

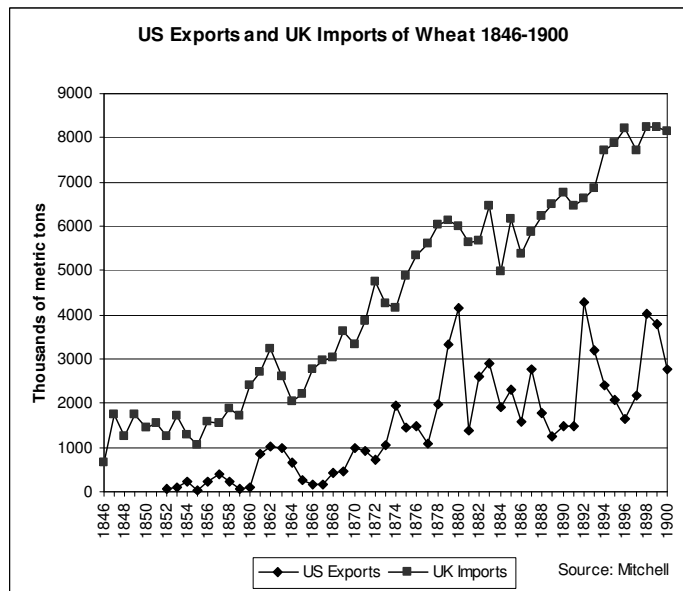
Explaining the Growth in World Trade at the End of the 19th Century

Introduction

One of the most interesting questions confronting economic historians is that of when globalization first started. For the layman, the answer is quite simple. Globalization is a recent phenomenon, brought about by such innovations as the Internet and symbolized by McDonald's in Beijing and sushi restaurants in Copenhagen. The historian can, however, trace its origins much further back.

For the economist, one of the most important indicators of a globalized world is growth in international trade. In this respect, "globalization" is simply a special case of what we would otherwise call market integration. Nevertheless, the question remains as to when market integration really took hold on a truly global or at least intercontinental scale. Of course, market integration had been steadily occurring

within countries and continents for hundreds of years (see the discussion in Persson (1999)). It was, however, first at the end of the 19th century that we begin to see the rapid growth of intercontinental trade. For example, Lathan (1996) and Lathan and Neal (1996) have argued that by the end of the 19th



century, the international rice markets of Asia were integrated with the Atlantic wheat markets through India, which consumed (and produced) both rice and wheat. Since India was an exporter of wheat to Britain, events in Asia were not disconnected from those in America.

It is, however, the growth of a transatlantic economy, in particular between the United States and the United Kingdom, which has attracted the attention of most scholars. Here the growth of trade, in particular in foodstuffs, was truly rapid. Taking the example of just one commodity, wheat, we get the picture seen in the diagram on page 1. The importance of this expansion of the grain trade should not be underestimated, since “around 1850 between a half and two thirds of the income of British workers was spent on food and drink, most of which was grain based”. (Harley 1986) The literature concentrates largely on Anglo-American trade, partly due to the wealth of data available, and also because the story of trade with the majority of other European countries is complicated by a globalization backlash during the 1870s and 1880s when competitive pressure caused the growth of protectionist measures¹.

The dramatic increase in trade, in particular from the 1870s, is there in the data for all to see, but there is some debate as to what made this period different and led to this development.

The Law of One Price and the Role of Falling Transport Costs

Until recently, it has been widely assumed that falling transport costs were the main reason for the growth of trade. In fact, O’Rourke and Williamson (2000) have gone so far as to state that “*all* of the commodity market integration in the Atlantic economy after the 1860s was due to the fall in transport costs between markets”.

In order to understand their reasoning, it is first necessary to be clear about what market integration actually means. Figure 3.1 from O’Rourke and Williamson (2000) helps to illustrate.

In a two-country world, perfectly integrated markets would ensure that the price of

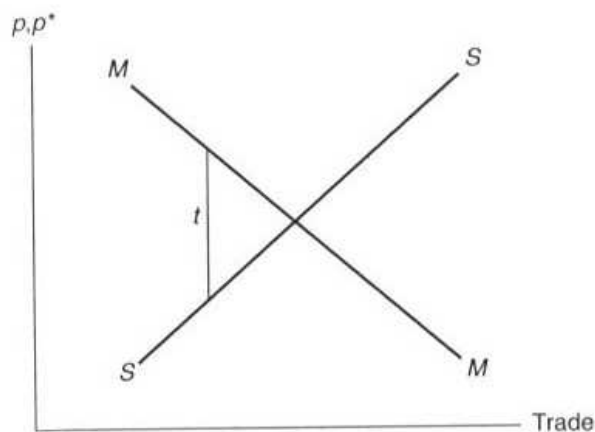


Figure 3.1
Trade and transport costs.

¹ See the lecture note for next week, “Cheap Grain and Tariffs”, on Gunnar Persson’s homepage.

a commodity is equal in both countries (the law of one price²). In the figure, *MM* is the home import demand function and *SS* is the foreign export supply function. Free trade would cause demand to equal supply, and prices in both countries would be equal (where the schedules cross). Barriers to trade, *t*, which can for example be tariffs or transport costs, mean that a wedge is driven between export and import prices. A reduction in the size of this wedge, for example through falling transport costs, implies market integration. This will lead to an increase in trade volumes *ceteris paribus*, but the information given in the figure on page 1 is not enough in itself to provide evidence of market integration, since it could also be caused by shifts in the two schedules.

There is some evidence of price equalization in this period (see the figure from Harley (1978)), but even this is not uncontroversial, since the prices he compares are not for identical commodities and so the law of one price does not apply. Nevertheless, the fact remains that there was a dramatic increase in trade during this period and one possible explanation is falling transport costs.

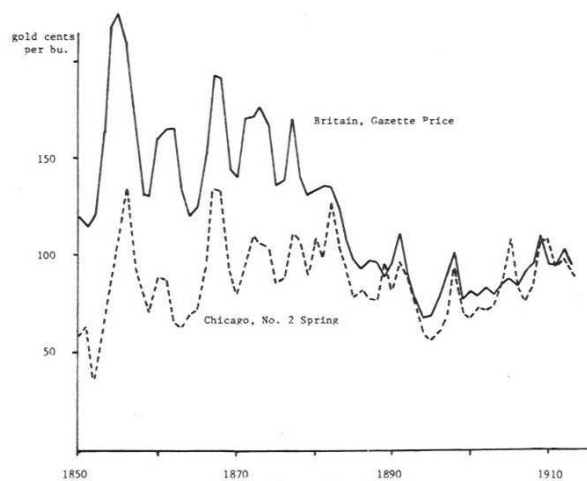


FIGURE 1
THE PRICE OF WHEAT IN BRITAIN AND CHICAGO, 1850-1913

Source: C. Knick Harley, "Transportation, the World Wheat Trade, and the Kuznets Cycle," paper presented at the MSSB Conference on Exports and National Economic Growth, 1975 (Princeton, forthcoming), Appendix Table.

On the face of it, this seems to be a reasonable explanation. Railways and canals were improving inland communication, and steamships were revolutionizing sea travel. Both railways and steamships were around earlier in the 19th century, but technical innovations made them far more efficient after 1860. This leads some economic historians to conclude that falling transport costs led to the growth in trade.

² Law of one price: In equilibrium, the price of a traded good in one market must be the same as the (exchange rate adjusted) price of an identical good in another market. Otherwise, arbitrage would result in price equalization as traders buy cheap and sell dear. The only difference in price should be the result of tariff barriers and non-tariff barriers (such as transport costs).

But did transport costs really fall?

Recent research suggests not. Persson (2004) gives three conditions for inferring a transport cost decline from price convergence:

1. Markets must be equally efficient over time, that is the price spread that is not accounted for by transport and transaction costs have been arbitrated away.
2. Transaction costs, such as insurance and port charges, are either insignificant or constant over time.
3. Quality differences between different varieties or grades of a commodity have been controlled for.

Not all of these factors have been taken into account in previous studies.

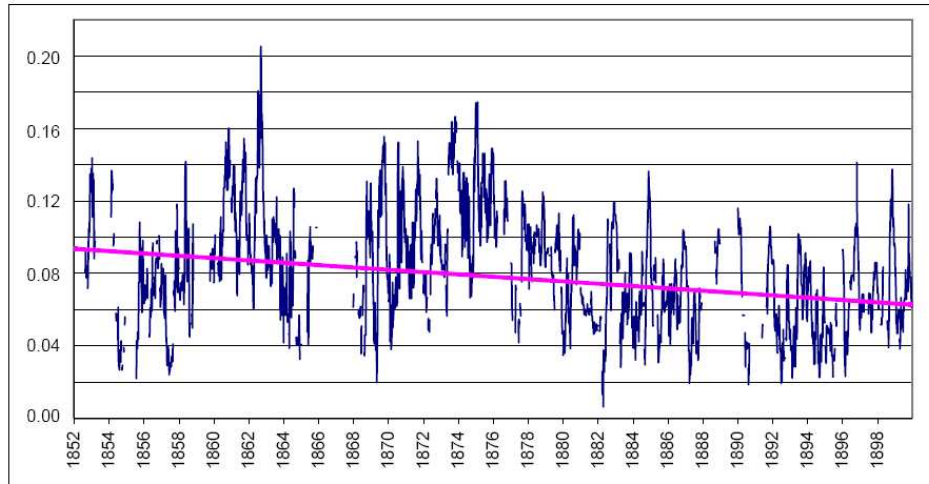
Although there is no doubt that freight rates fell in the last part of the 19th century, this is true of almost every other good and service, since this was a period of general deflation. What needs to be demonstrated is that freight rates fell in real terms. But what should we use as a deflator? An obvious choice seems to be the standard GDP deflator, but this includes many non-tradables, which have no bearing on the cost of transporting a tradable good. It turns out that the best deflator is the price of the commodity we are examining which, in the case of Persson (2004), is the price of wheat. The argument is simple. We can consider transport costs to be an implicit *ad valorem* tariff in as much as they add a unit cost to the import of a good. If we wish to see the level of an *ad valorem* tariff, we divide tariff paid on a unit of a good by the price of that good. We can do the same for transport costs. This is called the *freight factor*:

$$Freight_factor = \frac{T}{P},$$

where T is the transport cost per unit and P is the price per unit. So for example, if it costs \$1 to transport a unit of wheat, and \$10 for the unit of wheat itself, then the freight factor is 10%.

Persson's calculations result in the following picture:

Figure 6. The freight factor, New York to UK ports 1852-1900. (Transport costs divided by the price of US wheat in London. Linear trend)



Note: 1852:8-1853:3 American, Liverpool sail; 1854:2-1864:12 US Red, Liverpool sail, 1865:1-1865:12 US Red, Liverpool steam; 1867:12-1869:6 American, Liverpool steam, 1869:7-1869:12 US Red, Liverpool steam; 1870:1-1874:12 American, Liverpool steam, 1875:1-1877:12 US Red, Liverpool steam, 1878:1-1880:12 Red Winter, Liverpool steam; 1881:1-1885:3 Red Winter, London steam; 1885:3-1895:8 No. 2 Red Winter, London steam; 1896:1-1900:12 No. 2 Red Winter (Glasgow), London steam.

Test statistics: Intercept = 0.09356 sd = 0.0012 t = 77.96667 $R^2 = 0.078$
Trend = -0.00000176 sd = 0.00000014 t = -12.57143

Sources: See Appendix 1.

Far from an “amazing decline” as suggested by O’Rourke and Williamson, we see a decline from 0.09356 in 1852 to 0.06207 in 1900, i.e. a fall of just over 3 percentage points with freight rates still around 7 per cent of the value of goods for much of the period.

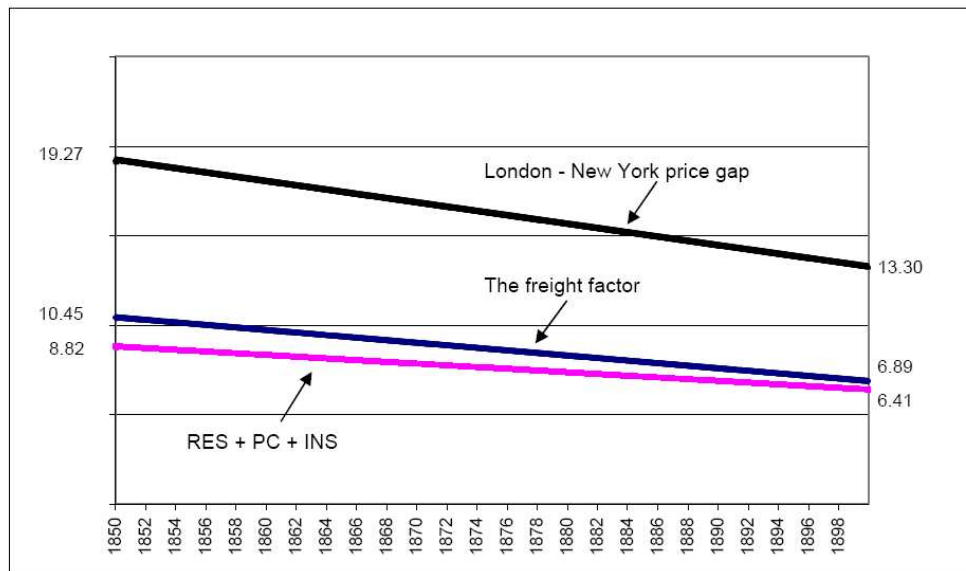
Moreover, if we are to measure the true price gap, the freight factor is just one of the factors we must take account of as shown in Persson’s equation (1’):

$$(1') P^{\text{US wheat, London}} - P^{\text{US wheat, New York}} = \text{TRANS} + \text{PC} + \text{INS} + \text{TA} + \text{RES.}$$

where TRANS is transport costs, PC is port charges, INS is the insurance premium, TA is the tariff rate³ and RES is the residual, which accounts for various unrecorded factors such as risk premiums and estimation errors. With all costs accounted for and perfect markets, RES should converge to 0 and the *transport and transaction cost adjusted law of one price* should apply.

After extensive research into the relative sizes of these variables, the following picture emerges:

Figure 7. The evolution of the transatlantic wheat price gap 1850-1900. Per cent of New York price of wheat.



The conclusion is clear: the price gap was by no means eliminated, but actually remained equivalent to an *ad valorem* tariff of around 13 per cent in 1900 of which transport costs account for over half.

Moreover, recent work by Harley (2004), presented to a meeting of the European University Institute in Italy in July 2004, lends support to Persson. In a comprehensive study of the North Atlantic Meat trade from 1870-1913, Harley discovers that the growth of the North Atlantic meat trade after 1880 with the introduction of refrigeration was to have some effect on the grain trade. Wheat was transported very cheaply (even at times free of charge) between New York and

³ Most tariffs had been abolished by the start of this period.

Liverpool as heavy ballast on ships otherwise carrying meat or passengers. However, this rate was not typical of other routes. To quote Harley, “The extreme impact of liner capacity was on the berth rate on grain from New York to Liverpool. This rate is usually taken to indicate the course of US export freight rates. However this rate was particularly reduced by liner capacity. Moreover, less than ten percent of the grain shipped was carried at this rate.”

The question remains, however, of what it was that caused the increase in trade, if it was not principally falling transport costs and a narrowing of price differentials.

Other possible explanations

One explanation ripe for rehabilitation is that of trade policy, in particular as regards the favourable conditions created by the repeal of the British Corn Laws in 1846. Without this, the expansion of trade would not have been possible, and indeed, with the return to protection by much of continental Europe, they remained cut-off from the price convergence that was seen in the UK.

O’Rourke and Williamson state, however, that “tariffs in the Atlantic economy did *not* fall from the 1870s to World War I; the globalization that took place in the late nineteenth century cannot be ascribed to more liberal trade policy.” (Their emphasis.) This conclusion is correct only if one sees the period from 1870 in isolation from the liberalization that did occur from 1846 (and before). This is not necessarily wise, since as is described below, the period immediately following the repeal of the Corn Laws was hardly conducive to trade, and so the effects of liberalization might have taken rather longer to be felt than otherwise.

Although the repeal of the Corn Laws meant that expansion of trade was now possible, political events had the opposite effect, at least until the 1870s. In 1848 there were revolutions in much of continental Europe, which were fundamentally to change the face of the continent. In 1854-56 there was the Crimean War, and, perhaps most importantly here, 1861-65 saw the American Civil War. From 1870-71 there was the Franco-Prussian War. From this point until the First World War there was relative peace in Europe and the North Atlantic as a whole. Is it so surprising that, in these conditions, trade began to flourish?

Another suggestion comes from Persson (2004), who suggests that “One hypothesis worth looking into is, to what extent was the grain market integration

driven by a downward shift in the New World supply schedule and/or a change in the supply schedule – its becoming more price elastic as nations with practically unlimited supplies of land were populated by immigrants”.

There are, therefore, many possible directions for future research in this area, and the question of why 19th century globalization in trade began when it did remains one of the most fascinating questions confronting economic historians.

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