

# The Long American Grain Invasion of Britain: Market integration and the wheat trade between North America and Britain from the Eighteenth Century

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**\*\*\* DRAFT - PLEASE DO NOT CITE \*\*\***

**Abstract:** This paper provides evidence that transatlantic commodity market integration might have begun prior to the “first era of globalization” at the end of the nineteenth century. It does so by giving a long term perspective to the story of the development of an Atlantic Economy in wheat between the United States and Britain. Both trade statistics and contemporary comment reveal the importance of this trade from the middle to late eighteenth century, long before the so-called grain invasion of the late nineteenth century. Using data on imports from America and a large volume of substantiating primary evidence, specific periods are identified when market integration might have been possible. Using price data for wheat in America and Britain, some evidence is found that market integration was occurring in various periods, but was continuously being interrupted by “exogenous” events, such as trade policy, war and politics. Transportation costs cannot be seen to be the driving force behind periods of increased trade.

## 1. Introduction

*“Sire, have you not taken away the only remedy for this scarcity; the only relief to which we can now look under a bad harvest – by closing the corn market of America.”*

– Brougham, Parliamentary Debate, 1812<sup>1</sup>

This paper considers the development of the trade in wheat between America and Britain from the beginning of the eighteenth century to the end of the nineteenth century. In doing so it takes up the suggestion raised by O’Rourke (2006) on whether there was a potential for intercontinental market integration prior to the famous “first era of globalization” at the end of the nineteenth century. O’Rourke suggests there might have been, based on evidence from the impact of the Napoleonic Wars on international trade. Going even further back, it is in fact possible to find evidence for intercontinental market integration between America and Britain – and an associated increase in trade – going back well into the eighteenth century.

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<sup>1</sup> Quoted by Galpin (1922, p. 24).

No apology is made for the focus on just two countries and one commodity. Similar studies have formed the basis of our understanding of market integration in the late nineteenth century, and going back to the eighteenth century is of course associated with much greater difficulties in finding data. The analyses presented below, however, do provide striking evidence both of the importance of the intercontinental grain trade long before the classic globalization era and of the power of “exogenous” events, such as biological phenomena, war and politics to set back severely this process. These correspond to those identified by O’Rourke (2006) who notes the possibility that market integration (globalization) might have started earlier if it had not been for the impact of such shocks.

Astonishingly, and with very few exceptions, despite the scholarly enthusiasm for the famous “Grain Invasion” of the late nineteenth century, very little attention has been paid to the trade in wheat between America and Britain in the eighteenth century. Indeed, politicians and farmers of the mid- to late nineteenth century seem to have been under the impression that the importance of grain imports from North America started in their time, and economic historians seem to have been content to accept this (see for example O’Rourke & Williamson 1999).

The pre-nineteenth century transatlantic grain trade has thus been almost completely neglected in the recent literature. It is in fact necessary to go back to the work of W. Freeman Galpin (1922, 1925) to find otherwise. Galpin painstakingly establishes the importance of the American supply of grain for Britons at home and to British forces stationed in Spain and Portugal during the French and Napoleonic Wars. However, even he was under the impression that the “importance... of American grain in English history presented itself for the first time during the Napoleonic era”. He does not, however, back his assertion up with any evidence.

This lack of understanding of the grain trade in the 1700s is probably in large part due to a lack of available data. The Customs House in London famously burned down in 1814, taking with it nearly all records of England’s international trade and customs revenues prior to that date, and Parliament burned down in 1834, thus destroying most copies of these accounts that had been presented for consideration in that place. Fortunately, however, it turns out that detailed records of Britain’s imports of wheat from the American colonies and the early years of the United States have in fact survived. These demonstrate quite clearly that the growth of supply from America can be dated to the 1770s rather than the 1870s (the decade normally considered to have witnessed the beginnings of the grain invasion).

The increasing trend in the intercontinental trade in wheat is, however, marked by large fluctuations, all of which can be easily explained as a consequence of the aforementioned exogenous events. For Britain, at least, it appears that the Invasion had its origins in the eighteenth century.

Establishing the potential for market integration in the eighteenth century requires a number of different steps. First, in section 2 the fact that there was a trade in grain between America and Britain stretching back to the early years of the eighteenth century is established by looking at the available data on wheat imports from America to Britain from 1697 to 1899. This means that evidence for market integration cannot be dismissed as spurious. Comparing the level of imports with estimates of total wheat consumption in each year also helps motivate the study of this important trade. In section 3 the “exogenous” episodes which might be expected to impact on market integration are identified. These correspond to years of below-trend wheat trade as identified from the data presented in section 2 and are explained with reference to evidence mainly gathered from a number of primary sources. This section also demonstrates the importance attached by eighteenth century Britons to the supply of grain from America, a fact not recognized in recent work. Section 4 looks at the behaviour of prices over the period. It should be possible to find evidence of market integration for the years when trade was not made difficult by the events described in section 3. Section 5 concludes.

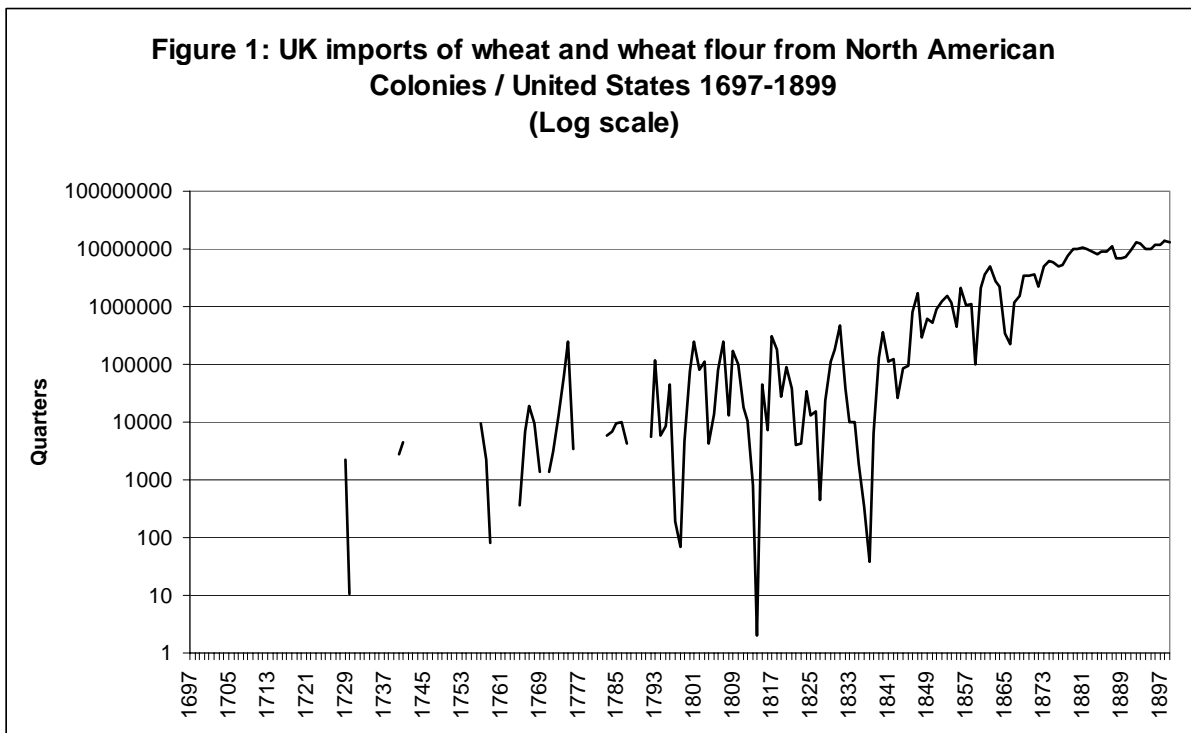
## **2. The long grain invasion of Britain**

The available data on wheat imports from the North American Colonies and the United States is illustrated in figure 1, which covers the period from 1697, when the office of Inspector General of Imports and Exports was established, with the first imports of wheat from North America recorded in the 1720s.<sup>2</sup>

The idea of a “grain invasion”, as usually applied to the three decades after 1870, implies a sudden break. One moment Britain was reliant on domestic supply and that of her near neighbours, and the next American wheat was flooding through her ports. But was this invasion from the US really such a break with the past? Levels of imports can be misleading, since when starting from a very low level, a constant percentage increase over time can easily be mistaken for a sudden level shift. It is usual in these situations to take the logarithm of the variable and in this way get a better idea of whether the rate of change was increasing over time.

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<sup>2</sup> The data from 1697-1787 is for wheat only and comes from BPP (1789). The data includes trifling imports from Canada. Before 1755 the data does not include Scotland. Afterwards it is for the island of Great Britain. I have not been able to locate data for the years 1788-1791. From 1792 all imports are for wheat and wheat flour combined. From 1792-1799 they are from BPP (1815), from 1800-1824 they are from BPP (1827a), from 1825-1828 from BPP (1827b), from 1829-1830 from BPP (1832), from 1829-1839 from BPP (1843) and from 1840-1899 from the *Annual Statements of Trade 1853-1900*. Total imports (including from Ireland) are taken from BPP (1843) until 1842 and the *Annual Statements of Trade 1853-1900*. Where this is not already done in the sources, imports of wheat (measured by volume: quarters) is added to imports of wheat flour (measured by weight: hundredweight, cwt) using the assumption that there are 392 lbs (i.e. 3.5 cwt) of flour to a quarter of wheat (the assumption made in British Parliamentary Papers). For later years imports of wheat are also recorded by weight, and for the sake of comparison it is thus assumed that there are 4.4 cwt of wheat to the quarter.

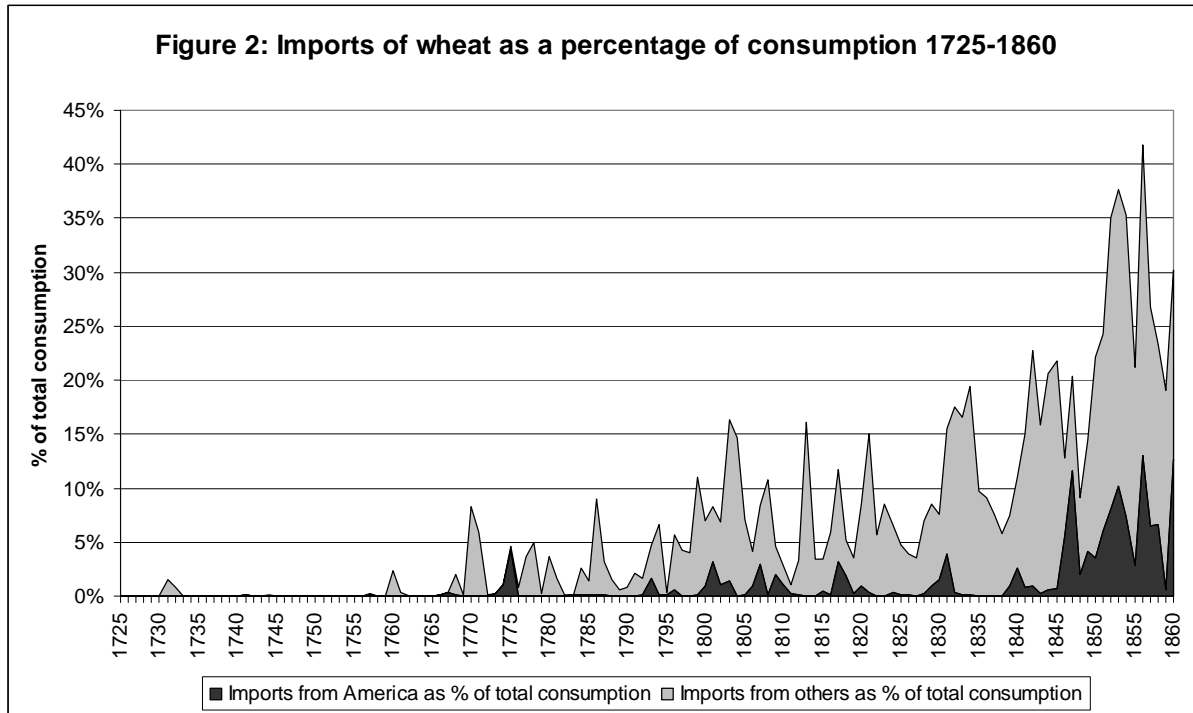


As figure 1 makes clear, there was no sudden break. The increase in wheat imports from the US, perhaps even as far back as the 1770s or '80s, was exponential until the 1870s, at which point the series levels off. There is an important lesson to be taken from these data. It is clear that, in contrast to the traditional interpretation, the roots of the “grain invasion” can be traced back to the 1770s or '80s – possibly even further - and were not simply a phenomenon of the 1870s. We need therefore not necessarily expect the explanation to be sudden changes such as a globalization “big bang” or “dramatic” falls in transport costs. There were longer term forces for change at work. Sharp (2007) found that the long-run determinant of British wheat imports from the US between 1838 and 1929 was the increasing supply from this source (i.e. an outward shift of the supply curve), and the fact that the tendency for increasing imports can now be traced back to the 1770s or '80s might suggest that this was the case even prior to this date. Unfortunately, the lack of available statistical evidence means that it is impossible to test this hypothesis.

The fact that data for American imports alone remain for the eighteenth century suggests the importance attached to them by contemporaries. More striking statistical evidence for this comes from comparing the level of imports from America with total imports and estimates of total consumption of wheat in Britain.

Collins (1975) provides a number of estimates of annual wheat consumption per head in the nineteenth century, ranging from 6 to nearly 9 bushels. He also shows, however, that this was changing over time, since in 1800 only 66 per cent of grain consumption was for wheat, as opposed to 88 per cent in 1850 and 97 per cent in 1900. This means that an assumption of 0.9 quarters (over

seven bushels) of wheat per person per year is almost certainly an overestimate for the eighteenth century. Nevertheless, making this fairly heroic assumption and multiplying it by the population statistics compiled by Wrigley & Schofield (1981) and Mitchell & Deane (1953, pp. 8-9) it is possible to get an idea of the levels of consumption.



As figure 2 illustrates, even in the late 1700s imports from America were often supplying up to about three or four per cent of consumption. In times of scarcity, which of course were also the times of greatest imports, these imports were most likely the difference between starvation and survival for certain portions of the population. Since data are available for total imports of wheat during these years, it is also possible to give an impression of the relative importance of US imports compared to those from other countries: for many years they were a large proportion of total imports. The lesson is clear: the United States' importance as a grain exporting country dates to the eighteenth century. There are, however, large fluctuations.

### 3. Explaining the fluctuations

It turns out that these fluctuations are surprisingly easy to explain. They are all the result of exogenous shocks to the developing Atlantic Economy, which in some cases cause imports to dwindle to a trickle for many years. It is convenient to divide this story into three periods: one until the 1760s and '70s, when Britain was a net exporter of wheat; the next from the industrial revolution and the accompanying population boom, which resulted in Britain becoming a net importer up until the end of the French and Napoleonic Wars; and finally from the introduction of extreme protectionism after 1815 until the abolition of the Corn Laws sliding scale in 1849. The

period after the repeal of the Corn Laws, when American grain assumes its huge importance, which it maintains until the 1930s, is covered in Sharp (2007).

### **3.1 Imports as a response to harvest failure: The period until 1773**

It turns out that the sporadic imports of wheat in the first period are easily explained by harvest failure in Britain. This can be seen by comparing the years in which imports are present with the annual evidence on English harvests collected by Jones (1964). So, for example, Jones records that 1728 and 1729 (the first years for which he collects evidence) were marked by “great dearth”. And indeed, we find that American imports are first present in 1729. 1730 to 1739 was, however, a decade of “good harvests”, and we find that American imports are entirely absent until 1740, following a “wet, late harvest” in 1739 and “extraordinary scarcity” in 1740. Jones then records that harvests were generally excellent until 1755, when the harvest was late, and 1756, “a year of scarcity”. And of course we then find that imports from America appear in 1756 and 1757. The success of American exporters in these years provoked an embargo on “all American vessels laden with corn, flour, &c” in 1757 (Pitt 1792, p. 266) Harvests are then recorded as being good until 1766, 1767 and 1768 which were all marked by food riots. This resulted in an embargo on the *exportation* of corn from England. Imports from America were then again welcome (Pitt 1792, p. 368), indeed, an “Act for allowing the Importation of Wheat and Wheat-flour from His Majesty’s Colonies in America, into this Kingdom, for a Time to be limited, free of Duty” was passed in 1766 (BPP 1766, p. 29) and was continued the following year (BPP 1767, p. 429).

Until this point we have learned nothing new: imports were largely the consequence of scarcity at home, a point well known from previous studies. However, it might be noted that American farmers were clearly looked to as a source of supply after a bad harvest, and were also obviously able to react. Every year there was a bad harvest the American colonies stepped in to help meet the deficit.

During this period, however, America was mostly seen as competition for British producers, and Britain was of course still at this time a net-exporter of grain. As early as 1713 a parliamentary committee heard of the quality of American wheat, superior to that Britain was able to export to the continent (BPP 1713, p. 368) and similar concerns were expressed in 1737 (BPP 1737, p. 116).

Already in 1740 a bill was read in parliament which proposed to prohibit the exportation of grain from North America, which met with condemnation by traders in the colonies themselves, as well as merchants involved in the trade in London (BPP 1740). In 1742, a petition was sent to Parliament “in Behalf... all the Farmers in Great-Britain” in which the petitioners made clear their fear that “great Quantities of Corn Land” were to be brought into production, and that wheat would be exported into Europe “at those Places, which always have been the British Farmers Markets”, and requesting that Parliament “prohibit the Exportation of Corn from America into Europe, and

other Things that may prejudice the British Farmer and Tradesman”. A petition from “several Merchants of London” also makes the point that they are unable to compete with the Americans on exports of wheat to the Continent (BPP 1749, p. 1032).

The advantages enjoyed by American farmers were concisely summarized by William Ellis, a farmer, in a letter from 1742. He expresses concern that Americans “by their great Increase of Land... have been tempted... to carry on the Cultivation of Corn, and have made such Progress in its Improvements, that they are become Masters of prodigious Crops of Grain, especially the finest of Wheat, by enjoying, perhaps, one of the best Opportunities the World affords” and that “they have the richest of Land both dry and wet, a very potent Influence from the Sun’s Heat, their Acknowledgement or Rent, little or nothing, their Slaves labour for a Trifle Charge, *and withal the great Cheapness and Conveniency of Water Carriage for transporting their Corn into Europe, to the infinite prejudice of Great-Britain.*” (Ellis 1750, emphasis added). The last point he makes is one that has often been neglected by economic historians: the fact that oceanic transport is relatively cheap compared to land or canal transport, meaning that the considerable distance between Britain and America need not necessarily imply large barriers to trade. This point will be taken up again in section 3.4.

What is clear, however, is that the importance of American wheat during these years was only apparent during times of harvest failure and contemporary comment focussed for most years on the problems of competing with this supply for foreign markets.

### **3.2 The first era of free trade: 1773 to 1815**

From the 1770s something changes however, perhaps not coincidentally at the same time as Britain industrialized, experienced a population boom and started to become a permanent net importer of wheat. 1771 and 1772 are recorded by Jones as being years of poor harvests, and American supply seems to respond in the usual way. Harvests are however recorded as being “fine” in 1773, unremarkable but not bad in 1774 and even “plentiful” in 1775, and yet these years see the beginning of large-scale imports from America. Although imports continue to fluctuate greatly after this date, there is no longer the clear correspondence between imports and scarcity that there was in the earlier period.

It is probably no coincidence that large volumes of American grain started to arrive in British ports after the enactment of the Corn Law of 1774, which ushered in a period of “practically free” trade in grain, as stated in a report of an 1821 Parliamentary Select Committee (BPP 1821, p. 15). From 1791 the Corn Laws became more protectionist, but the onset of the French and Napoleonic Wars drove prices so high that only nominal duties were payable on imports (Sharp 2006). The considerable swings in imports from the US we see during this period do, therefore, not seem to be principally related to trade policy. Neither can they be explained by harvest failure in the UK.

The sudden dearth of imports from America after 1775 is actually very easy to explain. First, there was the American War of Independence from 1775-1783 which of course had some impact on wheat and flour production in America. Hunter (2005) notes three phases of the impact of the war: the first until 1777, which saw an increase in demand. Then, with the British invasion of the Philadelphia region in 1777, there was difficulty until 1779. For example, General George Washington ordered the removal of millstones to prevent the British from acquiring flour and the British targeted merchant mills. In addition, throughout the war, the British intermittently from 1776 tried to mount a blockade and in 1778 Congress imposed its own embargo, prohibiting the export of grain and flour, although some illegal exports were possible. The overseas trade was reopened in 1780 and, combined with good harvests, this marked the beginning of the final phase, one of recovery.

Perhaps more important, however, was the impact of the Hessian fly invasion from 1776 which decimated wheat crops. Unfortunately, I have been unable to locate data for wheat imports from America for the years 1787-1791. It is known, however, that in 1788 Philadelphia merchants were planning to ship large amounts of wheat to England, and that this resulted in a total ban on wheat imports from the United States from June 25 that year. How much this ban was attributable to a fear of introducing the fly to England and causing “a Calamity of much more extensive and fatal Consequences than the Admission of the Plague”, and how much was due to an antagonism towards the newly independent United States is unclear, although Pauly (2002) notes that the Privy Council Committee for Trade were favourable towards ideas that would realign imperial trade and allow the Americans to suffer the consequences of independence. They also favoured policies that would stimulate home production at a time when higher general tariffs were not politically feasible.

The ban led to a considerable amount of debate and the publication by Parliament in March 1789 of a pamphlet, *Proceedings of His Majesty's Most Honourable Privy Council, and Information Received, Respecting an Insect, Supposed to Infest the Wheat of the Territories of the United States of America*, which attempted to justify the ban to the world<sup>3</sup>. The ban was poorly timed, however, because harvest failures in 1788 and 1789 made Britain's dependence on imports only too clear. The ban was reversed, and HMS *Echo* arrived in New York in February 1790 with the news (Pauly 2002). It appears likely that British leaders decided in 1789 that the United States would in the future be an important reserve food supply, and that the risk posed by French-style revolution was greater than that posed by the fly (Ritcheson 1969, cited by Pauly).

Hunter (2005) notes that “wheat and flour together served as a cornerstone of America's newly independent transatlantic commerce” and from an early date, wheat enjoyed a special status, Revolutionaries considering it to be the “ideal republican crop” in contrast to tobacco, with its

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<sup>3</sup> This useful publication furnished the statistical information on early wheat imports from America used in this paper.

association with “royal government, debt, slavery and poor agricultural practices” (Matson 2006, p. 246). The Hessian Fly itself might even have contributed to the long-run success of American wheat production, since it helped spur agricultural improvement, through for example experiments in diversification (Matson 2006, chapter eight). A similar point is made by Hunter (2005), who suggests that the French Revolutionary and Napoleonic Wars helped to ensure America’s later success in wheat and flour exports by stimulating the adoption of new milling technologies and regional specialization.

The years from 1792 are of course marked by war. Generally imports from the United States continued their upwards trend, although some years stand out for having no imports or particularly high levels of imports. Wheat exports from America to all destinations started dropping from 1792 when the Hessian fly arrived in Delaware and Maryland, at that time the centres of production. From 1795 to 1799 America virtually ceased exporting wheat, the recovery only coming in the first years of the nineteenth century (Matson 2006, p. 253). In vain successive Committees of the British Privy Council asked witnesses about the possibility of imports from the United States (BPP 1795a).

The recovery when it came, however, was quite impressive. Harvests in Europe were poor in 1799, but those of America were abundant and mostly free of the Hessian fly. Parliament enacted measures for bounties on the import of American wheat (Galpin 1925, p. 136) and by 1801 very large imports of American wheat came in. Indeed, in this year “the Americans so completely drained themselves of corn for this traffic, that bread became as dear, or dearer, at New York, than it was in England” (Board of Agriculture 1806, p. 277). Despite this, a combination of good harvests in England and poor harvests in the US contributed to the low level of imports from the US in the following years.

The imposition of Napoleon’s Continental System from late 1806 presented a great opportunity for American exporters, however, and contributed to the large volume of imports from the US in 1807, the year in which the US consul at Liverpool was led to declare that “such quantities of wheat and flour from the United States have lately poured into this market that prices have declined”<sup>4</sup>. This encouraged the belief “in the permanency of this seemingly inexhaustible granary” (Galpin 1925, p. 44). However, in the wake of the Royal Navy’s impressment of American citizens on the high seas, the United States itself imposed a trade embargo from 1807, reflected in testimony before a British parliamentary committee that trade in London declined in 1808 after the American embargo (Galpin 1922, p. 24). However, illegal wheat exports continued and Napoleon was quick to conclude that it was impossible to starve Britain, at least in part due to the availability of supplies from the United States. He thus soon, in the wake of bumper harvests in France, allowed exports of grain to resume (Galpin 1925, p. 168). There is no doubt, however, that the years of the

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<sup>4</sup> Quoted in Galpin (1922, p. 24)

embargo and the Non-Intercourse Act of 1809 were an important dampener on the level of trade (Galpin 1925, p. 147).

From this point on relations between the US and the UK gradually deteriorated and this, combined with good harvests in Europe, contributed to the low level of imports from America. The last years of the Napoleonic Wars saw the beginning of a new war, this time between the United States and the United Kingdom. The war lasted from the summer of 1812 to the beginning of 1815 and witnessed a blockade by the British of the American coastline (Galpin 1925, p. 149).

Although farmers continued to voice predictable concerns<sup>5</sup>, what is notable about contemporary comment over this period is rather than it changes from being focussed on the danger of American competition to a focus on the opportunities the American supply presented for meeting the demands of a growing population in Britain. Donaldson (1775), previously of the Jamaican government, wrote in a letter to the king that “The lands so liberally granted in America should be cultivated... and the mother country supplied from their industry; what magazines of corn might we hope to see from such resources!” This idea became more and more widely accepted, so that by 1790, a report of the British Privy Council (BPP 1790) concluded that “whenever the crops fail, in any degree, the deficiency can only be supplied from the harvests of America” (Glasgow Chamber of Commerce and Manufactures 1790). Although John Lord Sheffield argues vehemently against this conclusion in his *Observations on the Commerce of the United States*, other commentators were quick to back it up (Sheffield 17xx, Anon 17xx). A committee “on the high price of corn” looked first to the United States and the “abundant” supply there as a means of affording relief caused in part by the poor harvest in England (BPP 1795b, p. 85). By 1800, the British Board of Agriculture stated that “America be, or is hereafter to be the granary of Europe” (Board of Agriculture 1800, p. 148). A committee to “consider of the present high price of provisions” in 1801 also looked to America (BPP 1801a, p. 7, BPP 1801b, p. 8) as did a committee of 1805 (BPP 1805, p. 13).

Although the available statistics do not discriminate between imports of wheat and imports of wheat flour, it seems that most imports during these years were in fact of flour, in contrast to the years before the onset of the French Wars, when imports of wheat were “very considerable” (BPP 1813, p. 115). This caused millers to complain, and evidence was presented before a select committee in 1813 from a miller to the effect that the imports of flour from the United States in 1806, 1807, 1809 and 1810 were bad for millers (BPP 1813, p. 99). Indeed, it seems they had good reason to. Select Committees heard that US flour was of very high quality owing to a sophisticated system of inspections and branding, and that it was easy to transport (BPP 1813, BPP 1814).

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<sup>5</sup> For example, “A Farmer” writing in 1773 writes that “The only country from whence we can apprehend such an importation [of grain which could sell cheaper than British farmers could sell it for] is America” (A Farmer, 1773).

### 3.3 Prohibitive tariffs and the movement to free trade: 1815 to 1849

With peace, the Corn Laws soon became protectionist and this is reflected by the decline in American imports after 1818 (when prices fell sufficiently from wartime levels for imports to be prohibited under the terms of the Corn Law of 1815). Imports only really recovered with the introduction of the new Corn Law and the sliding scale of 1828 at which point swings in imports become clearly related to swings in import duties, which varied considerably from year to year (Sharp 2006), although it might be noted that during the 1830s America was again suffering from attacks of the Hessian fly.

In general, however, these years see a gradual decline in interest in the supply from America. Mentions in Parliamentary reports are rare<sup>6</sup> despite the huge volume of material published by Parliament during the debate in the run up to the repeal of the Corn Laws. So William Jacob's famous report on the "Agriculture and Corn of some of the Continental States of Europe" (BPP 1827) was just that, with no mention of America, and before a select committee in 1833 he dismissed the importance of the American supply (BPP 1833, p. 6).

With the repeal of the sliding scale in 1849, import duties become insignificant and were eventually abolished, allowing the great expansion of trade with America which was to become known as the Grain Invasion.

### 3.4 The role of transportation costs

Until now no mention has been made of the role of transportation costs, which are often cited as being the main reason for the grain invasion of the late nineteenth century.

Recent research on the grain invasion of the late nineteenth century has concentrated on the role of falling domestic transportation costs, allowing grain to be shipped more easily from new production areas as the centre of American agriculture moved westward. However, the role of domestic transportation costs must have been negligible for the early days of the Atlantic wheat economy, since the vast majority of American wheat was grown near the east coast. Indeed, even as late as 1839, the geographic centre of production was east of Wheeling, (West) Virginia, with cultivation concentrated in Ohio and upstate New York and relatively little grown as far west as Illinois (Olmstead & Rhode 2002, p. 936).

The evidence on transatlantic rates is sketchy, but intriguingly, it appears that freight rates were *highest* at the times when imports were greatest. For example, Douglass North's British import freight rate index, available from 1790, is highest in the years 1799-1801 and again in 1807, which correspond to years when imports from America were greatest. No "meaningful" freight index is

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<sup>6</sup> Those there are concern rumours of small-scale smuggling of American grain via Canada (BPP 1820, pp. 18, 30 & 35; BPP 1821, pp. 277, 314-5 & 320-1; BPP 1836a, p. 43; BPP 1836b, pp. 113-4) and a brief mention that the Corn Laws harmed bilateral trade with the United States (BPP 1840).

available from 1808-1813, when “freights rose to very high levels”, but even for these years historically significant levels of wheat imports were arriving from the United States for most years. This pattern repeats itself in the figures North collected for the East Coast American freight factor for wheat, available from 1826. This is again highest from 1829-1831 and from 1845-47, the years of greatest imports<sup>7</sup> (North 1958). Unless we are to believe that high transportation costs encouraged imports, then it appears that the high volumes of imports were pushing up demand for shipping and increasing freight rates.

Some evidence on transatlantic costs of transporting wheat is available for the eighteenth century. For example, A Farmer (1773, p. 102) gives a detailed breakdown of the cost of transporting wheat from America, although some of his assumptions might be rather suspect<sup>8</sup>, since he is trying to show that British farmers have nothing to fear from imports. But by far the largest cost he records is for freight, which amounts to 8 shillings per quarter of wheat. By 1791, information received by the Committee of Privy Council for Trade suggested that it amounted to 8s. 8d. (BPP 1791a). Dividing this by the price of wheat in Britain for each year gives freight factors of 15 and 17 per cent respectively, about the same as for most of the early nineteenth century and only marginally below that of the late nineteenth century, after the “transport revolution” (Sharp 2007). Perhaps surprisingly, in evidence before a select committee in 1821, one witness describes the difficulty of Irish competing with American flour due to the cheapness of freight. It was actually cheaper to ship flour from America to Liverpool than from Dublin to Liverpool, which required the use of expensive canal transport (BPP 1821, p. 319).

In short, it seems that at no time were transportation costs an important barrier to trade. Indeed, this was the point made long ago by Ellis (1750) - as quoted above.

#### **4. Market integration and the O'Rourke hypothesis**

If the O'Rourke (2006) hypothesis, that market integration (globalization) might have occurred earlier than the late nineteenth century, is correct, then it should be possible to find evidence of this in the available price data. The most basic evidence for this would present itself in the form of periods where grain prices in Britain and America were positively correlated.

With the available statistical evidence we cannot hope to fulfil the stringent conditions for testing market integration described for example in Persson (2004). There is no record of, for example, grain qualities, the only price information being for “wheat” in various markets. Nevertheless, when the available data are assembled, it does in fact seem possible to draw some meaningful conclusions.

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<sup>7</sup> He provides no data for the years 1839-1841, when imports were also high.

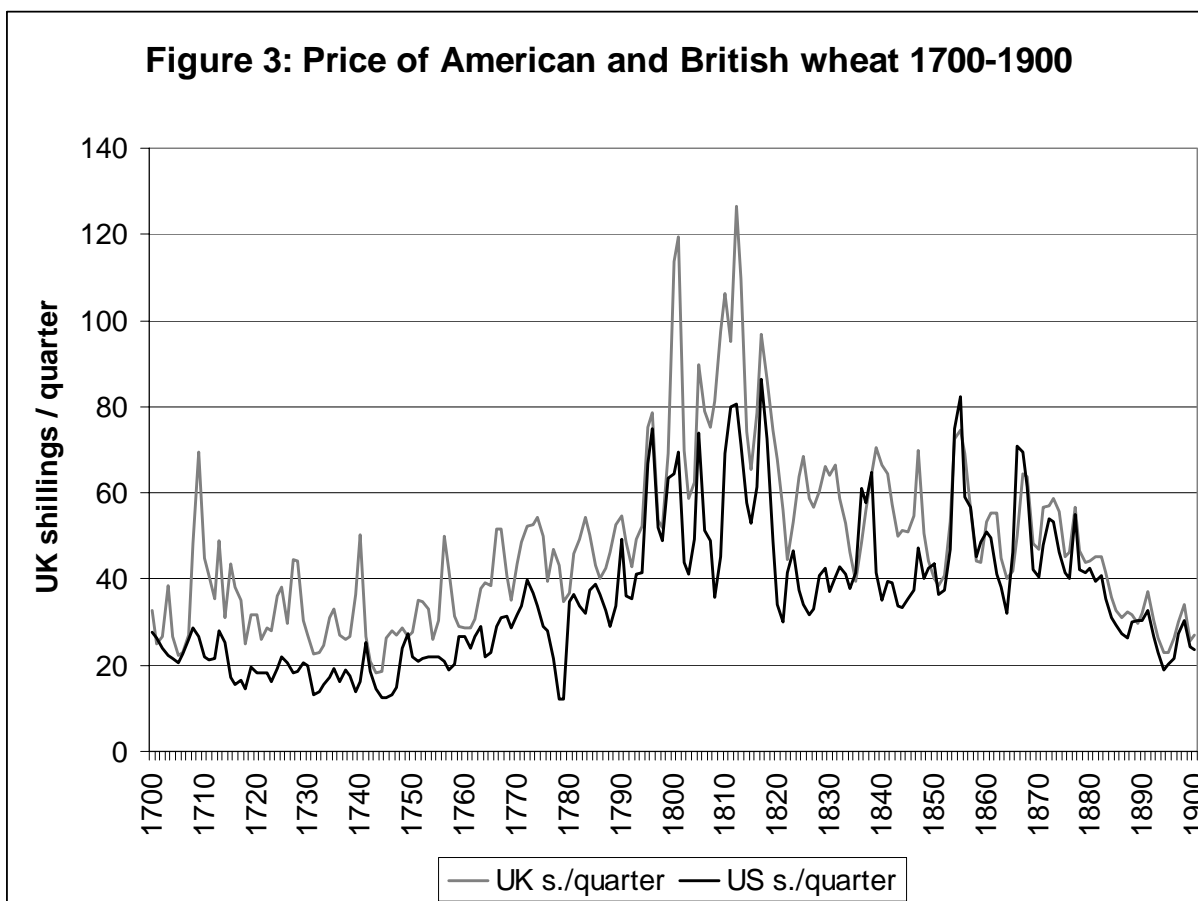
<sup>8</sup> Such as that 10 per cent must be added to the cost due to waste and damage and an additional cost due to the decline in value because the grain has been on the ship for too long.

The method employed is very simple. A series of rolling regressions are estimated over ten year periods starting in 1720 and ending in 1900. Each is a simple regression of the logarithm of the price of wheat in America and a trend on the logarithm of the price of wheat in Britain. Strictly speaking, a coefficient of one would imply perfect integration (since it implies that a one percent change in the price of American wheat corresponds to a one percent change in the price of British wheat), but in reality the data is not of sufficiently good quality, the estimation techniques not sufficiently sophisticated and the confidence intervals for such short periods too wide, for the coefficients to be given precise interpretations. Nevertheless, if it is possible to find periods of “significant”<sup>9</sup> positive correlation *and these correspond to the periods that have already been identified above* then this is most certainly striking evidence in support of the O’Rourke hypothesis.

When would we expect to find evidence for market integration? Probably not prior to the 1760s, when imports from America were tiny and Britain was still a net exporter. Certainly in the 1770s, with the beginning of large scale imports from America and the movement towards free trade. Almost certainly not from the mid-1780s to around 1800, when American harvests were being decimated by the Hessian fly; but certainly with the large imports from about 1800 until the end of the Napoleonic Wars. After this time, the presence for most years of high or prohibitive tariff barriers should have precluded market integration until the repeal of the Corn Laws sliding scale in 1849. In the second half of the nineteenth century, the integration of American and British markets is well documented.

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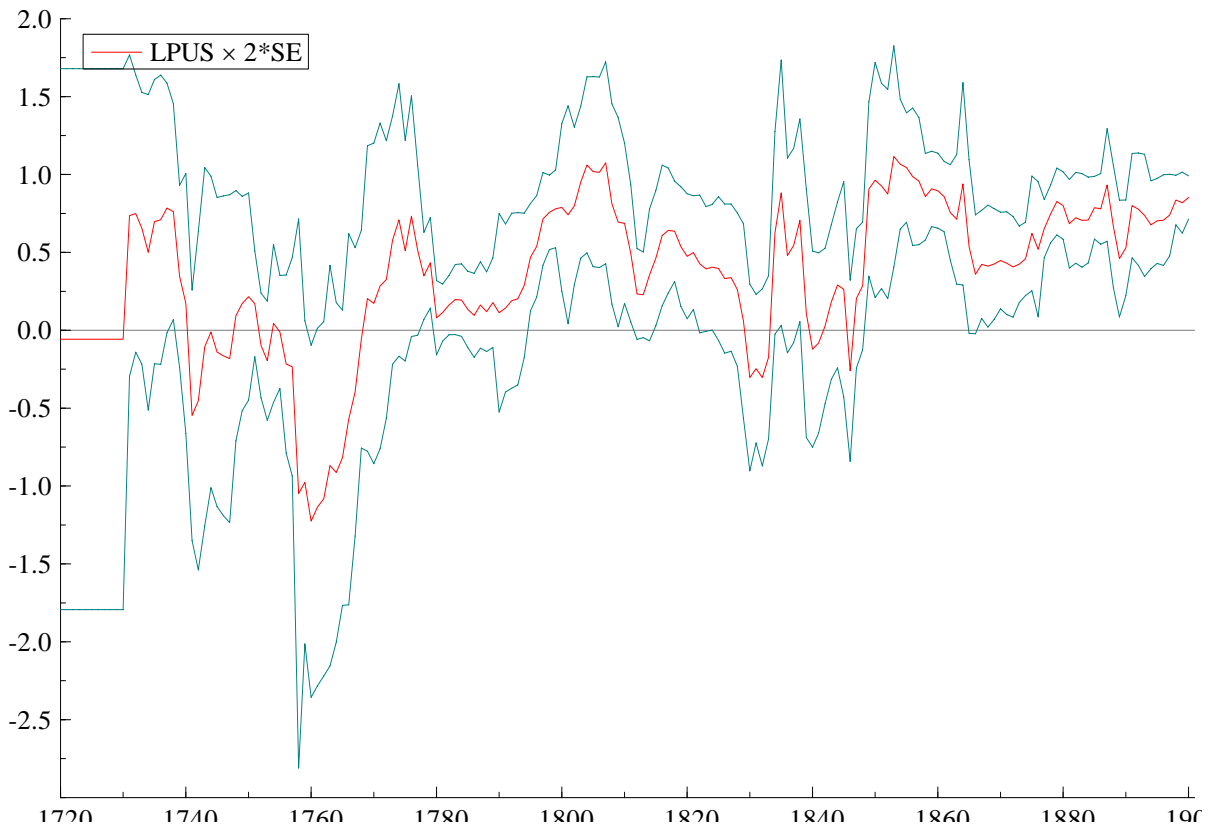
<sup>9</sup> Using “significant” in a rather imprecise way, since the conditions for OLS regression are unlikely to have been met!



Prices in America and Britain from 1700 to 1900 are shown in figure 3<sup>10</sup> and the statistical evidence is presented in figure 4. Using the reported confidence bands as a rough guide to the significance of the estimate, it is clear that there is no evidence for market integration prior to a short lived period in the 1770s. There then follows a long period with no evidence of market integration until the onset of the French and Napoleonic Wars. When the samples begin to include the years after 1819 with the onset of prohibitive tariffs, then market integration disappears again, only to reappear substantially and permanently with the repeal of the Corn Laws in the 1840s for most of the rest of the period (the main exception being associated with the break down in trade with the American Civil War). This seems to be important evidence in favour of periods of market integration prior to the late nineteenth century.

<sup>10</sup> The data for Britain is taken from Mitchell & Deane (1953) and is the “Winchester” series until 1770, and thereafter the *Gazette* series. The American data is taken from Carter et al (2006). Until 1783 the prices are taken from series Eg252 converted from Pennsylvania shillings to UK currency using the exchange rates given in series Eg318. A number of missing observations are filled in using best guess. From 1784 the prices are in dollars per bushel from series Cc205-208 converted to British shillings per quarter using the exchange rates given in Officer (2008). The missing exchange rates before 1791 are assumed to be the same as in 1791. In all cases, volumes are converted to imperial quarters using the fact that there are 8.256 American bushels to the imperial quarter.

**Figure 4: Sequential regressions (sample length: 10 years) for price of American on price of British wheat 1720-1900**



## 5. Conclusion

This paper thus supports the view, expressed by O’Rourke (2006), that there was potential for commodity market integration before the great era of “globalization” at the end of the nineteenth century. For the trade in wheat between the US and the UK, there is evidence that this market was developing since the late 1700s, but was interrupted by a series of events.

Another important lesson from this paper is the importance of the American grain supply far back into the eighteenth century<sup>11</sup>. However, if the American imports were as important for supplying the population as they appear to be, then we should expect to see some sort of protest against the prohibitive tariffs introduced in 1791 as was the case after the Corn Laws of 1815. Was this in fact the case? In fact, there is evidence that it was. In 1791 a petition was presented to the House of Commons by “Merchants of the City of London, concerned in the Commerce with the United States of America” (BPP 1791b, p.445) and petitions were received from Norwich, Somerset, Dorset, making it clear that these areas were unable to supply themselves with grain

<sup>11</sup> There is also some evidence of its importance for other European countries, such as Portugal and Spain (Galpin 1922) and France (Kaplan 1976, p. 634).

(BPP 1791b, pp. 466-467). A petition from Bailiffs and Burgesses of the Borough of Bridport, Dorset explicitly requested that Bridport be made a “Granary Port” so that the town might enjoy a “greater Connection with America, and that the Merchants will thereby be enabled to import Wheat, in Part, for their Manufacturies” (BPP 1791b, p.469). Even more explicitly a “Petition from the Mayor, Merchants, and principal Inhabitants, of the City of Bristol” stated that “the Western Part of the Kingdom does not grown Corn sufficient for the Consumption of its Inhabitants” and relied on imports “chiefly from America” through the port of Bristol (BPP 1791b, p. 653). If American crops had not have been ruined by the Hessian fly, and war had not intervened, might not the Anti-Corn Law League have emerged at this time? And then quite possibly we would now date the grain invasion – and possibly even the origins of globalization – to the late 1700s, rather than a century later.

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