibility of 'globalization backlash'. In the present work, we seek to understand a particular episode from the United States at the end of the nineteenth century when farmers and other groups in society protested and a succession of protest movements flourished. We specifically focus on a particular point in time, the 1892 Presidential election, and argue that votes for the (Populist) People's Party proxy for the extent of the protest in different parts of the country. We find that this correlated with the level of wheat prices and followed a specific geographical pattern related to the transportation costs to the international export hubs, and to the density of the railroad network.

At a time when the US was experiencing domestic market integration, railroad expansion and globalization, local prices were linked to the world price by the transportation costs of getting the good to the international market. As we will see, they were generally lower further away from the international export hubs such as New York City. Despite overall positive effects of railroad expansion and market integration on agricultural output (e.g. Attack and Margo 2011, Costinot and Donaldson 2016), farmers perceived these price differentials as unfair, and vented their anger at railroads and middlemen[5]. As we will discuss in the next section, although we are not the first to argue for an economic basis for the protests and focus on the perceived unfairness of price differentials, we believe we are the first to quantitatively link the spatial dimension of the protests with the transportation costs, following our earlier work (Persson and Sharp 2015, pp. 278-9, based on an unpublished PhD thesis by Sharp, 2009).[6] Taking the spatial dimension of agrarian protest into account has been allowed by recent advances in the digitization of the transportation network

[4] The common definition of populism associates it with promoting the 'people' often against an 'elite'. Populists thus often defy traditional left-right divides and might be associated for example with illiberal policies such as immigration restrictions (often considered right wing) as well as greater welfare spending (for example on the elderly – often considered left wing).

[5] The latter, particularly in terms of their products being graded inappropriately for their quality (e.g. Cronon 1991).

[6] A recent draft paper by Xu (2017) relates somewhat to ours, finding that although the railroads and increased market access were beneficial for the economy as a whole, more than fifty percent of this was offset by the negative effects of increased competition, so that less efficient counties could actually suffer due to market integration.

and the estimation of county-level transportation costs. In particular, this paper builds on the work of Donaldson and Hornbeck (2016), who estimated the pairwise county-level transportation costs which allow us to test empirically our arguments. We find that the share of votes for the People's Party was strongly associated with transportation costs to the international export hubs – New York City and Chicago – and that this holds not only in the immediate years running up to the 1892 election but also in the decades before. We also find support for the claim that the market power of railroad firms was related to the support for the People's Party by examining the effect of the density of the rail network on voting for the party.

Fears of globalization backlash are rooted in history, particularly the experience of the interwar years, but also the period of intense globalization prior to the First World War. At that time, in the wake of rapidly falling transportation costs, an American 'Grain Invasion' saw the United States exporting unprecedented quantities of cheap wheat to Europe (Williamson 1980, O'Rourke 1997, O'Rourke and Williamson 1999). This episode inspired the economic historian Eli Hecksher to speculate about the role of resource endowments for trade patterns giving rise to the Hecksher-Ohlin theorem and, following the elaboration of Stolper-Samuelson, the expectation that the owners of the scarce resource, land, in Europe would lose, and that landowners in the Americas would gain. The resultant agricultural distress and protest in the Old World was therefore both predictable and understandable (see also Rogowski 1989), and many countries eventually chose to shield themselves through protectionism.[7] Less obviously compatible with this idea, however, is the agrarian discontent in the US. Indeed, it has until now been difficult to find a wholly convincing argument as to why farmers were angry, in particular since there is evidence that the real incomes of farm households (usually proxied by the real prices of farm output) actually rose over this period, and many studies have found an agricultural sector which was flourishing at that time (e.g. Rhode and Olmstead 2008, 2011, Costinout and Donaldson 2016, Donaldson and Hornbeck 2016). This has given rise to speculation that farmers might simply have been irrational, equating nominal price falls during a time of general deflation with a drop in real incomes.

[7] The main exceptions were the UK, which saw a large decline in cereal production (Ejrnæs, Persson & Rich 2007), and Denmark - a particularly interesting case – which changed from being a net exporter of grain in the 1850s and 1860s to become a net importer in the 1880s of wheat as well as fodder for an agricultural sector switching to bacon and dairy products (Henriksen 1993, Lampe and Sharp 2018).

As we will demonstrate, this explanation omits, however, both the geographical pattern of the protests and agricultural prices across the country. The local prices and the prices in the US export hubs were widely published in the local press and a constant reminder of the high transportation costs. A look through the contemporary press reveals the anger and the perception of unfairness and wrongdoing the farmers felt about this. For example, as a local resident in Omaha, Nebraska, told the *Omaha Daily Bee* (May 15, 1891): 'There is something radically wrong when it takes half of the farmer's output to get the other half to market'. The agrarian reform movements singled out prices paid to the rail companies as a major problem and the People's Party made the public ownership of railroads and other natural monopolies such as the telegraph a cornerstone of their political program. Populist agitators frequently singled out grain traders and railroad companies as culprits. These alleged or real distortions related to railroad companies exploiting their monopoly power and middlemen downgrading the grain delivered to market thereby lowering the farmgate price. The founding convention of the People's Party set out the basic political line in the Omaha Platform adopted on July 4, 1892. Tight regulation of railroads, and in fact government ownership of rail and telegraph, was advocated, or as it was polemically formulated: '…the time has come when the railroad corporations will either own the people or the people must own the railroads.'[8]

To investigate this, we proceed as follows. The next section reviews and critically examines previous attempts at providing an explanation for the agricultural distress, and relates this paper to other relevant literature. Section 3 presents a historical overview, and Section 4 explores how the geographical pattern of agricultural unrest is linked to the extent of exposure to high transportation and transaction costs, limited access to alternative means of transportation, and high borrowing costs in settler areas. Section 5 describes our data and Section 6 provides empirical evidence for our conjecture. Section 7 concludes.

[8] They also advanced the idea of government supported granaries, the so-called 'sub treasury plan', where farmers could store their grain until prices had recovered after the post-harvest fall. These granaries, which never materialized, were supposed to advance temporary cash to farmers to evade loan-sharks while waiting for higher prices.

2. Literature review

The Reasons for the Agrarian Protest in the United States

The history of the agrarian protest in the United States during the latter part of the nineteenth century is well known (Farmer 1926; Hicks 1931; Goodwyn 1978; Stewart 2008), with Hicks in particular highlighting that the farmers believed they were being treated *unfairly*. A succession of protest movements emerged starting with Oliver Kelly's 'National Grange of the Patrons of Husbandry' in 1867 (see Buck 1913), followed by the Greenback party, the Farmers' Alliance, and finally the Peoples' Party of the 1890s. The farmers' concerns have been summarized as 'falling commodity prices, increased entry costs to farming, rising tenancy, farm foreclosure, and uncertainties generated by harvests in another hemisphere and reliance upon markets an ocean away' (Atack, Bateman and Parker 2000) – i.e. globalization.

However, the reasons for the discontent have long been disputed and putting it into the context of the emergence of the United States as the leading agricultural exporter can only appear to add to the confusion. Indeed, the reaction of American farmers was sharply at odds with the standard interpretation of the Grain Invasion as first suggested by Harley (1980, 1986). He demonstrated within a simple theoretical framework that the gains from falling transportation costs should have been shared by producers in the US and consumers in Europe with the establishment of a transatlantic grain market. The lower transportation costs caused the price gap between American and European grain to narrow, resulting in a price decrease in Europe (good for consumers) and a price increase in the United States (good for producers).

The Harley hypothesis fitted well into earlier research by North (1974), who argued that the real price of farm products increased, and transportation costs fell. However, this made it difficult to relate the agrarian protest movement to deteriorating economic conditions. The consensus view was therefore that the economic plight of farmers seemed to have been exaggerated or misrepresented in earlier research which took farmers at their own word. As Frieden (1997, p. 372) points out, 'there is a puzzling weakness of evidence' for a relationship between economic conditions and farm protest.

Accepting this, other researchers have looked elsewhere. One line of argument suggests that income uncertainty increased or was particularly high in regions with strong farm reform movements. The logic here is that there were welfare losses associated with price volatility if farmers were risk averse (Parker 1972; McGuire 1981). Another line of argument looks at the particular problems of indebted farmers in a period of deflation. Since the general price level fell by half or more in the Grain Invasion period, debt as a proportion of current income might increase when nominal prices fall because the nominal debt for a farmer remains unaffected by the fall in prices. The risk of foreclosures increased and fueled unrest (Stock 1983). The problem with this interpretation is that foreclosures were not very frequent, but Stock argues that even so most farmers would have known someone who was affected which fueled a fear of being the next victim. States with a higher frequency of foreclosures were fertile ground for the protest movement.

Higgs (1970) argued for an economic origin of the unrest, demonstrating that productivity gains in rail shipping did not always mean lower rates for farmers, and that real rates (relative to agricultural prices) were highly variable. Aldrich (1985) then showed that while railroad rates were generally trending downward after the Civil War, they actually increased between 1881 and 1897, which coincides with the rise of the Alliance and the Populist movement, although there is no discussion of geographical differences. Finally, Williams (1981) used a multi-equation voting model to understand the share of the votes for different political parties in Kansas, finding that the Populist vote was correlated with a number of economic, occupational, and cultural variables, including railroad monopoly.

Interesting as these explanations are they do not seem to have convinced the profession of economic historians. As Mayhew (1972, p. 466) points out, it is 'puzzling that farmers began complaining about railroad rates, interest rates, and problems of obtaining credit in a period when freight rates and interest rates were falling rapidly and when… credit was easily available'. She continues that it 'is also puzzling that earlier fluctuations in prices did not provoke farmer protest'. Thus, Whaples (1995) reports that only 22 percent of economists in the Economic History Association agreed with the proposition that 'The Agrarian protest movement in the Middle West from 1870 to 1900 was a reaction to the deteriorating economic status of farmers.' 52 percent disagreed. Did farmers suffer from money illusion, mistaking a nominal fall in income for a real fall?

This seems unlikely given that if farmers were aware of the prices of their own produce they must surely also have been informed about the prices of the goods they purchased.[9]

In fact, we ought to be concerned about any argument that implies that people protest for the wrong reasons, especially since European farmers are usually considered to have reacted in accordance with economic theory. Economists usually believe that man acts fairly rationally on the basis of knowledge that is accurate or at least not systematically misleading or biased. Indeed, Cooley and DeCanio (1977) convincingly argued that American farmers responded rationally to price signals during the period of discontent. However, in the dominant explanation for the unrest farmers were simply wrong or seriously misinformed.[10]

In fact, the favored explanation for the unrest according to Whaples' survey is almost aggressively non-economic. Mayhew (1972) argued that farmers were simply upset by 'commercialization', 'the increasing importance of prices' and their being forced into an economic system in which money was all important. Although we will attempt to reveal an economic basis for the farmers' concerns, our explanation is in fact compatible in a sense with Mayhew's. From a study of the contemporary political debate there is no doubt that farmers themselves were clearly under the impression that their economic condition was deteriorating and unfair. And there is also no doubt that the objects of their frustration were those identified by Mayhew: the owners of railroads, moneylenders, manufacturers, banks etc. All these were perhaps representative of the increasing commercialization of agriculture but more generally they were just one aspect of the increasing internationalization of agriculture, and indeed economic life in general, which occurred in the second half of the nineteenth century.

Our paper is closely related to the work of Eichengreen, Haines, Jaremski, and Lelang (2017) who examine the 1896 Presidential election. Their findings resonate with ours as they show that high levels of railroad penetration disincentivized voting for the Populist candidate. Although 1896 perhaps marked the height of the protests, the Populist candidate in that year stood for the

[9] Although see Friedman (1990, p. 1171) for a dissenting view.

[10] This idea was also apparent in the statements of contemporaries, for example the President of the Boston Manufacturers' Mutual Fire Insurance Company in evidence before the British Royal Commission on Agriculture in 1879 (1881, C. 7400): 'You do not think that the [agrarian protest] movement then has any real economic basis?--No…'

Democratic Party. The advantage of the 1892 presidential election is that the candidate for the Populists ran on a separate ticket.

Overall, the existing literature suggests multiple factors behind the protests, both economic and non-economic. We add a more formal theoretical framework, emphasizing the importance of transportation costs, and we test this using data for an election where voters were able (for most states) to explicitly state their preference for the Populist agenda.

Other related literature

There is a body of historical literature which is related to the period we study as well as a literature in political science which our paper also contributes to. A considerable body of work has emerged over the past decade or so on the productivity of US agriculture in the second half of the nineteenth century. One strand considers technological and biological innovations. Olmstead and Rhode in a series of works (2002, 2008, 2011) have demonstrated that in this period, the frontier was being extended westwards thanks to new biological technologies. Over the nineteenth century the center of wheat production moved from New York State, Virginia and Pennsylvania to the Midwest states which dominated around the Civil War with states such as Illinois, Iowa, Michigan and Wisconsin. But by the end of the nineteenth century the major new wheat producing states were Nebraska, Kansas and North and South Dakota (Olmstead and Rhode 2008) and new technologies increasing the productivity of agriculture provided the mechanism whereby frontier farmers were invited into the world market for grain.

Another strand considers a link between the railroads and transportation costs on the one hand and agricultural production on the other. Atack and Margo (2011) examine the American Midwest in 1850-60 and show that the expansion of cultivable land was largely due to the extension of railroads as decreasing transportation costs increased agricultural revenue and productivity, and in turn raised farm and land values. Donaldson and Hornbeck (2016) show a positive relationship between the expansion of market access between 1870 and 1890, driven by the expansion of the rail network, and agricultural land values in 1890. Focusing on the market integration of US agriculture resulting from the decreasing transportation costs, Costinot and Donaldson (2016) estimate that the gains from market integration due to the lowering of transportation costs in 1880-1920 amounted to a 1.46 percent annual increase in the real value of agricultural crops.

Overall, both strands suggest that the expansion of railroads in tandem with new biological technologies had a strong positive effect on agricultural production and the value of the agricultural sector in general (as characterized by the increasing land values). This, again, suggests a contradiction: if farmers were getting richer, why were they so concerned about their current condition? As we have outlined earlier, our explanation is that farmers perceived the prices they received as unfair. The notion of unfairness of market outcomes is well known from behavioral economics which has documented that people are particularly troubled by what they consider to be unfair outcomes. For example, in a pioneering article, Kahneman et al (1986) singled out the exploitation of the market power of firms or employers as particularly objectionable. This sentiment is of course the background for much of the popular support for antitrust legislation which was a cornerstone of Populist politics.

The notion that globalization caused anxiety and the perception of unfairness which was channeled into popular discontent is to a certain extent mirrored by the current literature on the rise of support for populist parties. There are many studies investigating one particular aspect of recent globalization - the effects of immigration on the support for populist parties (for a useful review see Edo et al 2019, Rodrik 2020). This literature offers insights into the support of mostly right-wing parties which includes economic anxiety caused by labor market integration and exposure to economic forces beyond the control of voters. Other studies go beyond labor market conditions and focus on a link between economic shocks such as increased market exposure due to low transportation costs and the economic vulnerability of voters (e.g. Kriesi et al 2006, Colantone and Stanig 2018, Dal Bo et al 2019). This paper offers a contribution to this literature by examining the discontent of farmers caused by increasing market integration and its link to the rise of a new political party.

3. The Presidential Election of 1892

We make use of the populist share of the votes in the Presidential election of 1892, which we believe offers the most direct measure of the agrarian protest, even though of course the populist campaign was much broader. Knowles (1942) presents a detailed overview of the election, describing the People's Party as having emerged 'as a result of distressing conditions in Southern

and Western agriculture in the postwar era.' He describes this as being due to declines in prices, and how in the West farming communities were pushed far out, away from markets, and became 'wholly dependent upon railroads, storage facilities, and processing plants, none of which regarded sympathetically the farmer's demands for cheaper transportation and better prices for his goods.'

A huge mass meeting known as the National Union Conference met in Cincinnati on May 19, 1891, arguing for a new political party to represent their interests, and this was followed by campaigns all over the country attempting to win over support. Most backing came from the West based on agrarian protesters, but other parts of the country were less enthusiastic. In New England demands from Southern and Western representatives were considered too radical, and there was little support, but the greatest struggle was in the South, where independent political action was seen as a possible threat to white supremacy (see also Goodwyn 1978). The Supreme Council of the Farmers' Alliance offered its support in November 1891, although the Industrial Conference of February 22, 1892, heavily dominated by agricultural interests, only offered a declaration of 'union and independence.' A committee of twenty-five was appointed to confer with the executive committee appointed in Cincinnati, and the two decided that a national convention for the new People's Party was to be held on July 4, 1892 in Omaha, Nebraska, with 1,776 delegates present, although only 1,366 turned up on the day. No mention was made of the Farmers' Alliance due to some who argued that it should remain nonpartisan.

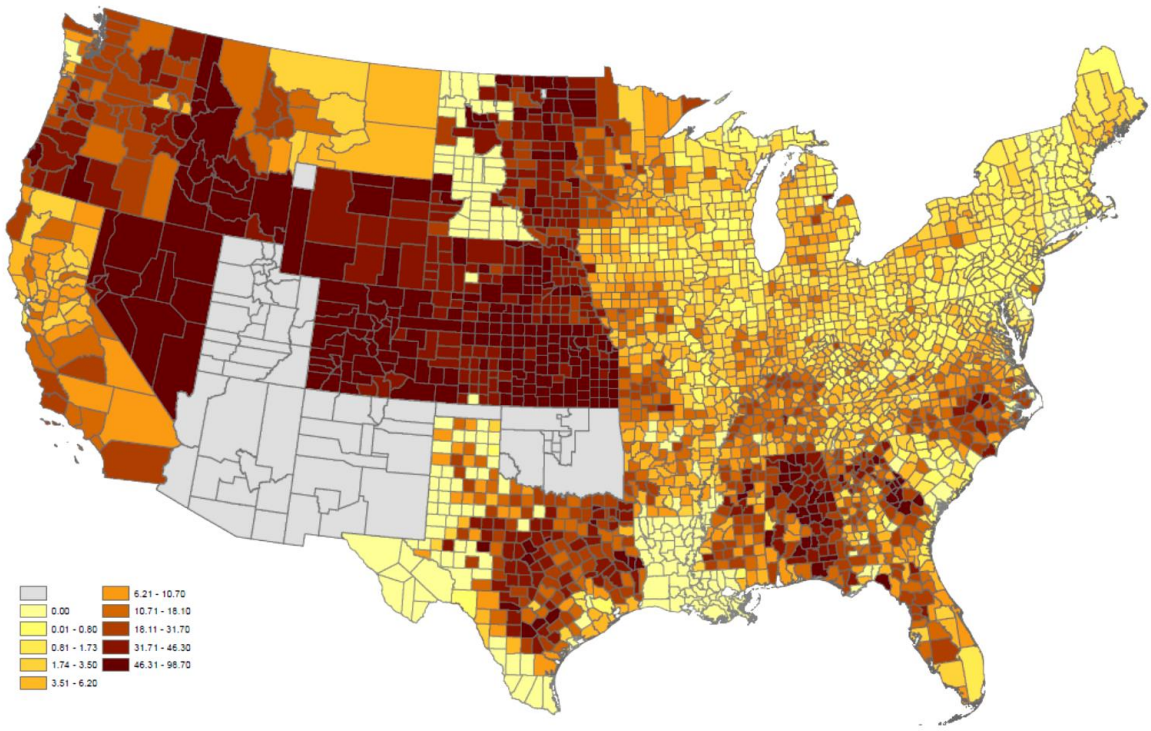
The national convention was by all accounts a raucous and at times somewhat chaotic affair, but it finally agreed on a platform including various aspects of monetary policy (effectively central banking and bimetallism), and the government ownership of the railroads, telegraph, and telephone companies. Landownership was also to be regulated. James B. Weaver, who had long been associated with the agricultural movement, was eventually nominated for the presidency, and James G. Field from Virginia was nominated for the vice presidency with the hope that he might garner more support from the South. In the end, the election, held on November 8, 1892, saw the Democratic candidate, Grover Cleveland, defeat his Republican rival by 277 Electoral College votes to 145, with James B. Weaver a distant third with just 22, representing 8.5 percent of the vote. The campaign was dominated by the protectionist McKinley Tariff of 1890, which Cleveland proposed to lower, and whether or not to stay on the gold standard, which Cleveland supported. Despite

losing the election, the People's Party did nevertheless fare well in certain areas as illustrated in Map 1, and Table A1 in the appendix[11].

Map 1 plots the share of votes for the People's Party by counties. It enjoyed strong support in the West and South-West, and even the 'old' South gave non-trivial support to the party. The lowest support was, unsurprisingly, in the East and Midwest. Nevertheless, there is a discernable gradient of increasing support for the Party as we move away from the East Coast export hub of New York City to the West. There was also a strong effect of state politics. It has previously been noted in the literature (e.g. Ostler 1992) that in some states, farmers supported the People's Party more than in others with similar economic conditions. The explanation for such strong state effects lies in differences in state politics, specifically in terms of how effective/ineffective the state Democratic and Republican parties were in facing off the political threat from the People's Party and its predecessors. Ostler (1992) offers a detailed account of the unsuccessful attempt to establish a following in Iowa which was thwarted by both major parties responding to farmers' demands and focusing on state reforms, thus leaving little scope for a third party. Magliari (1989) considers the relatively low support for the Populists in California, a major wheat producer, and finds that this was partly due to the Californian economy being more diverse, but that there was even a lack of support within the wheat-growing areas. His explanation for this supports our hypothesis, however, since he argues that 'Wherever wheat farmers had access to cheaper and competitive water transportation, Populism foundered.' Another important consideration for the strong state effect is the issue of bimetallism, an important part of the Populist platform. This emphasized farmers' discontent with falling agricultural prices and their demand to inflate the economy by returning to a bimetallic system based on silver as well as gold. The support for the People's Party was thus strong in the states with an important silver mining sector such as Colorado, Idaho, Montana, and Nevada, as is clearly discernible on Map 1.

[11] Note that AK, AZ, HI, NM, OK, and UT (six present day states) had not yet achieved statehood, thus giving 44 states in total.

Map 1: Presidential Election in 1892: The Share of Votes for the People's Party



Source: Clubb, Flanigan and Zingale (1987), supplemented by data from Walter Dean Burnham (1955).
Note: Grey areas on the map represent territories without a political representation.

4. A Simple Model for Understanding the Populist Protests

We advance an explanation that rests on the perceived 'unfairness' of the prices farmers received relative to the prices in the international export hubs such as Chicago or New York City.[12] The price differential reflected transportation costs endured by farmers wishing to get their produce to the international market, and these were far greater for farmers further to the west from the export hubs. Moreover, farmers in the states further west were land-locked as they had no direct access to navigable water transportation routes, leaving them with little choice as to how to deliver their agricultural produce to the export hubs other than railroads. Evidence to support our theory would be that the Populist vote rose with the price gap between the local prices and the price at the international export hub. Alternatively, using the Law of One price, the price differential is reflected

[12] We do not analyze whether the prices were truly unfair or not, which is an area for future research. The important point for us is how farmers acted upon what they perceived as an unfair price.

by the transportation costs, thus the exposure to the high transportation costs of delivering agricultural produce to the international export hubs should be positively associated with the Populist vote.

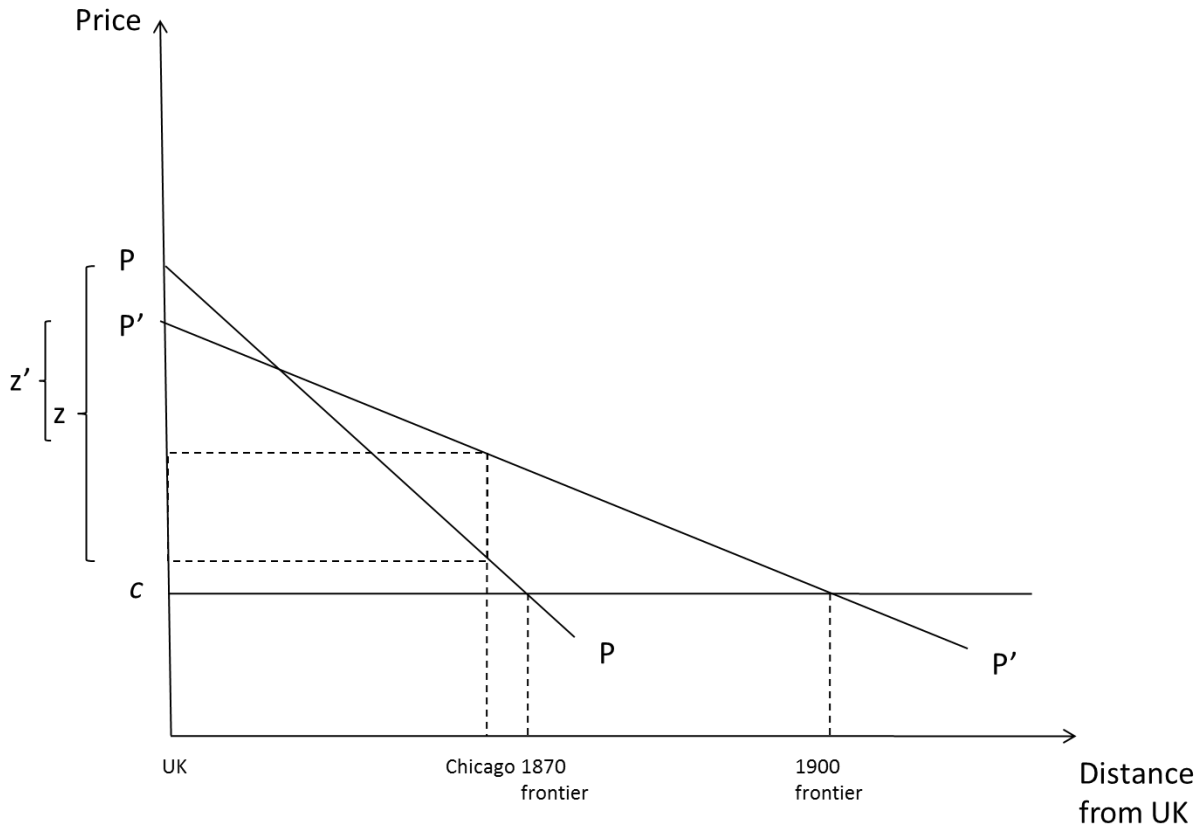


Figure 1: A simple model for understanding the distribution of grain prices

We structure our arguments with a simple model. We assume that that land and labor supply is very elastic, which is also true for this period, given the availability of land in the West, and the huge immigration from especially Europe. The world prices of wheat will be denoted as those in the UK given the dominant position of the UK in the transatlantic economy at that time and in its role as an open economy importing wheat from the US. Figure 1 illustrates our reasoning.[13]

[13] Figure 1 is inspired by a similar diagram presented by Harley (1978).

Schedule *PP* represents the prices received by farms at different locations moving west from the UK and from the East Coast of the US westwards in 1870. Following the Law of One Price, farmers west of the UK receive the world (UK) price minus the transportation costs. The location of the frontier is given where farmers can just cover their costs, i.e. where $p = c$.[14] The location of the frontier can be moved by shifting the *c* schedule, and the opening up of the frontier due to the technological improvements in agriculture discussed in the literature review section is equivalent to the downward shift of *c*. Note a fall in *c* will cause prices to fall at *all* locations.

The transportation costs involved in shipping wheat from an international export hub to the UK is represented by *z* on the vertical axis. We call this hub 'Chicago.' By the end of the nineteenth century, technological advances had resulted in transaction costs falling at all locations, opening up international markets to more farmers. This corresponds to *z* falling to *z'* and a flattening of the slope of the *PP* schedule to the new schedule *P'P'*. Now, farmers in Chicago enjoy higher prices and lower shipping costs to the UK, where consumers thus pay lower prices. Whether farmers gained or lost from changes in the transportation and transaction costs depended on their location on the x-axis. Those furthest to the left of where the *PP* and *P'P'* schedules intersect – geographically this corresponds to furthest to the east – receive a lower price for their produce, while farmers to the right from the *PP* and *P'P'* intersection, hence to the west of this point and up to the old frontier, receive a higher price. Beyond the 1870 frontier, the price received by new farmers who are being brought into the world economy by lowering transaction costs depends on the previous local demand and supply conditions.

The implication for the farm protest is that if the transportation costs were considered 'unfair', then the protest should have been pronounced in the recently settled areas of the frontier where the price received was considerably lower than at the international export hubs such as New York City. Farm gate prices were indeed lower further west as we will see later. Figure 1 also illustrates, however, that the farmers close to export harbors on the East Coast would also face *lower* prices than they used to before the transportation costs fell. So why did they not react in the same way as Western farmers? To understand this it is helpful to apply Hirschman's exit-voice dichotomy

[14] The assumption of constant costs across states is not important. Allowing for a Ricardian extensive margin with increasing costs further west would, however, imply even lower markups for these farmers. This if anything strengthens our argument.

(Hirschman 1970). This idea essentially acknowledges two types of reactions to a deteriorating economic situation: you either *exit* the market (or the condition) or you *voice* your concerns. Eastern famers were able successfully to follow the 'exit' strategy by diversifying out of grain to other agricultural products: vegetables, meat, dairy products, poultry etc., or by a movement into other sectors of the economy. This strategy was possible because these farmers worked close to large urban centers with a diversified demand for goods relying on fairly swift transportation. Farmers in the Western settler states did not have the opportunity to exit, and thus voiced their concerns politically.

Overall, the arguments advanced in this section provide testable hypotheses to explain the spatial dimension of the support for the People's Party: the lower the prices in local markets relative to the prices in international export hubs, the stronger should be the farmers' protest, and thus the higher the support for the People's Party. An alternative testable hypothesis uses the Law of One Price: the price differential between the local markets and international export hubs will be larger the higher the transportation costs are. As a consequence, the greater the transportation costs, the greater is the farmers' discontent, and the larger is their support for the People's Party. We will empirically test these hypotheses in the following sections.

5. Data

To examine the reasons for voting for the People's Party, we combine county-level geographic, demographic, agricultural, and transportation cost data with county-level shares of votes for the People's Party. This latter is taken from Clubb, Flanigan and Zingale (1987) and is supplemented by data from Walter Dean Burnham (1955). Socio-economic data come from Haines (2010), who provides county-level data on the share of urban populations, the share of foreigners, the share of the black population, the share of the Chinese population, the number of farms, the value of agricultural and manufacturing output respectively, and the interest rate on farm mortgages. To this we add a number of geographical variables. We use a measure of terrain ruggedness based on 'The Terrain Ruggedness Index' (in millimeters), which is provided by Nunn and Puga (2012)[15], and

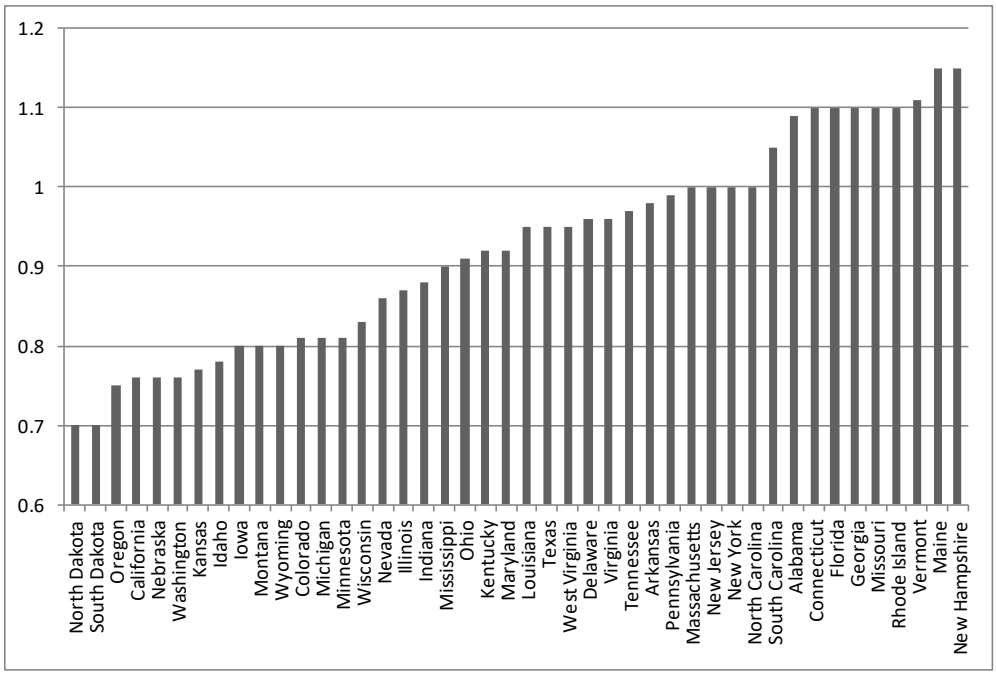
[15] Downloaded from: www.diegopuga.org/data/rugged/tri.zip

calculate average county elevation based on the data from GTOPO30 (US Geological Survey, 1996). Furthermore, we use the suitability index for wheat (Crop suitability index (class) for low input level rain-fed wheat, FAO) provided by the Food and Agriculture Organization of the United Nations from the same source (category 'low input level rain-fed').

In order to test the hypothesis developed in the previous section, we would ideally like to look at price differentials between each county and the point of export, i.e. often New York. However, prices are to our knowledge only available on the state level. Following the law of one price, the cost of shipping should be a good proxy for price gaps and we will use this since county-level transportation costs are available. We will also supplement this with information on the county-density of the railroad network to capture the effect of competition on prices, an argument developed in more detail below. We use transportation costs in 1870, 1880, and 1890 calculated by Donaldson and Hornbeck (2016) who also provide data on the railroad network density per county. They calculate transportation costs as the lowest-cost route on the network comprised of wagon routes, waterways, and the railroad network for the transportation of agricultural goods. The spatial variation of these costs thus depends on the accessibility of the transportation network, and the counties with easy access to the rail network have, in general, lower transportation costs. Their calculations include three components: the freight rate, the transportation network, and the calculation of the lowest-cost route across the transportation network. Donaldson and Hornbeck keep the freight rate constant across the network and decades using the following national averages given by Fogel: rail rates are set at 0.63 cents per ton-mile, waterway rates at 0.49 cents per ton-mile, wagon transportation costs at 23.1 cents per ton-mile, and trans-shipment costs at 50 cents per ton. They also hold the canals, navigable rivers, natural waterways, and wagon routes constant over time. Given that the main advancements of transportation were in rail, this is a justifiable assumption. However, the fact that the freight rates are kept constant is a limitation since they might be expected to vary according to local demand and, importantly for us, market power in the transportation sector, which would also be endogenous to local conditions. At the same time, however, this offers an econometric advantage since the changes in the transportation costs are determined by changes in the rail network, thus limiting the endogeneity problem.

We start by looking at the available agricultural prices, for which we use the ATICS dataset, collected and described in detail by Cooley et al (1977)[16], for the prices of wheat by state in 1890. The database refers to farmgate prices (recorded on December 1) and thus measures directly the prices relevant for the welfare of farmers. The use of wheat prices only is justified since it was both the most ubiquitous crop and the most important in terms of exports. Figure 2 presents the ratio of wheat prices relative to New York as the east coast's international export hub.[17] We see a geographical gradient of declining prices west and south-west from New York: in states like South and North Dakota the price differential was as much as thirty percent.

Figure 2: Farm gate prices of wheat relative to New York on December 1, 1890



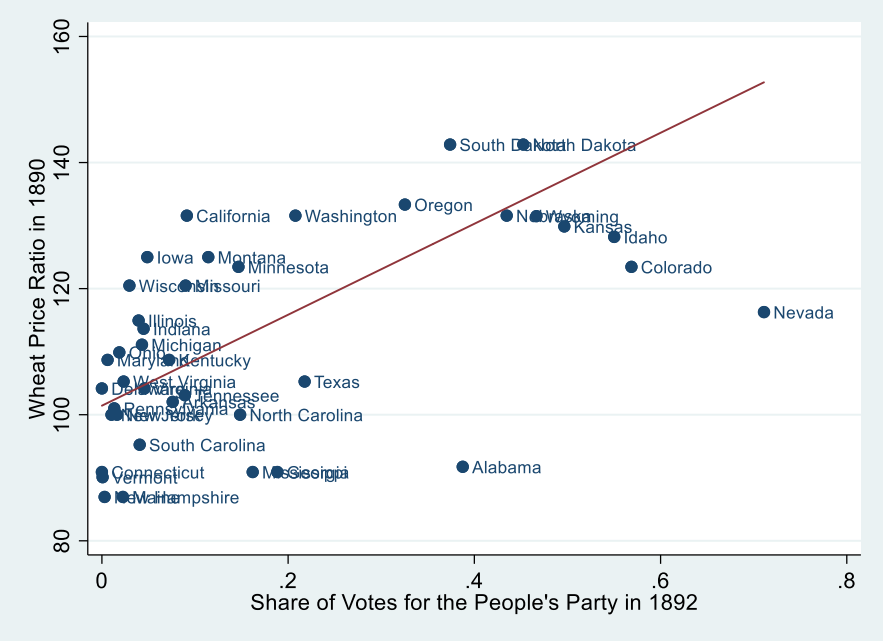
Source: ATICS, see Cooley et al (1977).

[16] ATICS was kindly made available to us by Stephen J. DeCanio.

[17] A possible objection is that the price differences were simply due to quality differences between the states. Of course, this is a possibility, but in fact there are theoretical reasons to believe that the wheat furthest from the East Coast should have had the highest quality, and thus the highest price ceteris paribus. A.A. Alchian and W.R. Allen (1967) noted long ago that there is good reason to 'ship the best apples out' since transportation costs do not differ for good and bad apples making the low quality apple relatively more expensive in foreign markets. Transportation is thus simply a specific price increase which lowers the relative price of the higher-quality produce in the distant market. East Coast and European demand will therefore shift to the high quality variety of the commodity. Producers might have been expected to meet that demand by improving the quality of the product.

One of the testable hypotheses developed in the previous section is a positive relationship between the price differential and support for the People's Party. To see how the wheat prices expressed relative to New York relate to votes for the People's Party, we present a scatter plot of these prices and votes of the Party at state level in Figure 3 with a fitted line which weights states by the acres of wheat grown. This figure shows a positive correlation and clearly indicates the east-west gradient which was already noticeable in Map 1 – the further away from the East Coast, the larger is the populist support. We note outliers such as Nevada and Alabama which cautiously motivate controlling for state-specific conditions in the analysis that follows.

Figure 3: Relationship between the Share of Votes for the People's Party and Wheat Prices Relative to New York



Note: Wheat price ratio is defined as (wheat price in NYC/wheat price in a US state)*100
Source: ATICS, see Cooley et al (1977).

Ideally, we would prefer county-level, not state-level agricultural prices. Since these are not available, we use the second hypothesis developed in the previous section and explore a relationship between the transportation costs to the export hub and the support for the People's Party. As a first look, we illustrate this relationship at the state level to see if the patterns are similar

to Figure 3. Figure 4A thus presents a relationship between the average state transportation costs to New York City and the share of votes for the People's Party where the average state transportation costs are calculated as the average of the state's counties. Figure 4B depicts the same relationship but this time at the county level. In both cases the fitted line is weighted by the acres of wheat grown. We see that both figures show a similar positive relationship as in Figure 2, thus supporting the arguments from Section 4. It is interesting to note that the Plains and the West dominate the upper right corner of Figure 4A. We also note that the South also exhibits a positive relationship between the transportation costs and support for the People's Party. Admittedly, these are unconditional averages and we will explore this relationship in more detail using regression analysis in Section 6.

Figure 4A: Share of Votes for the People's Party and Transportation Costs to New York City

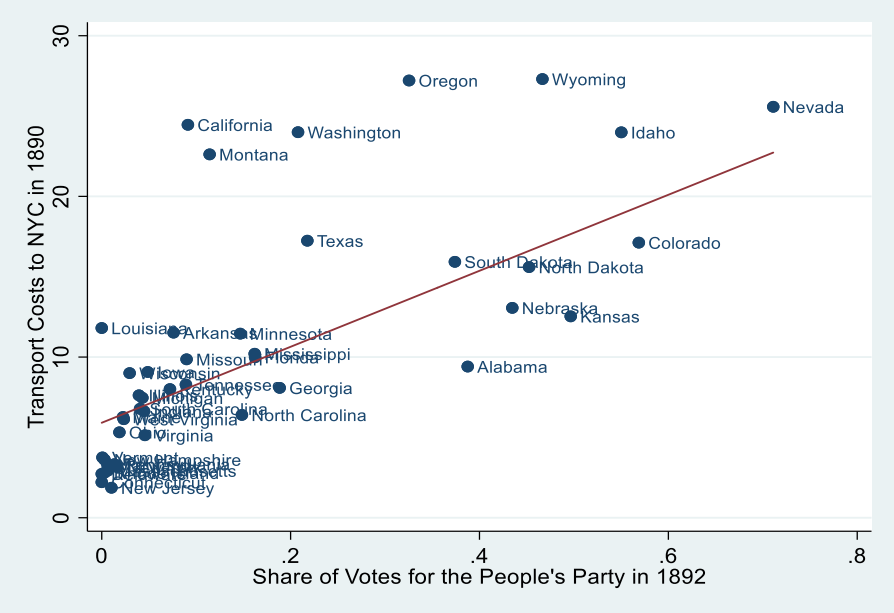
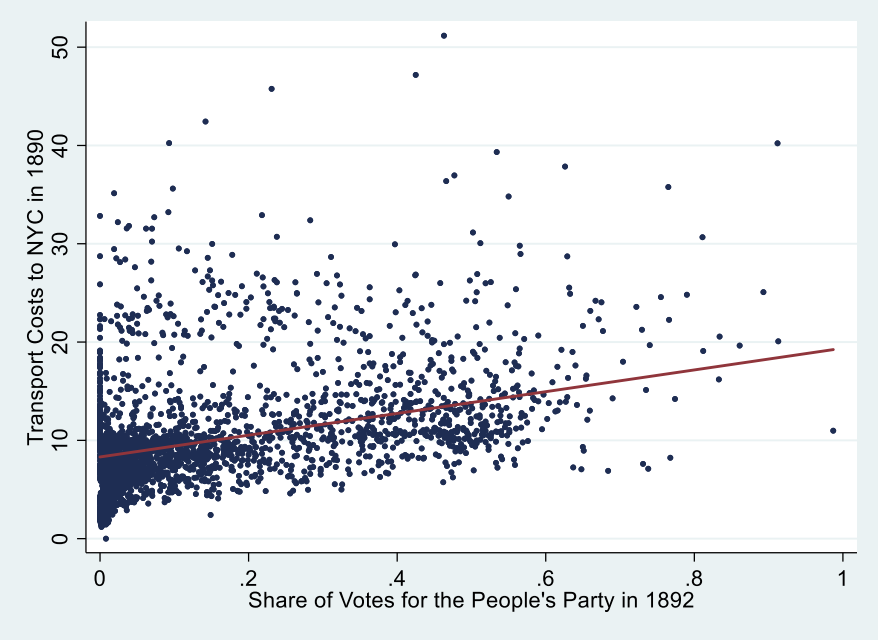


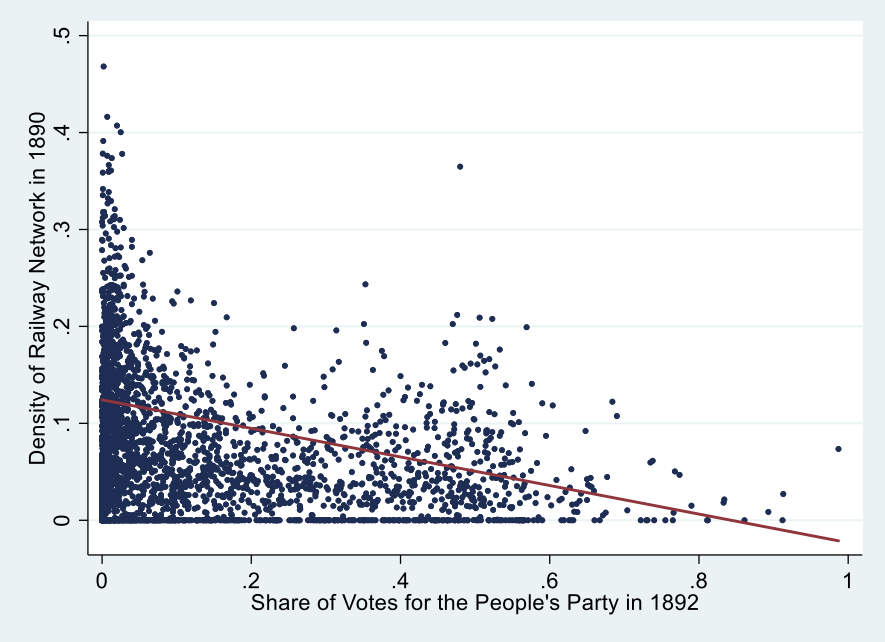
Figure 4B: Share of C Votes for the People's Party and Transportation Costs to New York City at County Level



Sources: Voting data: Clubb, Flanigan and Zingale (1987), supplemented by data from Walter Dean Burnham (1955). Transportation costs: Donaldson and Hornbeck (2016)

The digitization of the transportation network by Donaldson and Hornbeck (2016) allows us to explore the density of railroad network as another dimension related to the transportation costs and railroads in particular. The way in which Donaldson and Hornbeck constructed the transportation costs directly links them to that density: the higher the density, the lower the transportation costs. This is because as there are more routes to transport goods, there are more options to find an optimal (least cost) path. Moreover, the density of the railroad network offers an additional advantage: it is linked to the market power of the railroad companies, since a denser railroad network might mean more railroad companies provide transportation services. Admittedly, it is not a perfect proxy since one company can run all railroads in a county. However, this is increasingly less so as we look at this density outside the counties, something we will explore in Section 6. Figure 5 shows a correlation between the density of the rail network and the votes for the People's Party. It is negative, suggesting that the famers' discontent was muted by the availability of a denser rail network. In the next section we explore whether this result will still hold in a regression analysis.

Figure 5: Share of Votes for the People's Party and Density of Railroad Network in County



Sources: Voting data: Clubb, Flanigan and Zingale (1987), supplemented by data from Walter Dean Burnham (1955). Density of railroad network: Donaldson and Hornbeck (2016)

6. Regression Analysis

This section investigates whether the relationships discovered in the previous section hold in a multivariate regression analysis. Similarly to Figures 3-5, we quantify the extent of political protest in a county using the share of votes for the People's Party candidate in the 1892 Presidential election, which we term $populist\ vote_{i,j}$. Our empirical strategy includes two main regression specifications. The first is:

$$(Populist\ Vote\ )_{i,j}^{1892} = \alpha + \beta(Transport\ Costs)_{i,j,h}^{t} + \sum_{z=1}^{Z} \gamma_z (Controls)_{i,j,z}^{1890} + s_j + \varepsilon_{i,j} \quad (1)$$

in which the main variable of interest is the transportation costs of the shortest route from the centroid of county *i* in state *j* to the trade hub *h = {New York City, Chicago}* at time *t={1870, 1880, 1890}* expressed in log form, s_j is a vector of state dummies, and $\varepsilon_{i,j}$ is the error term. The second regression specification considers the density of the rail network in county *i*:

$$(Populist\ Vote\ )_{i,j}^{1892} = \alpha + \beta(Rail\ Density)_{i,j}^{1890} + \sum_{z=1}^{Z} \gamma_z (Controls)_{i,j,z}^{1890} + s_j + \varepsilon_{i,j} \quad (2)$$

where the rail density is defined as the length of rail lines per square miles in county *i* of state *j* in 1890.

Since our dependent variable is the share of the votes for the People's Party – a variable in the interval [0,1] – we use a fractional estimation model due to Papke and Wooldridge (1996). Specifically, we estimate equations 1 and 2 with a quasi-maximum likelihood estimator, cluster standard errors at the state level, and weight the regressions by the county's wheat production in 1890 to minimize the effect of outliers[18]. The error terms are clustered at the state level to account for any state-specific cross-county correlation. Map 1 has also shown that there are rather strong state-specific effects which could have affected voting for the People's Party across each state's counties. For example, Nevada or Colorado had strong mining interests which were very specific to these states. Also, as discussed in Section 3, states' major political parties differed considerably in

[18] We used the total production of wheat in bushels, as well as the total acres of wheat respectively. The results are very similar.

their responses to the Populist movement, thus influencing how well the People's Party was established in the individual states. All this strongly justifies controlling for state unobserved effects using state dummies, s_j.

We have chosen two international export hubs: New York City, and Chicago. New York City was the major port for export and imports to and from the rest of the world. Chicago was the gateway city to the North American frontier and one of the main grain exchanges in the country (Cronon 1991). Farmers from the frontier were bringing to and selling their agricultural produce in Chicago which was then shipped to New York City for export. The transportation costs to Chicago thus mattered, hence we included them in the regression analysis. The controls include socio-demographic variables (share of urban populations, share of foreigners, share of black population, share of Chinese population), geographic factors (latitude, longitude, elevation, ruggedness, wheat suitability), and economic factors such as the number of farms, the interest rate on farms, and as robustness checks the value of agricultural production, and the value of manufacturing production, all at the values from 1890.

To interpret the estimated coefficients as causal, we need to make sure that endogeneity is not an issue. Two forms of endogeneity might pose an issue for our estimates: (i) reverse causality, and (ii) omitted variable bias. Since we regress the past values of the explanatory variables on the contemporary values of the dependent variable, reverse causality is not an issue. We also believe we control for all variables which might have affected the voting behavior at the county level. Furthermore, as argued by Donaldson and Hornbeck (2016), the construction of the transportation costs variable assures that they depend on the overall transportation network rather than county-specific conditions, making them very likely exogenous to the local conditions. However, the density of the rail network in a county is probably most susceptible to the endogeneity issue since there could have been an unobserved county effect correlated with both the rail density and the reasons why people voted for the People's Party. Therefore, we err on the side of caution and interpret our estimates conservatively as associations.

Regression results and robustness checks

Table 1 presents the results of estimating equation 1. We estimate separately the effect of transportation costs to New York City and Chicago respectively, and we consider transportation costs in the years 1870, 1880, and 1890 respectively. The year 1890 immediately precedes the 1892 Presidential election. The reason we estimate the effect of 1870 and 1880 is that the farmers' discontent had a long history which culminated with the People's Party and the nomination of its candidate for the US president. We are interested in whether there are any signs of possible persistency of the levels of transportation costs during the two decades preceding the 1892 election. We focus on the main variables of interest. Overall, three patterns emerge from Table 1: (i) a positive relationship between the costs of delivering goods to the trading hubs and support for the People's Party, both in the case of New York City and Chicago, (ii) the relationship is quantitatively stronger for NYC than Chicago, and (iii) the relationship is stronger in 1890 than in 1880 or 1870.

The first pattern is consistent with our theoretical reasoning: the larger the transportation costs, the higher is the support for the Party, and also confirms the qualitative evidence that freight rates were among the primary concerns of farmers. The magnitudes of the coefficients are also non-trivial. In the case of the transportation costs to NYC in 1890, a doubling leads to a sixteen percentage point increase in the support for the Party. Since there is a clear east-south, and east-west gradient of voting for the Party, the results imply that, *ceteris paribus*, as we move away from the East coast, the Populist political agenda gained stronger support. The effect of transportation costs is considerably smaller for Chicago (more than sixty percent relative to NYC). This is in line with the fact that Chicago was an important wheat market for the farmers on the Western Frontier (Cronon 1991), hence the counties for which the transportation connection allowed them to deliver their agricultural produce to Chicago at a lower cost did not vote for the Party as eagerly as in other counties. Here we need to remember that the transportation costs are *not* a mere function of distance, but also the connectivity of counties to the export hubs which rests on the accessibility of the transportation network. Nevertheless, even though the magnitude was smaller than in the case of NYC, it was not miniscule: a doubling in the transportation costs to Chicago in 1890 led to a nine percentage point increase in votes for the Party, a margin wide enough to win it a majority

in counties on the Frontier. As for the variation over time, the transportation costs exhibit a milder effect in 1880 or 1870 compared with 1890. This is perhaps not surprising. However, it is important to notice that there is an effect even 12 or 22 years before the election, which might reflect a long-running evolution of farmers' discontent going back to the Granger movement, or the Farmer's Alliance. These results are admittedly a first look into the long-run effects of these movements on the presidential elections in the 1890s and more research is needed to explore this question in detail.

< Table 1 about here >

Table 2 presents the results of estimating equation 2. Panel A displays the result when we consider only the county's rail density, and Panel B also takes into account the rail density around the county in buffers of up to forty miles. The results show an interesting pattern. We see that, *ceteris paribus*, the denser the rail network, the lower was the support for the Populist Party. This is consistent with our exposition in Section 3: the density of the network proxies the opportunities for transportation of the agricultural goods to the export centers. The denser the network, the more likely it was that farmers could find a less costly transportation for their goods than if there was only one rail line passing through the county. As a result, farmers would have less incentive to vote for the People's Party on the grounds of high transportation costs. Of course, this measure has its disadvantages, as discussed above. Therefore, in Panel B we also consider the effects of density in buffers around the county. Indeed, a connectivity to the transportation network means that it mattered not only whether and how many railroads were passing through the county, but also how many railroads were passing through the neighboring counties. The results are revealing: the negative effect strengthens with the increasing size of buffer zones around the county. This supports even more our initial conjecture: the more opportunities to transport agricultural goods available to farmers, as represented by a denser railroad network, the less prone they would be to supporting the People's Party. Since railroad density captures to some extent the market power of railroads, these results also suggest that the smaller the market power of the railroad companies (as a result of a denser rail network), the smaller is the support for the People's Party.

< Table 2 about here >

We have conducted a number of robustness checks which are reported in the Appendix, Tables A2-A7. The first set – Tables A2 and A3 – reports the regressions in which we excluded Colorado, Montana, and Nevada, the states with a strong mining interest and counties with some of the highest support for the People's Party. We thus examine whether our main results are driven by the states in which concerns about bimetallism were most likely stronger than concerns about how much it cost to transport agricultural goods to the export hubs. In doing so, we also check whether our results are driven by several counties on the Frontier with the highest support for the Party. Both tables show that the statistical significance is preserved and the effect on the magnitude of the marginal effect is very small. This reassures us that our main results are not the outcome of a handful of counties in the states with a strong support for bimetallism. The second set of robustness checks excludes the state dummies. This is more to reassure ourselves that controlling for the state effects is indeed important and that otherwise the results would suffer from omitted variable bias leading likely to an upward bias in the estimated coefficients. Tables A4-A5 show that the marginal effects are indeed much larger than in Table 1 and 2. This confirms our conjecture that not controlling for state effects would bias our estimates upwards as the main variables of interest also capture the effects of state party politics and state-specific interests, which thus need to be controlled for. The third set of robustness checks expands the controls with the manufacturing output per worker and agricultural output per worker respectively. We see that the main patterns remain unchanged with the magnitudes of the marginal effects being only slightly lower.

Regarding these controls, it should first be noted that these are rather sensitive to the inclusion of state dummies. When fixed effects are included, a number of the controls remain statistically significant, and we provide a brief interpretation here, although the full results are available on request. The number of farms had a positive impact on the Populist vote, whereas per capital manufacturing output had a negative impact. This is as expected, and emphasizes the agrarian nature of the protests. Chinese were less likely to vote for the Populists, which was not surprising given that the Omaha Platform condemned 'the fallacy of protecting American labor under the present system, which opens our ports to the pauper and criminal classes of the world and crowds out our wage-earners; and … the present ineffective laws against contract labor' and called for 'the further restriction of undesirable immigration.' As is well known, the Chinese were the first group

to be subject to discriminatory immigration law with the Chinese Exclusion Act of 1882. Finally, the negative sign on wheat suitability might appear counterintuitive, until we note that agricultural suitability in general is higher in the eastern half of the United States, where the vote for the Populists was generally lower.

7. Conclusion

We have argued that US farmers producing for foreign markets were right in identifying economic stress in the Grain Invasion period. The traditional argument that wheat prices increased relative to the general price level is not disputed, but we argue that the impact of the fall in transportation costs on the grain producing sector differed according to location. Farm protest was most intense in the regions near or at the grain producing frontier. Farmers in these regions, we argue, were permitted by falling transportation costs to access foreign markets, but only at the pre-determined farm income. These farmers received the world price minus the transaction costs involved in getting their produce to market. Many considered these costs to be unfairly large, owing to the monopoly power of rail firms and the discriminatory practices of middlemen.

Recognizing the gap between what they received and the price in export hubs, the burden of transportation and other transaction costs became apparent, and the farmers most affected protested. Consistent with this, we find that votes for the Populist presidential candidate in 1892 correlated with price gaps and transportation costs, but were offset by greater rail density, which reduced the price setting power of the railroads. Although the People's Party itself ultimately failed, farmers and politicians eventually found alternative ways to mitigate their concerns, first with the establishment of cooperative grain elevators, particularly in the north-central United States (Kenkel 1922, p. 16), and later with the introduction of the regulation of freight rates (Federico and Sharp 2013).

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Table 1: The Effect of Transportation Costs on the Voting for the People's Party in 1892 US Presidential Election.

VARIABLES	1	2	3	4	5	6
Transport costs to NYC in 1890 (log)	0.16***					
	[0.033]					
Transport costs to NYC in 1880 (log)		0.06***				
		[0.016]				
Transport costs to NYC in 1870 (log)			0.08***			
			[0.020]			
Transport costs to Chicago in 1890 (log)				0.09***		
				[0.027]		
Transport costs to Chicago in 1880 (log)					0.04***	
					[0.014]	
Transport costs to Chicago in 1870 (log)						0.05***
						[0.016]
State Dummies	YES	YES	YES	YES	YES	YES
Observations	2,297	2,297	2,297	2,296	2,296	2,296

Notes: this table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table 2: The Effect of Railroad Density in 1890 on the Voting for the People's Party in 1892 US Presidential Election.

	1	2	3	4	5	6	7	8	9
Density of rail network in the county	-0.34***								
	[0.105]								
Density of rail network around county		-0.37***							
up to 5 miles		[0.121]							
Density of rail network around county			-0.46***						
up to 10 miles			[0.127]						
Density of rail network around county				-0.48***					
up to 15 miles				[0.147]					
Density of rail network around county					-0.52***				
up to 20 miles					[0.147]				
Density of rail network around county						-0.54***			
up to 25 miles						[0.143]			
Density of rail network around county							-0.57***		
up to 30 miles							[0.150]		
Density of rail network around county								-0.59***	
up to 35 miles								[0.156]	
Density of rail network around county									-0.62***
up to 40 miles									[0.172]
State Dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297

Notes: this table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls are for 1890 and include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A1: Percentage Votes for the People's Party, 1892

State	%	State	%
Alabama	36.55	Nebraska	41.53
Arizona Territory		Nevada	66.78
Arkansas	7.99	New Hampshire	0.33
California	9.39	New Jersey	0.29
Colorado	57.07	New Mexico Territory	
Connecticut	0.49	New York	1.23
Delaware	0.00	North Carolina	15.82
Florida	13.65	North Dakota	49.01
Georgia	18.80	Ohio	1.75
Idaho	54.21	Oklahoma Territory	
Illinois	2.54	Oregon	34.35
Indiana	4.01	Pennsylvania	0.87
Iowa	4.65	Rhode Island	0.43
Kansas	50.20	South Carolina	3.41
Kentucky	6.89	South Dakota	37.64
Louisiana	0.00	Tennessee	9.00
Maine	2.06	Texas	23.61
Maryland	0.37	Utah Territory	
Massachusetts	0.82	Vermont	0.08
Michigan	4.28	Virginia	4.20
Minnesota	10.97	Washington	21.79
Mississippi	19.27	West Virginia	2.44
Missouri	7.61	Wisconsin	2.70
Montana	16.50	Wyoming	46.14

Source: https://uselectionatlas.org/RESULTS

Table A2: The Effect of Transportation Costs on the Voting for the People's Party in 1892 US Presidential Election Excluding Colorado, Montana, and Nevada.

VARIABLES	1	2	3	4	5	6
Transport costs to NYC in 1890 (log)	0.157***					
	[0.033]					
Transport costs to NYC in 1880 (log)		0.059***				
		[0.015]				
Transport costs to NYC in 1870 (log)			0.082***			
			[0.020]			
Transport costs to Chicago in 1890 (log)				0.087***		
				[0.027]		
Transport costs to Chicago in 1880 (log)					0.0404***	
					[0.014]	
Transport costs to Chicago in 1870 (log)						0.055***
						[0.017]
Socio-economic controls	YES	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES	YES
Observations	2,222	2,222	2,222	2,221	2,221	2,221

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. Colorado, Montana, and Nevada are excluded. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A3: The Effect of Railroad Density on the Voting for the People's Party in 1892 US Presidential Election Excluding Colorado, Montana, and Nevada.

	1	2	3	4	5	6	7	8	9
Panel A									
density of rail network in the county	-0.33***								
	[0.107]								
Panel B									
density of rail network around county up to 5 miles		-0.36***							
		[0.123]							
density of rail network around county up to 10 miles			-0.44***						
			[0.129]						
density of rail network around county up to 15 miles				-0.47***					
				[0.150]					
density of rail network around county up to 20 miles					-0.51***				
					[0.149]				
density of rail network around county up to 25 miles						-0.53***			
						[0.144]			
density of rail network around county up to 30 miles							-0.56***		
							[0.151]		
density of rail network around county up to 35 miles								-0.58***	
								[0.156]	
density of rail network around county up to 40 miles									-0.61***
									[0.174]
Socio-economic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,222	2,222	2,222	2,222	2,222	2,222	2,222	2,222	2,222

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. Colorado, Montana, and Nevada are excluded. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A4: The Effect of Transportation Costs on the Voting for the People's Party in 1892 US Presidential Election, Excluding State Dummies.

VARIABLES	1	2	3	4	5	6
Transport costs to NYC in 1890 (log)	0.22***					
	[0.073]					
Transport costs to NYC in 1880 (log)		0.14**				
		[0.059]				
Transport costs to NYC in 1870 (log)			0.14***			
			[0.029]			
Transport costs to Chicago in 1890 (log)				0.12***		
				[0.034]		
Transport costs to Chicago in 1880 (log)					0.09***	
					[0.030]	
Transport costs to Chicago in 1870 (log)						0.1***
						[0.020]
Socio-economic controls	YES	YES	YES	YES	YES	YES
State dummies	NO	NO	NO	NO	NO	NO
Observations	2,297	2,297	2,297	2,296	2,296	2,296

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A5: The Effect of Railroad Density on the Voting for the People's Party in 1892 US Presidential Election, Excluding State Dummies.

	1	2	3	4	5	6	7	8	9
Panel A									
density of rail network in the county	-0.44**								
	[0.210]								
Panel B									
density of rail network around county up to 5 miles		-0.59**							
		[0.263]							
density of rail network around county up to 10 miles			-0.78***						
			[0.272]						
density of rail network around county up to 15 miles				-0.85***					
				[0.295]					
density of rail network around county up to 20 miles					-0.91***				
					[0.324]				
density of rail network around county up to 25 miles						-0.99***			
						[0.338]			
density of rail network around county up to 30 miles							-1.09***		
							[0.340]		
density of rail network around county up to 35 miles								-1.18***	
								[0.337]	
density of rail network around county up to 40 miles									-1.25***
									[0.341]
Socio-economic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
State dummies	NO	NO	NO	NO	NO	NO	NO	NO	NO
Observations	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297	2,297

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A6: The Effect of Transportation Costs on the Voting for the People's Party in 1892 US Presidential Election with Additional Controls.

VARIABLES	1	2	3	4	5	6
Transport costs to NYC in 1890 (log)	0.14***					
	[0.035]					
Transport costs to NYC in 1880 (log)		0.04**				
		[0.018]				
Transport costs to NYC in 1870 (log)			0.072***			
			[0.019]			
Transport costs to Chicago in 1890 (log)				0.073**		
				[0.029]		
Transport costs to Chicago in 1880 (log)					0.028*	
					[0.015]	
Transport costs to Chicago in 1870 (log)						0.047***
						[0.015]
Socio-economic controls	YES	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES	YES
Observations	2,214	2,214	2,214	2,213	2,213	2,213

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, and longitude, agriculture output per worker, manufacturing output per worker. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

Table A7: The Effect of Railroad Density on the Voting for the People's Party in 1892 US Presidential Election with Additional Controls.

	1	2	3	4	5	6	7	8	9
Panel A									
density of rail network in the county	-0.25***								
	[0.082]								
Panel B									
density of rail network around county up to 5 miles		-0.27***							
		[0.093]							
density of rail network around county up to 10 miles			-0.35***						
			[0.101]						
density of rail network around county up to 15 miles				-0.38***					
				[0.127]					
density of rail network around county up to 20 miles					-0.43***				
					[0.132]				
density of rail network around county up to 25 miles						-0.44***			
						[0.126]			
density of rail network around county up to 30 miles							-0.47***		
							[0.137]		
density of rail network around county up to 35 miles								-0.49***	
								[0.146]	
density of rail network around county up to 40 miles									-0.53***
									[0.165]
Socio-economic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
State dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,214	2,214	2,214	2,214	2,214	2,214	2,214	2,214	2,214

Notes: This table estimates a regression where the dependent variable is the share of votes for the People's Party in 1892 presidential election. The estimation is done with a fractional response estimator. The reported estimates are marginal effects. Standard errors in brackets are clustered at state level. Controls include the share of foreign born, Chinese born, black, share of urban population, number of farms, interest paid on farm, wheat suitability, elevation, ruggedness, latitude, and longitude, agriculture output per worker, manufacturing output per worker. *** p<0.01, ** p<0.05, * p<0.1
Sources: see the text

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