

# **Much ado about nothing?**

## **Why American 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, despite increases in the real price of agricultural produce, can be given an economic explanation and was not merely the result of nominal illusions as other scholars have suggested. Exposure to distant export markets, in particular the United Kingdom, in the wake of falling transport costs, brought with it incentives for American farmers to improve the quality of their produce for export. When this quality improvement is controlled for, it turns out that the real quality adjusted price of American wheat was falling. On the other hand, the real price of American wheat in Britain was also falling at the same time as the quality was increasing – so British consumers got a better product for a cheaper price. The gains from falling transport costs were thus unfairly distributed. American producers lost, while British consumers won.

**JEL codes:** N5, N7

**Keywords:** United States, agriculture, Grain Invasion, populism, quality changes

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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 transport costs, the United States began exporting unprecedented quantities of cheap wheat to Europe. 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 farmers actually *increased* over this period.

We will however suggest that farmers in the United States saw something that economists and economic historians have not seen. We will demonstrate that, although it is true that the price of farm products relative to the general price level increased, this is true only when the *quality* of the produce is not controlled for. We place the discontent within the context of the ‘Grain Invasion’ of Europe. We show that those who complained got next to nothing from the export boom despite falling transport costs and despite the surging overseas demand. It was

consumers in Europe who got all or almost all the benefits as long as domestic farmers did not succeed in protecting their markets.

The contours of an alternative explanation of the Grain Invasion thus emerge in which the expansion of the agricultural workforce in the era of mass migration made New World farmers succumb to the effects of ‘unlimited’ supply of labour and land as the frontier of grain production moved further away from the importing markets in Europe. What falling domestic freight rates did was to give land-locked producers access to the world market. Farmers thus supplied grain at the going wage and grain price. There is a W.W. Lewis flavour to the argument in that the US labour supply to agriculture and, by implication, grain supply is believed to be very if not perfectly elastic. This also implies that technological progress in the farming sector did not translate into higher wages but rather resulted in lower prices. There is an expectation here that the farm protest had a particular geographical pattern being concentrated in areas of the frontier where recently settled farmers gained access to the world market made possible by falling transport costs but at the going farm income.

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 demonstrates a theoretical reason for expecting quality increases when suppliers are exposed to distant markets. Section 4 provides empirical evidence for our conjecture that American wheat improved in quality relative to British wheat and reveals who won and who lost from the Grain Invasion. 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 transport costs should have been shared by producers in the US and consumers in Europe with the establishment of a transatlantic grain market. The lower transport 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 transport costs fell. However, this made it difficult to relate the agrarian protest movement to deteriorating economic conditions. The consensus view<sup>1</sup> 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

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<sup>1</sup> This was shared for example by W. Parker and R. Higgs.

protest'. Thus, in a recent survey, Whaples (1995) reports that only 22 per cent 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 per cent 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.<sup>2</sup>

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 & 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.<sup>3</sup>

In fact, the favoured 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.

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 brought pressure to bear on farmers to improve the quality of their

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<sup>2</sup> Although see Friedman (1990, p. 1171) for a dissenting view.

<sup>3</sup> 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..."

produce. We will demonstrate that when this quality improvement is controlled for, the real price of American agricultural produce actually fell during the years of protest. The farmers' concerns were thus entirely consistent with those of rational economic agents.

### **3. Why international trade can promote quality increases**

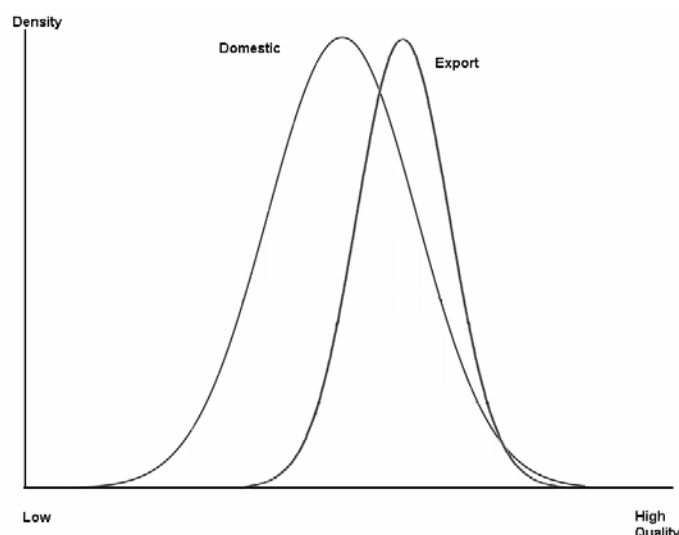
Earlier work has ignored or even gone so far as to dismiss the importance of quality changes for the agrarian unrest. Bowman & Keehn (1974, p. 599) go so far as to claim that it 'is likely that goods purchased by farmers experienced greater improvements in quality than farm products sold... if these quality changes could be accounted for, the agricultural sector's terms of trade indices would be higher than actually reported.' However, there are in fact theoretical reasons why we might expect quality improvements to be particularly important when a sector is entering the world market and starts supplying distant urban markets.

A.A. Alchian and W.R. Allen (1967) noted long ago that there is good reason to 'ship the best apples out' since transport costs do not differ for good and bad apples making the low quality apple relatively more expensive in foreign markets. Transport is thus simply a specific price increase which lowers the

relative price of the higher-quality produce in the distant market. Foreign demand will therefore shift to the high quality variety of a commodity. Producers can meet that demand by improving the quality of the product. To better understand the Alchian and Allen argument imagine a normal distribution of quality of domestically produced wheat. The exported portion will have a skewed distribution concentrated in the right hand 'tail' of the distribution, as illustrated in Figure 1.

Quality improvements can be stimulated by introducing well defined standards and by selecting the best produce for export. Indeed, US producers pioneered a precise quality grading

**Figure 1: The quality composition of domestically produced and internationally traded wheat**



system for wheat and the prices normally reported in the construction of price series are for qualities for export which were obtained by a careful sorting of the crop in which wheat of poor quality was rejected and sold at a discount.

‘Rules governing the inspection of grain in the city of Chicago’ were first introduced in the late 1850’s and then revised over the years. So, for example, the rules in force from October 1, 1878 stated that there should be four classes of White Winter wheat. The best, No. 1 White Winter Wheat, ‘shall be pure White Winter Wheat, sound, plump and well cleaned’; while No. 2 was required to be ‘sound and reasonably clean’. The lowest rank was Rejected Winter Wheat which was ‘damp, musty or from any cause so badly damaged as to render it unfit for No. 3’.

The price premium for the top quality varied considerably but was in the range of 40 to 60 per cent above ‘rejected’, the lowest class. It paid to improve quality but it could not be improved without effort. Whether the ‘race towards the top’ also implied that an increasing proportion of an increasing total output was downgraded we cannot tell. The farmer’s movement targeted middlemen and traders, rightly or wrongly, because the grading was performed by officials assumed to be close to the traders and not impartial.

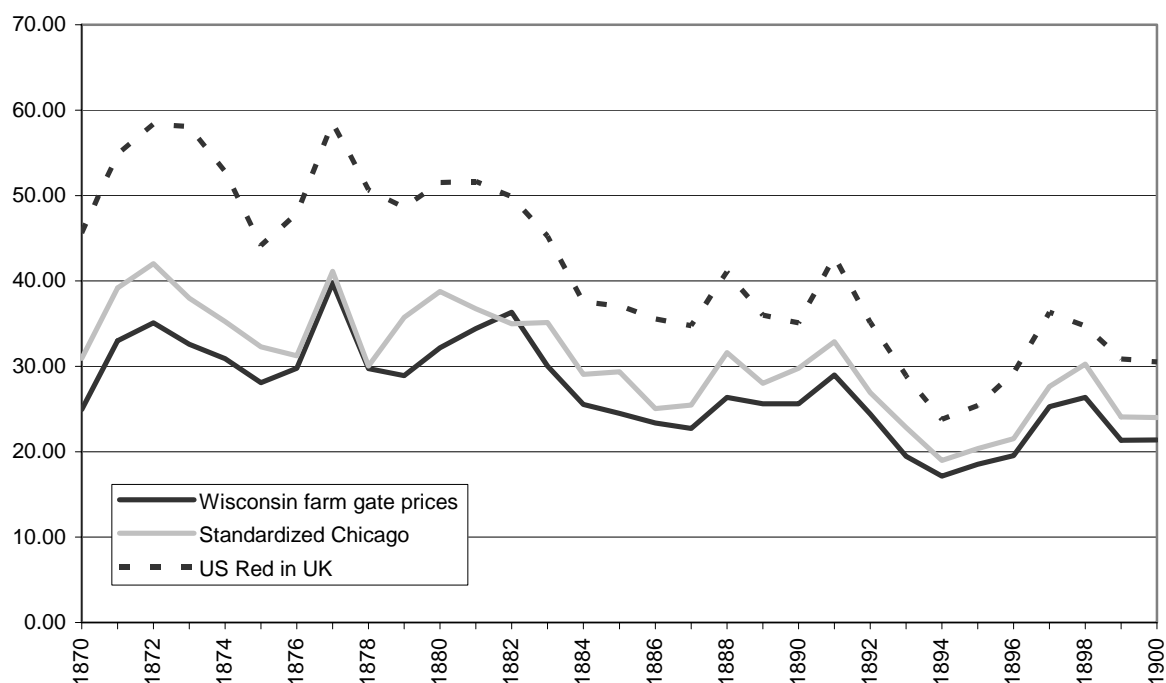
#### ***4. Winners and losers from the Grain Invasion***

We use a simple yardstick when picking winners and losers from the Grain Invasion. Consumers win to the extent that the real price of a bushel of imported wheat in the UK market falls, and producers gain if the real price of a bushel of exportable wheat increases in the Chicago market. But there might be an additional gain for consumers if the quality of the imported grain increases over time, as the Alchian & Allen argument makes clear might happen. A simple comparison of the magnitude of the opposing signs of the price movements in exporting and importing markets is not therefore sufficient, and will in effect underestimate the gains for consumers and the loss for producers.

We start by looking at the change in prices without adjusting for quality. For the sake of making an accurate comparison, an important first step in the analysis is to construct series based on a homogenous grade of grain in the producer’s region, Chicago, and in the importing market, the UK. The procedure followed is explained in the note to Figure 2. It is clear from the figure that the price of US wheat in the UK falls more than the price of the equivalent quality of wheat in Chicago. On the basis of the data underlying Figure 2 we have calculated the compound rate of change of price of US wheat in the UK and Chicago. The former prices fell by

2.35 per cent per year while producers' prices fell 1.72 per cent when calculated as the slope coefficient of a linear regression of the log of prices.

**Figure 2: Farm gate and commodity exchange prices of wheat (shillings per imperial quarter) in US compared to price of US wheat in UK, 1870-1900**



**Note:** Annual averages based on 4 observations per month. When converting from US to UK prices a UK bushel is 1.0321 times a US bushel. The figure displays US Red wheat traded in UK (London 1870-77, Liverpool 1878-1895 and Glasgow for the rest of the period). It is composed by Red (winter) wheat which by the late 1870's is specified as No. 2 Red Winter. The Chicago series is normalized so as to be identical to No 2 Red Winter. For the period up to 1880, for which we do not have continuous observations of No. 2 Red winter wheat in Chicago we used the Spring No 2 series from Chicago Board of Trade and multiplied it with the price ratio of No. 2 Red Winter to Spring No. 2 in New York. Between 1881 to 1890 we used the Chicago Board of Trade series of No. 2 Red Winter. Between 1891-1900 the series is composed by either No. 2 Spring or No. 2 Red Winter but the price differential between the two grades was insignificant by then. The Wisconsin series is not specified as regards grade. A missing observation in the US Red in the UK series in 1889 is interpolated.

**Sources:** Wisconsin: 'Wisconsin Farm Prices 1841 to 1933', Agricultural Experiment Station at University of Wisconsin Research Bulletin 119, November 1933. Grade not specified. Commodity exchange prices in New York from New York Times. Chicago: 1870-1880, NBER. 1881-1890 Annual report of the Chicago Board of Trade; 1891-1900: Wheat Studies, Vol. XI, No. 3 1934. New York Times for remaining years. UK: 1870-1877 The London Times; 1878-1900 J.E. Beerbohm's Evening Corn Trade List.



We have included farm gate prices in Wisconsin to illustrate the mechanism by which transport costs invite frontier farmers into the world market for grain. It is plausible that the recorded gap primarily reflects differences in transport costs to consumer markets. Over the nineteenth century the centre 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.

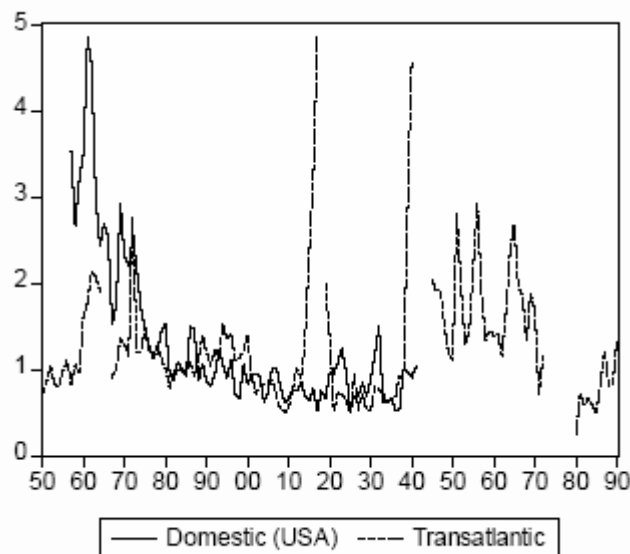
Falling transport costs in this interpretation makes it possible for newly populated distant states to ship grain at the going wage and local price, rather than giving them a share in the gains from

falling transport costs. It is also worth noting, contrary to a widespread myth, that the price differential between the Midwest (Chicago and Wisconsin) and the UK price level remained high at the end of the nineteenth century, at more than 25 per cent of Chicago price. However at the close of the nineteenth century prices in South Dakota were 23 per cent below prices in Illinois and 13 per cent below prices in Iowa.

There was a reduction in real transport 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. Figure 3 indicates that real transatlantic freight rates (i.e. nominal rates per unit of wheat divided by the price of wheat) fell only modestly in the Grain Invasion period and over the very long run, perhaps surprisingly, there was no trend in Atlantic real rates. Domestic rail and maritime transport costs fell, however, from the 1850's and for the rest of the century.

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. The US wholesale

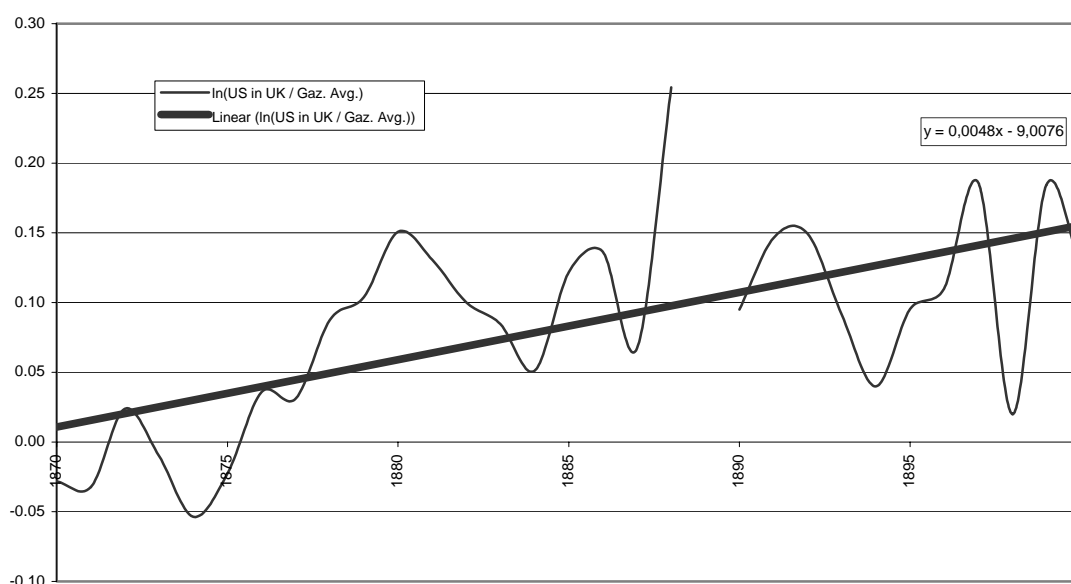
**Figure 3: Freight factors, 1850-1990  
(1884=1)**



price index fell by 2.0 per cent per year in the period indicating that the real change in the producer price of wheat, that is the price deflated by the price index, is  $-1.7 - (-2.0) = 0.3$  per cent. Producers thus gained in real terms. So far the traditional dismissal of the farmers' discontent seems to hold true: farmers' prices increased relative to the general price level.

A similar calculation for consumers but using the UK wholesale price index as a deflator reveals a fall in the relative price of wheat of -0.58 per year. By these standards consumers and producers seem both to have been treated well, with a small advantage to British consumers.

**Figure 4: The ratio of the price of US Red to the Gazette Average in the UK, 1870-1900**



Source: Price of US wheat traded in UK same as for Figure 2. UK domestic wheat is the Gazette average from:  
*British Parliamentary Papers (1904), Second series of memoranda, statistical tables and charts.* London.

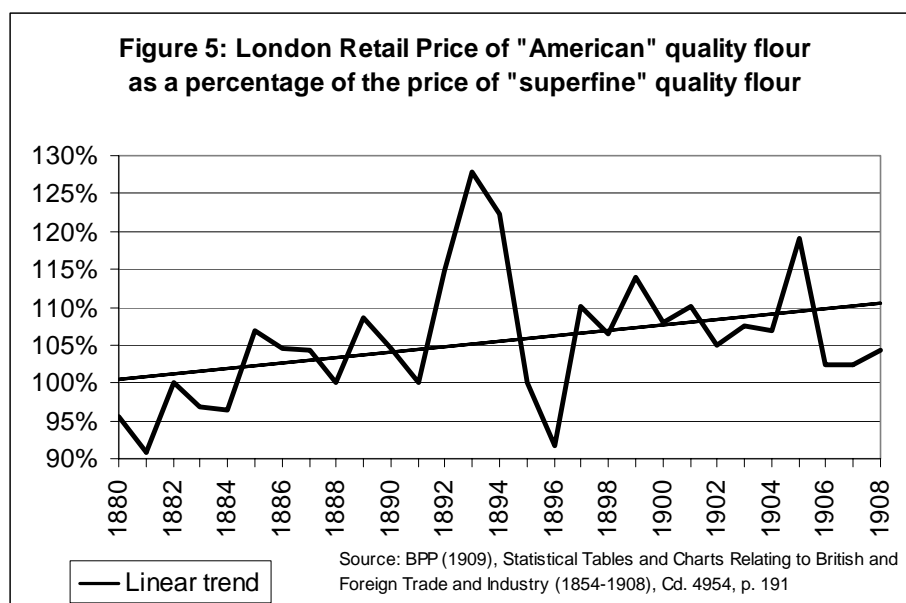
However, this is not the full story as has repeatedly been stressed. In order to quantify the quality improvement in American wheat, Figure 4 illustrates the ratio of the price of American wheat in the UK and the UK *Gazette* price, the latter of which is an average of the price of British wheat traded in the UK. The conclusion is clear: the quality improvement of US export grain relative to UK domestically produced grain was substantial.<sup>4</sup> In fact, as the slope

<sup>4</sup> Veblen (1892) finds something similar, although he does not quantify the effect. He attributes it to the fact that "with the adoption of the more modern methods of milling the harder and stronger American wheat have come to be preferred to British wheat that may be otherwise of unexceptionable character".

coefficient indicates, quality improved by almost 0.5 per cent per year in the 1870-1900 period. This seems to provide clear evidence in support of the Alchian & Allen hypothesis.

Can we be sure that this relative improvement is also an absolute improvement? Yes, and it is even plausibly the case that Figure 4 underestimates the magnitude of the improvement of US wheat. The reason for this is that it is likely that the quality of UK wheat – and hence the average quality described by the *Gazette* price – was also increasing over time. Faced with stiff foreign competition UK domestic output of wheat fell to half its pre-Grain Invasion level over this period. Since it was almost certainly the least suitable land which was taken out of production first, the quality of UK wheat was probably increasing, which means that the US quality might have been increasing even more than the above would suggest.

Evidence from the price of flour presented in Figure 5 suggests that this quality improvement was recognized by retailers. Although the data is only available from 1880, they show that the “American” quality of flour went from a position of selling at a discount compared to the “superfine” quality to selling at an almost permanent mark-up



from 1885. Moreover, evidence presented by witnesses before the British Royal Commission on the Depressed Condition of Agricultural Interests<sup>5</sup> tells a similar story. For example, the President of the Institute of Surveyors, in evidence presented on March 11, 1880, claimed that the difficulties of English farmers could be attributed to competition with American wheat - “a good article coming into competition with an inferior one” - and that American wheat enjoyed a price premium of about ten shillings over English “owing to the quality”. In addition, the

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However, since these techniques were mostly introduced fairly late in the period they do not explain the fact that this process is apparent throughout our period.

<sup>5</sup> BPP (1881), C. 2778

Commission appointed two representatives to travel around America and report back on the state of agriculture there. In evidence presented on July 23, 1880 they state that the American is “better wheat, and has more power in it”.

What is the implication of this finding? It is certainly bad news for producers. Although the real price of wheat increased, this was for wheat of improved quality. As a consequence it is not at all clear that the real price increase remains after the quality improvement has been controlled for. It is necessary to stress again that a quality improvement is not costless because it is undertaken by rejecting grain in poor condition, from deliberate improvements in selecting better seed corn and from better care in handling and storage of the crop. The relevant measure if we want to estimate whether US farmers gained must be the evolution of the price of a constant quality of wheat. The quality improvement alone was valued by the market at an equivalent of a price increase of 0.48 per cent per year relative to domestic UK wheat. The consequence for the computation of gains and losses in the Grain Invasion is demonstrated in row B in Table 1. The logic here is this: if quality had not improved in US top grade wheat then the fall in US prices would have been larger. On the consumer side the gains are underestimated unless the quality improvement is controlled for: UK consumers got a better product at a lower price.

Table 1 summarizes the estimates discussed in the text.

**Table 1: Nominal, deflated (real) and quality adjusted compound rate of change per year in the price of American wheat for US producers and UK consumers**

	Annual % change in	For US producers	For UK consumers
<b>1</b>	Nominal price	-1.7	- 2.4
<b>2</b>	Quality improvement	0.5	0.5
<b>3</b>	Wholesale price index	-2.0	-1.8
<b>A</b> (= 1 - 3)	Non quality adjusted deflated price	0.3	- 0.6
<b>B</b> (= 1 - 2 - 3)	Quality adjusted deflated price	-0.2	-1.1

Sources: UK and US prices same as for Figure 2. US wholesale index from *Historical Statistics of the United States Millennial Edition* (Cc125). UK Wholesale price index in B. R. Mitchell, *International Historical Statistics, Europe*, Table H 1, pp.856-9, London 1998. Quality improvement from estimates of the data in Figure 4.

## 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 experienced an Alchian & Allen effect when penetrating foreign markets by improving the quality of its produce. When the quality improvement of the grain has been controlled for producers in the established grain producing regions got next to nothing. 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 transport costs to access foreign markets, but only at the going farm income.

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