Winners and Losers from Globalization: Why both European and US Farmers were angry in the Grain Invasion era, 1870-1900

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Abstract: We demonstrate that the agrarian unrest in the United States between 1870 and 1900 can be given an economic explanation, despite its association with increases in the real price of agricultural produce. It was not merely the result of nominal illusions as other scholars have suggested. Falling transportation costs allowed for the extension of the frontier and for more farmers to enter the international grain market. These farmers received, however, 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 perceived market power of rail firms and the discriminatory practice of middlemen. Recognizing the gap between what they received and what farmers further east received, frontier farmers protested. Using the shares of the People’s Party (Populist) candidate in the 1892 Presidential elections as a measure of the extent of the protest, we demonstrate that this is negatively related with state wheat prices relative to East Coast prices, even when we control for other factors often also considered relevant.

JEL codes: N5, N7

Keywords: Agriculture, grain Invasion, populism, United States

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1. Introduction

For the historian of European agriculture, the last decades of the nineteenth century are perhaps principally associated with the American ‘Grain Invasion’ when, in the wake of rapidly falling transportation costs, the United States began exporting unprecedented quantities of cheap wheat to Europe (O’Rourke and Williamson 1999). The resultant agricultural distress and protest in the Old World was both predictable and understandable. Countries either chose to shield themselves through protectionism, as in the cases of Sweden, Germany and France, or allowed their economies to adjust. The UK saw a large decline in agriculture (Ejrnæs, Persson & Rich 2007) whereas Denmark - a particularly interesting case – 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).

Somewhat paradoxically, however, the historian of American agriculture would also associate this period with agrarian discontent. A succession of protest movements flourished throughout this period, culminating with the Presidential campaign of the Populist William Jennings Bryan. Shortly before securing the Democratic nomination for the 1896 election he delivered a famous address highlighting the importance of the rural economy:

‘Burn down your cities and leave our farms, and your cities will spring up again as if by magic, but destroy our farms and the grass will grow in the streets of every city in the country.’

However, it has been difficult to find a wholly convincing argument as to why farmers were angry. The problem rests on evidence that the real incomes of farmer households actually increased over this period. This explanation ignores, however, both the geographical pattern of the protests and that of agricultural incomes across the country. In fact, wheat prices were lower the further west the farmer was located. This was due to the fact that local prices were always equal to the world (UK) price minus the transaction costs, as follows from the Law of One Price, which states that $p = p^* + t$, where $p$ is the price in the importing market, $p^*$ is the price in the exporting market, and $t$ are the transaction costs involved in shipping the product...
between the markets. The further west the farmer household was located, the higher was \( t \), and the lower was the price it received, \( p^* \).

We relate this to the concept of perceived fairness of the incomes received. Much of the protests concerned the supposed monopoly power of railroads, and the discriminatory practices of middlemen, particularly in terms of their products being graded inappropriately for their quality. Using the voting share for the People’s Party (Populist) candidate in the 1892 Presidential election, we demonstrate that this was lower where the prices received by farmers relative to East Coast prices were higher.

The remainder of this paper is as follows. Section 2 reviews and critically examines previous attempts at providing an explanation for the agricultural distress. Section 3 introduces a theoretical framework for understanding the geographical pattern of agricultural unrest. Section 4 provides empirical evidence for our conjecture. Section 5 concludes.

2. The Agrarian Protest in the United States

The story of the agrarian protest movement in the United States during the latter part of the nineteenth century is well known. A succession of protest movements emerged starting with Oliver Kelly’s ‘National Grange of the Patrons of Husbandry’ in 1867, followed by the Greenback party, the Farmers’ Alliance and finally the Populist movement of the 1890s. The farmers’ concerns are typically 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 & Parker 2000).

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\(^2\) was therefore that the economic plight of farmers seemed to have been exaggerated or misrepresented in earlier research when farmers were taken on 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 are welfare losses associated with price volatility if farmers were risk averse (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 fuelled 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 fuelled a fear of being the next victim. States with a higher frequency of foreclosures were fertile ground for the protest movement.

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, in a recent survey, Whaples (1995) reports that only 22 percent

\(^2\) This was shared for example by W. Parker and R. Higgs.
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 then have
nominal illusions, 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.3

In fact, we ought to be concerned about any argument which implies that people protest for
the wrong reasons. Economists usually believe that man acts fairly rationally on the basis of
knowledge which 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. 4

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 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 a sign 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.

3 Although see Friedman (1990, p. 1171) for a dissenting view.
4 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…”
What the farmers were then really experiencing was their submergence in the new Atlantic Economy. This gave rise to concerns which were entirely economic in nature. Exposure to distant export markets had differential effects on producers in America. The farmers’ concerns were thus entirely consistent with those of rational economic agents.

3. A Simple Model for Understanding the Populist Protests

We start from economics first principles, and argue that political protest of the Populist variety was related to negative shocks to the utility (satisfaction) levels of individuals or households. The utility of a wage-earner is usually represented by a simple utility function such as

\[ u = u(w, h) \] (1)

where utility is rising in \( w \) for wage and declining in \( h \) for hours of work.

Over the past 30 years, however, an increasing number of economists, often inspired by findings in sociology and psychology, have argued that functions of type (1) are seriously inadequate since workers also derive satisfaction or dissatisfaction from their wage relative to others.\(^5\) For example, in a pioneering article, Kahneman et al (1986) investigated perceptions of unfair outcomes and singled out the exploitation of the market power of firms or employers as particularly objectionable.

These results have more recently been confirmed by experimental economists. Specifically, there is evidence of ‘inequality aversion’, which means that subjects have strong views about disadvantageous inequality and that quite a few hold strong views about fair and unfair outcomes. In fact, these findings relate to an earlier discussion among sociologists, who developed the concept of relative deprivation, as opposed to absolute deprivation. The point here is to relate social behavior to the gap between actual conditions and legitimate expectations formed by the example of others (Merton 1938, Runciman 1969). For example, women rightly express dissatisfaction about being paid lower wages than a relevant male group with similar schooling and work experience. Although it is accepted that wages can and must

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differ because of skills and education there are strong views about what the magnitude of these wage differences should be.

We thus argue that a more representative and realistic representation of the utility function is

\[ u = u(w, w^#, h) \]

(2)

where utility is declining in \( w^# \), which is the wage gap relative to the wage of a reference group.

For self-employed workers such as farmers the utility function takes a slightly different form, however. Since income depends crucially on the price of the goods produced and sold by the farmer we can rewrite equation (2) as

\[ u = u(p, p^#, h) \]

(3)

where \( p^# \) is the price gap to a reference price of the commodity produced and sold.

The discussion of the American farm protest has hitherto been characterized by a type (1) utility approach. We argue instead that relative prices and incomes have crucial importance. The model we test suggests that (at least a fraction of) price differentials between farmers were considered unfair. As is well known, following the Law of One Price, price differentials will reflect transportation and other transaction costs between markets, and in fact the Populist agitators frequently singled out grain traders and railway companies as culprits. Much of the farmers’ protest thus related to alleged or real price distortions which made price gaps too big to be considered ‘fair’. These alleged or real distortions related to railway companies exploiting their monopoly power and middlemen downgrading the grain delivered to the market thereby lowering the farm gate price.

Evidence to support this theory would be that the Populist vote was higher the larger the price difference between a reference price and the local price. However, to the extent that the price gap is caused by railway operators exploiting their market power, it might be expected that
perceived or real market power was smaller in states which had access to alternative means of transportation, and thus that the Populist vote should be smaller.

This framework does not directly address the timing of discomfort and protest of US farmers, however. This we believe had to do with the increasing globalization of the grain markets in the last third of the nineteenth century, which both made farmers knowledgeable about prices in export hubs and in Europe, and brought new land into world agricultural markets. Furthermore, in this period the extension of the frontier westwards was made possible by migrants from Eastern states and Europe, who would have had their expectations shaped by price levels in the areas they came from. Moreover, it seems that in the process of recruiting prospective farmers to newly settled areas there was a tendency to give potential settlers inflated expectations of economic conditions.

Falling domestic transportation costs thus provided the mechanism whereby frontier farmers were invited into the world market for grain. 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.

There was a reduction in real transportation costs mainly because of the fall in domestic freight rates from the producing regions in the US Midwest to the ports on the US Atlantic coast. These falling transportation costs in our interpretation made it possible for newly populated distant states to ship grain at the going wage and local price, rather than giving them a share in the gains from falling transportation costs. This is illustrated in Figure 1.6

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6 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 (the price which we take as representing the world price for wheat) and from the East Coast of the US westwards in 1870. Farmers west of the UK receive the world (UK) price minus the transportation and other transaction costs, following the Law of One Price. The location of the frontier is given where farmers can just cover their costs, i.e. where $p = c$. $z$ represents the transaction costs involved in shipping wheat from the center of gravity of production (COG) to the UK. At the COG, the price of wheat received by farmers is $\bar{p}$. We define this as the weighted average by production of the prices of wheat in all states. Note that this model assumes 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 immigration from especially Europe.
By the end of the nineteenth century, technological advances in transportation have resulted in transaction costs falling at all locations, and \( z \) falls to \( z' \). This causes the slope of the \( PP \) schedule to flatten, giving the new schedule \( PP' \). The COG moves westwards, but as Figure 1 is drawn, farmers still receive \( \bar{p} \) for their produce, and thus the representative farmer is not made better off. In fact there is empirical evidence for this.

The Grain Invasion era was a period of a general and substantial deflation which means that we need to compute the change in wheat prices relative to the price level. Figure 2 illustrates the COG price as defined above, deflated by the wholesale price index (both including and excluding farm produce). There is no discernible trend, and notably, there is a trough at the height of the protests in the mid-1890s.

**Figure 2: Center of Gravity Prices Divided by the Wholesale Price Index (1866 = 1)**

Source: The center of gravity prices are based on the ATICS sample as defined in the text. The WPI is taken from HSUS Cc125 and Cc126
Farmers east of $x$ receive a lower price for their produce, whilst farmers west of $x$ receive a higher price. Beyond the 1870 frontier, new farmers are being brought into the world economy, and whether they receive higher of lower prices depends on the previous local demand and supply conditions. Note, however, that frontier farmers always receive only $c$ for their produce, and thus just cover their costs. Note also, that productivity improvements in agriculture will simply cause $c$ to fall, thus causing prices to fall at all locations.

The implication from this in terms of the farm protest is quite simple. The representative farmer does not appear to have been made better off by falling transaction costs, and thus might have had reason to protest. More importantly, if the transaction costs were considered ‘unfair’ then the protest should have been louder in the recently settled areas of the frontier, where the price received was considerably lower than the East Coast price (for example than in New York). We will demonstrate in the next section that farm gate prices were indeed lower the further west the producer was, and that this matched the pattern of protest.

As Figure 1 illustrates, however, producers close to export harbors on the East Coast (east of $x$) would actually face lower prices as 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 (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 farmers 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. We test for both the ‘voice’ in protest at price differentials, and the ‘exit’ from agriculture in the following.

We test whether price differentials explain the pattern of the protest by regressing the level of protest by state on the price of wheat by state relative to a reference price.

We quantify the extent of political protest by state using the percentage share of votes for the People’s Party candidate in the 1892 Presidential election, which we term $vote_i$. Although 1896 perhaps marked the height of the protests, the Populist candidate in that year stood for the Democratic Party. The advantage with the 1892 election is thus that the Populist vote is recorded separately. Figure 3 illustrates this: clearly, Midwestern states were those with the highest voting shares. Note that AK, AZ, HI, NM, OK, and UT (six present day states) had not yet achieved statehood, thus giving 44 observations in total.

Figure 3: Percentage of votes for the People’s Party candidate in the Presidential election of 1892

Source: www.uselectionatlas.org
For prices, we use the ATICS dataset, collected and described in detail by Cooley et al (1977)\(^7\), for the prices of wheat by state in 1890. The database refers to farm gate prices (recorded on December 1) and thus measures directly the prices relevant for the welfare of farmers. Our use of relative wheat prices alone might seem odd, but wheat was both the most ubiquitous crop and the most important in terms of exports. Figure 4 gives some price series relative to the price in New York: note the pattern of prices – high in the East, low in the West.

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**Figure 4: Farm gate prices of wheat relative to New York on December 1, 1890**

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

The pattern of prices thus seems to fit our model very well. Might the price differences simply be due to quality differences between the states, however? Of course, this is a possibility, but in

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\(^7\) ATICS was kindly made available to us by Stephen J. DeCanio.
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.

We use the price of wheat in New York in 1890 as the reference price, since this price was well publicized, and it was to New York that grain was typically shipped for export to European markets, and thus define the ratio of the price in 1890 in state $i$ to the 1890 price in New York. To take account of the competition afforded to rail by water transportation, we also include a dummy, which takes the value 1 if the state borders one of the Great Lakes.

It might seem likely that the strength of the impact of wheat prices on protest might be stronger if wheat is of greater importance for the state. To control for this we include the percentage area of the state under wheat in 1889 taken from the 1890 census and its interaction with the relative price variable.

Other variables take inspiration from the literature on the Populist protests, and are mainly taken from the 1890 census. We include a measure of the percentage of males over 10 in agriculture in 1889 and a dummy for whether or not silver was mined in the state. The Populists are generally associated with an alliance of farmers and those desiring a return to a bimetallic standard. The percentage of foreign born in each state in 1889 is also included, as is a dummy for the Southern states (the fifteen slave states at the Civil War and West Virginia). Since the Populists complained about increasing indebtedness and tenancy, we also include measures of these. Finally, we also include the ‘lag’ of the protests with a variable for the members of the

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8 We have no observations for Florida, Louisiana, Massachusetts, and Rhode Island, for which we substitute the prices in Georgia, Texas, New York, and Connecticut, respectively.
Patrons of Husbandry per 100 agrarian population in 1876 taken from Buck (1913). Table 1 gives some summary statistics for these variables.

**Table 1: Summary statistics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std.Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>% votes for Populists</td>
<td>15.72</td>
<td>19.00407</td>
<td>0.00</td>
<td>66.78</td>
</tr>
<tr>
<td>State price / NY price of wheat (A)</td>
<td>0.92</td>
<td>0.130089</td>
<td>0.70</td>
<td>1.15</td>
</tr>
<tr>
<td>Access to the Great Lakes</td>
<td>0.18</td>
<td>0.390154</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Acres wheat / person</td>
<td>1.05</td>
<td>2.643296</td>
<td>0.00</td>
<td>16.20</td>
</tr>
<tr>
<td>% males over 10 in agriculture</td>
<td>48.02</td>
<td>18.805</td>
<td>10.50</td>
<td>80.11</td>
</tr>
<tr>
<td>Silver producing</td>
<td>0.30</td>
<td>0.461522</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>% Members of Patrons of Husbandry 1876</td>
<td>26.11</td>
<td>19.6467</td>
<td>0.00</td>
<td>88.50</td>
</tr>
<tr>
<td>% foreign born</td>
<td>0.16</td>
<td>0.119387</td>
<td>0.00</td>
<td>0.45</td>
</tr>
<tr>
<td>South</td>
<td>0.36</td>
<td>0.486607</td>
<td>0.00</td>
<td>1.00</td>
</tr>
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</table>

Tables 2a-b illustrate the strong correlation between the price ratio and the protests, and the importance of access to the Great Lakes. None of the other variables, which we introduce one at a time due to the limited degrees of freedom, have much explanatory power at all.
Table 2a: Explaining the Populist vote

<table>
<thead>
<tr>
<th>Dependent variable: Share of votes to Populist Party</th>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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</thead>
<tbody>
<tr>
<td>State price / NY price of wheat (A)</td>
<td>-76.40***</td>
<td>-81.35***</td>
<td>-85.19***</td>
<td>-78.91***</td>
<td>-69.50***</td>
</tr>
<tr>
<td></td>
<td>(18.29)</td>
<td>(17.04)</td>
<td>(24.95)</td>
<td>(16.79)</td>
<td>(19.07)</td>
</tr>
<tr>
<td>Access to the Great Lakes</td>
<td>-17.45***</td>
<td>-12.56***</td>
<td>-15.50***</td>
<td>-13.67***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.37)</td>
<td>(4.04)</td>
<td>(3.79)</td>
<td>(3.95)</td>
<td></td>
</tr>
<tr>
<td>Acres wheat / person (B)</td>
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<td></td>
<td>42.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(26.90)</td>
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<td></td>
</tr>
<tr>
<td>A*B</td>
<td></td>
<td></td>
<td>-59.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(39.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% males over 10 in agriculture</td>
<td></td>
<td></td>
<td></td>
<td>0.18*</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.10)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>Silver producing</td>
<td></td>
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<td></td>
<td></td>
<td>8.27</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(6.36)</td>
</tr>
<tr>
<td>Constant</td>
<td>86.35***</td>
<td>94.10***</td>
<td>100.40***</td>
<td>82.83***</td>
<td>72.24***</td>
</tr>
<tr>
<td></td>
<td>(17.94)</td>
<td>(17.04)</td>
<td>(26.59)</td>
<td>(19.95)</td>
<td>(21.83)</td>
</tr>
<tr>
<td>Observations</td>
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<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.27</td>
<td>0.40</td>
<td>0.44</td>
<td>0.43</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses. * significant at 10% ** significant at 5% *** significant at 1%
Table 2b: Explaining the Populist vote

<table>
<thead>
<tr>
<th>Dependent variable: Share of votes to Populist Party</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State price / NY price of wheat (A)</td>
<td>-81.72*** (19.94)</td>
<td>-75.83*** (17.32)</td>
<td>-73.07*** (16.00)</td>
<td>-89.52*** (18.07)</td>
<td>-81.89*** (16.84)</td>
</tr>
<tr>
<td>Access to the Great Lakes</td>
<td>-17.48*** (3.61)</td>
<td>-18.22*** (3.82)</td>
<td>-19.99*** (4.20)</td>
<td>-16.40*** (3.77)</td>
<td>-17.96*** (3.33)</td>
</tr>
<tr>
<td>Members of Patrons of Husbandry per 100 agrarian population, 1876</td>
<td>-0.00 (0.12)</td>
<td>13.15 (22.31)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% foreign born</td>
<td></td>
<td></td>
<td>13.15 (22.31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td>-6.31 (5.01)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of incumbrance of value (of those with incumbrance)</td>
<td></td>
<td></td>
<td>0.30 (0.37)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% change in farms cultivated by owners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-27.96 (39.09)</td>
</tr>
<tr>
<td>Constant</td>
<td>94.57*** (21.59)</td>
<td>87.03*** (17.95)</td>
<td>89.21*** (16.08)</td>
<td>90.08*** (18.47)</td>
<td>93.76*** (17.15)</td>
</tr>
<tr>
<td>Observations</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.40</td>
<td>0.41</td>
<td>0.42</td>
<td>0.41</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses. * significant at 10% ** significant at 5% *** significant at 1%
We then experiment with another variable which has been considered to be of importance, the interest rate premium calculated by Eichengreen (1984, PREM1), and then a measure of ‘exit’ as described above: the change in the wheat production between 1880 and 1890 (from the ATICS dataset). Summary statistics are given in Table 3, and the regression results in Table 4.

Table 3: Summary statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std.Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log interest risk premium</td>
<td>3.93</td>
<td>1.439405</td>
<td>1.29</td>
<td>7.59</td>
</tr>
<tr>
<td>Change in wheat production</td>
<td>0.88</td>
<td>4.330357</td>
<td>-1.00</td>
<td>23.67</td>
</tr>
</tbody>
</table>

Table 4: Explaining the Populist vote

<table>
<thead>
<tr>
<th></th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable: Share of votes to Populist Party</td>
<td>(11)</td>
<td>(12)</td>
</tr>
<tr>
<td>State price / NY price of wheat</td>
<td>-47.04***</td>
<td>-36.65*</td>
</tr>
<tr>
<td></td>
<td>(16.98)</td>
<td>(19.81)</td>
</tr>
<tr>
<td>Access to the Great Lakes</td>
<td>-9.39**</td>
<td>-8.14*</td>
</tr>
<tr>
<td></td>
<td>(4.40)</td>
<td>(4.50)</td>
</tr>
<tr>
<td>Log interest risk premium</td>
<td>21.86***</td>
<td>22.14***</td>
</tr>
<tr>
<td></td>
<td>(6.45)</td>
<td>(6.41)</td>
</tr>
<tr>
<td>% change in wheat production</td>
<td>0.63*</td>
<td>0.56</td>
</tr>
<tr>
<td>1880-1890</td>
<td>(0.35)</td>
<td>(0.57)</td>
</tr>
<tr>
<td>Constant</td>
<td>32.67</td>
<td>21.92</td>
</tr>
<tr>
<td></td>
<td>(21.63)</td>
<td>(23.71)</td>
</tr>
<tr>
<td>Observations</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.56</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses. * significant at 10% ** significant at 5% *** significant at 1%

The coefficient to the relative prices changes with the new variables, but it is robust. It seems that a substantial proportion of the variation in the Populist voting share can be explained by our price and water variables, although the risk premium was also important. The ‘exit’ variable
also has the right sign – if wheat production fell, then farmers were less likely to protest. We take this as strong evidence in favor of our hypothesis.

5. 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 it is argued that the grain producing sector was impacted on by the fall in transportation costs differently depending on 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 going 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 practice of middlemen. Recognizing the gap between what they received and what farmers further east received, frontier farmers protested.
References


