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**1846 and All That:
The Rise and Fall of British Wheat
Protection in the Nineteenth Century**

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The Rise and Fall of British Wheat Protection in the Nineteenth Century

Abstract: By documenting the legislative history of the Corn Laws from 1670 and using previously unused data to calculate annual *Ad Valorem* Equivalents for most years from 1814, it is possible to establish several important facts about British wheat protection. Statutory protection was only significant for a few years after 1815, the decline starting in the 1820s and continuing beyond the famous “repeal” in 1846. The level of protection prior to 1846 was, for many years, much lower than previous accounts have suggested. The annual time series of *Ad Valorem* Equivalents will allow for UK trade policy to play the important role it deserves in econometric analyses of the nineteenth century.

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1. Introduction

It is now three-quarters of a century since the publication of *1066 and All That*. The authors ridiculed the historian's fixation with "memorable dates", although this enthusiasm even now seems little diminished. For the economic historian few dates in the nineteenth century are more memorable than 1846.

The repeal of the British Corn Laws is one of the nineteenth century's most famous political episodes concerning economic policy. As such it has attracted the attention of historians of British politics, who have revelled in the cut and thrust of the political debate of the time, and that of economic historians: see for example the articles in Harley (1996) and Schonhardt-Bailey (1997).

Recently, there has been renewed interest in the Corn Laws. The late twentieth century phenomenon of "globalization" has led economic historians to demonstrate that this process actually occurred in two phases. The beginning of globalization has been placed in the late nineteenth century, the process being interrupted and severely set back during the interwar years, only to experience a second wave after the Second World War (O'Rourke & Williamson, 1999). The trade liberalization exemplified by the repeal of the Corn Laws was of course a necessary precursor for this.

The true economic significance of the nineteenth century Corn Laws has not been satisfactorily assessed, however. Two strands are discernable in the literature. The first presents the day to day functioning of the Corn Laws and/or the politics surrounding them; see for example Fay (1932), Barnes (1965) and Vamplew (1980). The second attempts to quantify the economic impact of the Corn Laws, for example through estimates of their *ad valorem* incidence. These, however, differ widely. For example, estimates for the pre-1842 system have ranged from 5.6 per cent in McCloskey (1980) to 54 per cent in Williamson (1990). The reason for these discrepancies is their complexity: the Corn Laws were by no means a simple *ad valorem* tariff and it is easy to oversimplify when interpreting them as such.

The workings of the Corn Laws are in fact recorded in great detail in British parliamentary papers. This information can be used to lay to rest some of the conventional historical wisdom about the Corn Laws. Traditionalist accounts even today¹ suggest that 1846 was a dramatic break with the past, repealing age-old tariffs, inspiring other European countries and paving the way for an age of free trade in Europe and the first era of

¹ See for example Schonhardt-Bailey (2006).

globalization, as exemplified by the American “grain invasion”. None of this is true. British grain protection was significant for just a few years after 1815 and the movement to free trade was a gradual process, starting in the 1820s, but only ending in 1869. 1846 was just one stage, albeit an important one, in this.

This paper focuses on the tariffs on foreign wheat. Section 2 documents the legislative history of the Corn Laws from the seventeenth century, showing the rise in protection up to 1815 and the subsequent fall. Section 3 first gives a critical summary of previous attempts to assess the incidence of the Corn Laws in the nineteenth century, and then utilizes previously unused data from British parliamentary papers to provide an alternative account. In particular, this is done by compiling an annual time series of *Ad Valorem* Equivalents (AVEs) from 1828, which give an impression of the rise and fall of British wheat protection after this date. These estimates will be useful for economic historians and econometricians investigating the history of trade in wheat and the extent of market integration in the nineteenth century. Section 4 suggests some implications from these findings. Section 5 concludes.

2. The Legislative History

2.1 The Rise of Protection

It is impossible to understand the significance of the movement towards repeal without first understanding the historical background for the Corn Laws. Many accounts give the impression of a protectionist order steeped in history, but the reality is rather different. The rise of trade barriers for the sake of protectionism was a nineteenth century phenomenon. It happened suddenly in the aftermath of the Napoleonic Wars and represented a significant break with the past.

As Nicholson (1904, p. iii) and others have noted, the Corn Laws have come to be seen as principally protective measures governing imports. However, for much of their history the import duties were a very minor part, although they assumed greater and greater importance. Neither was wheat the only grain legislated for, but it was certainly the most important in terms of the volume of imports and consumption. Indeed, Barnes (1965) documents the extraordinary attachment of the ordinary English populace to white wheat bread. At times of scarcity, the authorities would attempt to encourage the substitution of other grains, even by example, but to no avail, in an interesting parallel to present day government attempts to influence diet.

After the repeal of an old and inoperative law of 1463 there was no statutory restriction on importation until the Corn Law of 1660. (Barnes 1965, p. 6) From 1670 until 1815 there

was little change in the basic format of the laws governing imports. With a basis in medieval ethical thinking, the Laws attempted to secure for both the consumer and the producer a “just price” (Nicholson 1904, p. 63). In times of poor harvests and high prices, consumers were protected by low import duties. In times of surplus and low prices, producers would be protected by “bounties”, i.e. subsidies, on exports.

Price bands were specified within which certain duties would be payable. A common feature after 1670 is a very small “nominal” duty payable when the price of wheat was high (normally about 1s. per quarter), and a “pivot level” below which duties were very high. These bands and duties were adjusted at various times, and extra levels, above and below the aforementioned were sometimes in effect, but in practice they had little impact on imports which were very low, and at times of scarcity they were suspended. The importance of the duties was as a counterpart to the system of export bounties². Without the wheat duty, it would have been profitable to import in order to re-export and collect the bounty. (Fay 1932, p. 15)

The import restrictions only began to have large practical relevance from the late 1780s, when a combination of the effects of the industrial revolution and population growth led to England becoming a net importer of wheat on a permanent basis (Fay 1932, p. 28). 1792 was the last year when England was a net exporter.

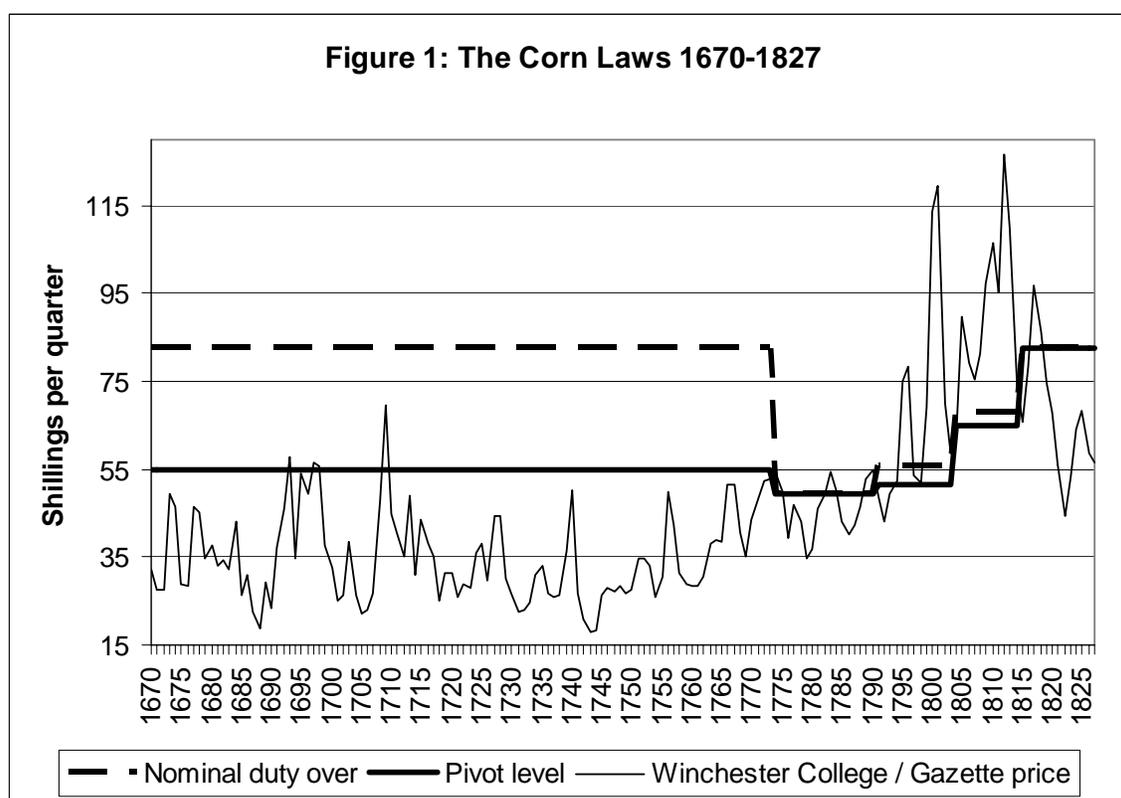
At first, this change appears to have led to an early movement towards free trade, perhaps with a basis in the ideas of the Scottish enlightenment. The preamble to the Corn Law of 1774 stated that “Whereas it had been found by experience that the restraints laid by several statutes upon the dealing in corn, flour, meal, cattle, and other sundry sort of victuals, by preventing a free trade in the said commodities, have a tendency to discourage the growth and to enhance the price of the same”. (Nicholson 1904, p. 82) This Law saw a considerable reduction of the pivot level, from 82.5s. to 49.5s. per quarter and came on top of the introduction of preferential rates for colonies from 1766 (Nicholson 1904, p. 39).

Corn Laws from 1791 steadily increased both the pivot level and the duty payable. However, almost constant wars with France from 1792 until Waterloo in 1815 meant that the Corn Laws became irrelevant, as prices rose to such a level that only the (very small) lowest rate of duty was payable for most of the time. In sum, the period from 1774 to 1815 was one of “practically free” trade in corn, as stated in the report of an 1821 select committee. (Fay 1932, p. 80)

² Although these were rarely payable after 1773 (Fay 1932, p. 31), and they were abolished in 1814.

With peace in 1815 a new law was passed which prohibited wheat imports when prices were under 82.5s. and admitted wheat free of duty above this level. This was a radical departure from previous Corn Laws. Fay has described the 1815 Law as “the one and only serious breach in corn-law policy from beginning to end” and “defiantly protective” (Fay 1932, p. 35) Barnes (1965) has suggested that it reflected a new antagonism between the classes after the French Revolution.

Figure 1 serves to illustrate the impact of the Corn Laws prior to these dates. The graph plots the annual average price of wheat against the level above which small “nominal” duties were payable, and the pivot level, below which duties were high³. The price data is the *Gazette* series from 1771 and is the “Winchester College” series before this date.



Source: Mitchell & Deane (1962), BPP (1843)

The graph demonstrates that it is possible to divide the Corn Laws before 1815 into three regimes. Before 1774 the Corn Laws appear highly protectionist, with the average annual price only rarely exceeding the pivot level and never implying nominal duties. However, as Fay (1932, p. 15) notes, the only times when the price was high enough to justify the second highest band, the import duties were suspended, and besides, England was a net

³ For some years my definition of the pivot level includes two bands.

exporter of corn for most of these years. In Nicholson's (1904, p. 70) words, the duties on import until 1773 were "practically inoperative, though nominally prohibitive".

From 1774-1791 there is a clear movement towards free trade, but starting in 1791 and culminating in the Law of 1815 there is a gradual reversal, although high grain prices during the wars meant that in practice the Laws were inoperative. For some years the protection afforded by the Corn Laws might even have been negative, since in 1794-5 neutral ships bound for France were seized and from 1795-6 and from 1800-1 imports were bountied, i.e. a subsidy was paid on import. (Fay 1932, p. 37)

In 1815 the graph illustrates dramatically the protectionist tendency of the new law, and of course by this time a price below the pivot level did not just imply a high tariff, but rather prohibition. With one notable exception from November 1816 to November 1817, ports were almost permanently closed from the passing of the Act until 1825⁴. (Fay 1932, p. 79)

2.2 The Fall of Protection

Although the UK turned protectionist in 1815, this was immediately met by protests, including a formal Protest in the House of Lords, signed by eleven peers including two royal dukes, and this opposition continued, amongst other things resulting in the famous "Petition of the London Merchants" in 1820 drafted by Tooke (McCord 1970).

New legislation followed the protests. Protection was ostensibly relaxed by a new Act in 1822, but this was only to come into operation "as soon as wheat should be again admissible for consumption, under the Act of 1815" (BPP 1843). Since these terms were never met (except for colonial corn), this Act never came into force. However, in 1825, 1826 and 1827 a series of temporary Acts allowed some wheat to be released from bond for a short period of the year, although these applied only to grain that had been imported prior to the passing of each Act⁵. The 1815 Act was permanently repealed in 1828 when the import prohibition was dropped in favour of the Duke of Wellington's "sliding scale" of import duties.

For most of the 1830s domestic harvests were plentiful, prices were low and discussion of the Corn Laws was muted. However, from 1837 prices began to rise and in 1838 the famous Anti-Corn Law League⁶, led by Richard Cobden and John Bright, began to campaign

⁴ Ports were also open for a few months in 1818 and 1819.

⁵ Schlote (1952, p. 112) states that "imports" (i.e. releasing wheat from bond) were prohibited from May 15, 1825 to July 14, 1828. This is not strictly true.

⁶ It has been suggested that the League's motives were wider than a simple reaction to the rise in prices. See McCord (1968).

for free trade in grain⁷. In 1842 an attempt was made to ease the degree of protection, but poor harvests and the Irish Potato Famine caused political disarray which finally led to the repeal of 1846, when duties were greatly reduced together with a promise that only a “nominal” registration duty would be payable from 1849. (Tracy 1989, pp. 39-40)⁸

The Acts from 1828 are complicated and scholars have contradicted each other when documenting them⁹. The account below is based on contemporary parliamentary papers and for simplicity only documents the measures concerning foreign wheat; colonial wheat was given favourable rates until 1849, but was a very small proportion of imports.

Again, it is important to emphasise that the Corn Laws were not a simple *ad valorem* tariff. From 1828 to 1849, they involved a complicated “sliding scale”, whereby certain price ranges would imply a particular duty on “wheat entered for home consumption”. This was a throw back to the years prior to 1815, when duties were also payable according to what can be seen as a miniature sliding scale. The rate of duty payable was recalculated on a weekly basis. Until 1849 there was no import duty on wheat as such; grain could be imported freely, and then placed in “bonded warehouses”. It was only on release from “bond”, i.e. “entered for home consumption”, that the duty was payable.

The price determining the duty was an average of wheat prices recorded for a varying number of “inspected markets” (varying depending on the current Act governing the Laws). An average was taken of these prices: this is the famous “*Gazette*” price – so called because it was (and still is) recorded weekly in the *Gazette* newspaper. In determining the price relevant for the duty for each week, the average of the last six weeks’ *Gazette* prices was calculated.

The duties payable under the various tariff regimes are shown in table 1.

⁷ This raises the question as to whether Williamson (1990, p. 130) seeks to answer the wrong question: “What was the impact of the Corn Laws in the mid-1830s when the Corn Law debates rose to a crescendo?” The mid-1840s are far more interesting in this respect.

⁸ For a more detailed account of the politics of repeal, see Barnes (1965).

⁹ That is not to say that contemporaries were more enlightened, as the following exchange from the parliamentary debates between the Conservative Prime Minister Peel and the Whig leader of the opposition shows:

Sir R. Peel: ...At present the House is aware, that the duty payable upon corn is levied in this manner. At 59s. and under 60s., the duty is 27s. diminishing 1s. with 1s. increase of price, until corn arrives at the price of between 66s. and 67s., when the duty is 20s. 8d. The duty then falls 2s. when corn is between 68s. and 69s. At 69s. the duty is 16s.

Lord J. Russell: Not exactly so. Between 69s. and 70s. the duty is 13s. 8d.

Sir R. Peel: I am reading from a printed statement, and I believe it to be correct...

[Quoted in Fay 1932, p. 173 – Lord Russell was correct!]

Table 1: The Corn Laws 1828-1869
All prices in shillings per imperial quarter

When the Gazette price was...	... the duty payable was...			
	From 15 July 1828 to 29 April 1842	From 29 April 1842 to 26 June 1846	From 26 June 1846 to 1 February 1849	From 1 February 1849 to 1 June 1869
73+	1	1	4	1
72+	2.67	2	4	1
71+	6.67	3	4	1
70+	10.67	4	4	1
69+	13.67	5	4	1
68+	16.67	6	4	1
67+	18.67	7	4	1
66+	20.67	8	4	1
65+	21.67	9	4	1
64+	22.67	10	4	1
63+	23.67	11	4	1
62+	24.67	12	4	1
61+	25.67	13	4	1
60+	26.67	14	4	1
59+	27.67	15	4	1
58+	28.67	16	4	1
57+	29.67	17	4	1
56+	30.67	18	4	1
55+	31.67	19	4	1
54+	32.67	20	4	1
53+	33.67	20	4	1
52+	34.67	20	5	1
51+	35.67	20	6	1
50+	36.67	20	7	1
49+	37.67	20	8	1
48+	38.67	20	9	1
47+	39.67	20	10	1

+1 for every shilling decrease in price
 20 was the maximum payable
 10 was the maximum payable
 Fixed rate of duty

A point to note about the 1828 Law is the non-linearity. Above 66 s. the duty fell away very rapidly. The table demonstrates clearly the legislative progress towards free trade from 1828. Duties were decreased in 1842, 1846 and 1849.

Interestingly, although 1846 is popularly considered to mark the “repeal” of the Corn Laws, duties on grain survived for many years afterwards, and it certainly did not mark an era of “free trade in grain”. (Williamson 1990, p. 125) From June 26, 1846 to January 31, 1849 the sliding scale was to continue in a truncated state, although duties were suspended from

January 26, 1847 to March 1, 1848¹⁰. Shortly afterwards under the terms of the 1846 Act, the sliding scale was abolished altogether: from February 1, 1849 a fixed “nominal registration duty” of 1s. per quarter was in effect¹¹. In addition, an Act of August 1, 1849 ended the practice of “warehousing” by making the duty payable on import. (Prest 1996, p. 474)

Prest (1996) has shown that the registration duty was anything but “nominal”, at least in revenue terms: because of the rapid growth of trade after 1849, the registration duty earned the British state an average of £629,602 per annum – far higher than under the sliding scales. As he says, “whoever gained from the repeal of the corn laws, the revenue did not lose”. (Prest 1996, p. 474) With the growing realization, documented by Prest, that the registration duty amounted to a significant tax on the poorest in society, it was finally repealed on June 1, 1869, leading to true free trade in grain, although it was briefly re-imposed in order to pay for the Boer War from April 15, 1902 to June 30, 1903. (*Annual Statement*, 1903) Wheat then remained duty free until the Wheat Act of May 1932. (Malembaum 1953, p. 35)

The obvious point to be taken from this is that, despite the imposition of the 1815 Act, already from 1822 there were legislative movements towards free trade, which came to a conclusion in 1869.

2.3 Some preliminary conclusions

The traditional account of the movement towards free trade and the first era of globalization in Europe sees Britain playing a leading role, first repealing the Corn Laws in 1846 and then negotiating the Cobden-Chevalier Treaty with France in 1860. According to this story, other countries learned from Britain’s experience and, belatedly, followed suit. This account has come under increasing attack, for example by Nye (1991) who suggests that French protection was consistently below that of Britain for most of the nineteenth century, and most recently by Accominotti & Flandreau (2006). In particular, they question the significance of another memorable date, 1860 and the Cobden-Chevalier Treaty. This included a Most Favoured Nation clause in trade agreements between Britain and France¹², but, they suggest, was of little practical importance, since European trade was already more-or-less free by this time. They also find that “Britain’s trade liberalization after the repeal of the Corn Laws was typical rather than exceptional” and that continental countries adopted trade liberalization before

¹⁰ Schlote (1952) gives the last date as September 1, 1847, but contemporary sources (for example *Tables of Revenue* (1847) give the date as March 1, 1848. This also seems more likely, given the very small level of tariff revenue reported for 1847, see table 3, below.

¹¹ From September 1, 1864 duties were calculated and imports measured based on weight (cwt.) rather than volume (quarters). So technically from this date the registration duty was 3d. per cwt., but this is approximately the same as 1s. per quarter. (*Annual Statement*, 1864)

¹² This was no innovation. The Anglo-French Treaty of 1786 included the same concept. (McCord 1970, p. 40)

1846. Thus they conclude that Britain cannot have been the inspiration for the movement to free trade that she has been assumed to be.

It is, however, surprising how much can be learned from a simple account of the legislative process leading to repeal. The movement away from the protection of 1815 was gradual, starting with the temporary laws from 1825-7, and it was most importantly and permanently reversed in 1828. So, although this paper cannot attempt to resolve the debate as to which country led the way to free trade, which would require a far more general survey, it does provide some interesting evidence as far as the important trade in wheat is concerned. Here Britain's example was set in the 1820s, not the 1840s¹³. In the context of previous history, the "repeal" in 1846 seems less important, and simply another step in a progress toward free trade after the reversal of 1815. Indeed, 1846 did not even mark the end of British wheat protection, which only finally gave way to true free trade in 1869.

The traditional argument might therefore have more validity than recent accounts suggest. This is of course the oft-neglected but important point to be taken from Williamson (1990), who demonstrated the steady decline in protection from 1815, and more recently, from O'Rourke & Williamson (2005, p. 14), who find that "by 1838 there had already been a radical liberalization of British commercial policy, and Britain stuck with that pro-globalization stance up to the more famous 1846 Repeal of the Corn Laws and beyond". The reason for the importance of 1838 will be revealed in section 4.

What a simple history of the tariff legislation does not answer, however, is how important the statutory protection after 1828 was. At the extremes of the sliding scales, the UK market was either practically closed or as open as under the nominal duty of 1849. Several attempts have been made to assess this question as will be discussed in the next section. All rely on the calculation of so-called "*Ad Valorem* Equivalents".

3. The incidence of the Corn Laws in the nineteenth century

3.1 *Ad Valorem* Equivalents

In order to compare the impact of the various Corn Law regimes, it can be helpful to convert the statutory tariffs to so-called *Ad Valorem* Equivalents (AVEs). An *ad valorem* tariff is one that is a fixed percentage of the value of the imported commodity. So $P = (1+t)\bar{P}$, where

¹³ This was not only in terms of grain. Britain's nineteenth century commitment to a process of trade liberalization can be dated to at least 1820, when parliament, which at that time included David Ricardo as an MP, declared that future commercial policy should be guided by the principle of free trade (Grampp 1987). In fact, by the 1840s "the Corn Laws stood out as the major remaining bastion of Protection, while tariffs on other imports had been very substantially diminished" (McCord 1970, p. 10).

$t \geq 0$ is the tariff rate, P is the price payable by the domestic consumer and \bar{P} is the value of the imported commodity. The Corn Laws were, however, a specific, rather than an *ad valorem* tariff.

A specific tariff is one which charges a specific duty per non-monetary unit of a good. The Corn Laws first charged per unit of volume (quarter) and from 1864 per unit of weight (hundredweight). Obviously the information requirements for imposing a specific duty are rather less from those for an *ad valorem* duty – the good only needs to be weighed, measured or counted to determine the duty. For an *ad valorem* tariff, the good also needs to be valued.

When converting specific tariffs it is thus necessary to value the product. This could be based on the domestic price, the world price, or something in between. There is no standard way of calculating these so-called AVEs and in fact the recent WTO Doha round broke down over this very issue, although “Draft guidelines” were accepted by negotiators on May 4, 2005¹⁴. (Economist, May 5, 2005)

There are two generally accepted approaches. The first is the “unit price” method, whereby a specific duty is compared to a reference price. The other is the “revenue method”: total tax revenue over a period compared to the total value of imports over the same period. The two methods are actually equivalent, since

$$AVE = \frac{D}{P} = \frac{D*Q}{P*Q}, \quad (1)$$

where D is the monetary value of the duty collected per unit of imports and P is the import unit value. So D/P is the unit value expression of the AVE. Multiplying by Q , the quantity of imports, in the numerator and the denominator gives the revenue method expression of the AVE, since $D*Q$ is total duty revenue and $P*Q$ is the total value of imports.

The problem remains of how to value the imports and this matter will be returned to later in this paper. Ideally, given the definition of an *ad valorem* duty, imports should be valued at the counterfactual price that would apply under free trade, which would be the c.i.f. price of imports. This is, however, not normally known and previous attempts at calculating the *ad valorem* equivalent of the Corn Laws can be seen as ways of trying to get around this problem.

One popular solution is to calculate estimates based on the price differential between UK wheat and a representative foreign exporting country (Prussia). This approach relies on the efficient operation of the Law of One Price and thus the strong assumption of perfect

¹⁴ AVEs would allow countries to “tier” their tariffs and thus allow for a “progressive” reduction in tariffs, i.e. high tariffs should be reduced more.

market integration. The former states that the price of a traded good, adjusted for trading costs, such as transportation and tariffs, will be equal in two markets due to the possibility of arbitrage:

$$P = (1+t)(P^* + \tau), \quad (2)$$

where P is the price of the good in the home importing market, which is a mark-up on the foreign price, P^* , including the cost of the tariff (expressed as an AVE), t , and other non-tariff barriers, τ , such as transportation costs. From this we can calculate the home price with free trade as

$$P^{FT} = P^* + \tau \quad (3)$$

since $t = 0$.

Using this, we can solve for the extent of the *ad valorem* equivalent of a tariff, t , as follows:

$$AVE = t = \frac{P - (P^* + \tau)}{P^* + \tau} = \frac{P - P^{FT}}{P^{FT}}, \quad (4)$$

where the numerator is the part of the price differential due to the tariff and the denominator is the free trade domestic price. The *ad valorem* tariff is simply the proportion of the price attributable to the tariff. However, although P is observable, P^{FT} is not, because normally we do not know how much of the price differential $P - P^*$ is due to non-tariff barriers.

3.2 Previous estimates

An obvious and simple way of estimating the impact of the Corn Laws on an annual basis is to use the unit price method employed by Schlote (1953, p.61). He takes the average yearly *Gazette* price of wheat and uses the sliding scale to calculate what the tariff would have been at that price. That is

$$AVE_t = \frac{D_t(P_t)}{P_t}, \quad (5)$$

where $D_t(P_t)$ is the duty payable from the relevant sliding scale at time t , which is a function of the price at time t .

He then reports the tariff as a percentage of the price for selected years from 1829 to 1848. Completing his time series gives the picture in figure 3.¹⁵ However, although Schlote's method seems intuitively correct, it tends to flatten the true variation in the *ad valorem*

¹⁵ The duty for 1828-41 is calculated using the 1828 sliding scale. The duty for 1842-5 is calculated using the 1842 sliding scale. The duty for 1846-48 is calculated using the 1846 sliding scale. From 1849 the duty used is 1s. per quarter.

incidence of the Corn Laws between the years. This is due to the workings of the Corn Laws under the sliding scale, as touched on above. Vamplew (1980) has shown that wheat was only normally released from the bonded warehouses when tariffs were at their lowest level during a year. Indeed, in most cases over 95 per cent of wheat was released at the lowest level of duty in each period of an up- or downswing in duties.

Thus, to take one example, during the downswing in duties from week 5 to week 38 in 1838, 1,306 quarters of wheat were released for home consumption, 96.6 per cent of this at a rate of 1s. per quarter. From week 39 to week 45 there was an upswing in duties, during which only 166 quarters were released. In the downswing from week 46 to week 13 in 1839 100 per cent of the 996 quarters released for home consumption paid a duty of just 1s. per quarter. Just looking at the average price for 1838 (64s.), as Schlote did, would imply a duty of 22.67s, or 35 per cent of the *Gazette* price. In reality, most wheat paid a duty of just 1s. per quarter: less than 2 per cent of the price.

Thus it is that Schlote's method yields unreliable estimates: very little grain was subject to duty at the highest rates and any estimate using the average price for the year to determine the implied duty will upwardly bias the estimates of the *ad valorem* incidence.

The most widely cited estimates for the *ad valorem* incidence of the Corn Laws are those of Williamson (1990), given again by him again in O'Rourke & Williamson (1999, p. 38 and pp. 83-4)¹⁶ and O'Rourke & Williamson (2005, p. 10).

Williamson (1990) attempts to assess the *ad valorem* impact of the Corn Laws after 1815 by first testing whether there is market integration between the UK and Prussia. If markets are well integrated "it would be a simple matter to infer the impact of the Corn Laws on home prices by measuring price differentials between British and foreign markets, adjusting for transport costs". (p. 126)

Williamson draws inspiration from Fairlie (1969), who divides the period 1815-68 into five periods: 1815-27, 1828-41, 1842-8, 1849-59 and 1860-8. She has a time series with an average yearly price of wheat in England and Wales and an average yearly price of wheat in Prussia. Both are taken from Fairlie (1965). She provides estimates of the "amount by which English prices would have been lower had there been free trade" by making seemingly *ad hoc* assumptions about the level of transport costs and terms of trade effects. This number can then be used (see Williamson 1990, p. 128) to give an estimate of the *ad valorem* impact of the tariff in each period. Williamson (1990, p.128n) suggests that Fairlie's calculations

¹⁶ Here the figure for the 1842 regime is given incorrectly and should read 22 per cent rather than 7 per cent.

assume too strong a terms of trade assumption, although Ward (2004, p. 254) finds support for Fairlie’s assumption.

Williamson’s solution is to run a simple regression of the English prices of wheat from 1815-61 on the Prussian prices given in Fairlie (1965). Dummies are introduced for the three protectionist regimes, 1815-27, 1828-41 and 1842-45 and finally a trend is introduced “to reflect the possibility of changing transport costs or changing market efficiency”. (Williamson 1990, p. 127) It is possible to use the dummy coefficients to calculate an estimate of the *ad valorem* protection afforded by the various Corn Law regimes. To see this, note that

$$AVE = t = \frac{(1+t)P^* - P^*}{P^*}, \quad (6)$$

where $(1+t)P^*$ is the price that would prevail in England if there were no non-tariff costs under the Law of One Price. The coefficients to the dummies provide an estimate of $(1+t)P^* - P^*$, i.e. the increase in the English price due to the tariff. This divided by P^* provides his estimate of t .

Using the results from the regression and comparing with Fairlie’s calculations without the terms of trade effect (“Using Williamson’s assumption”), Williamson concludes that “[t]he preferred estimates... are quite close. They imply that the *ad valorem* equivalent tariff rate was about 71% between 1815 and 1827, about 54% between 1828 and 1841, and about 22%¹⁷ between 1842 and 1845.” (Williamson 1990, p. 128)

There are a number of problems with Williamson’s analysis; for example, there are some minor questions about the data.¹⁸ More importantly, however, interpreting his results presents difficulties. Williamson finds the constant to be insignificant. This means that it is difficult to accept his interpretation as any meaningful “estimate of transport costs and expenses”. Moreover, the trend is also insignificant, which using Williamson’s interpretation suggests that “there is no evidence of significant combined changes in market efficiency and transport costs over time”, but the three dummies act much like a trend, and it is surely difficult to separate the effects.

¹⁷ This is incorrectly cited as seven per cent in O’Rourke & Williamson (1999, p. 38).

¹⁸ There is an error in the Prussian series. From 1816-27 this is taken from a contemporary article, Rawson (1842). The price for 1816 appears to have been transcribed incorrectly by Fairlie (58s. instead of 48s.) and no source is given for 1815. However, even correcting for this, it has not been able to reproduce Williamson’s estimates using the data he cites. Using the regression the figures, for 1815-27, 1828-41 and 1842-45 respectively, are 74.8%, 59% and 24.8%. Using “Williamson’s assumption”, the figures are 63%, 50% and 23%. Even using Williamson’s regression coefficient for 1815-27, the estimate is 74.8% rather than 72.8%. This difference, as well as the reported average Prussian price of 34.47s. in his footnote 2, suggests that the differences between my results and his stem from discrepancies between his Prussian data for 1815-27 and that given in Fairlie (1965). The difference is of little importance for the results, however.

However, there is no escaping the main conclusion from Williamson's regression: that the price gap was narrowing over time, and that successive tariff reductions almost certainly played a large part in this. The main criticism has to be, however, that it fails to provide any information on the swings in the protection from year to year. In fact, of course, the protection varied from week to week, so to state that the 1828 sliding scale was equivalent to a 54 per cent *ad valorem* tariff provides about as much information as quoting the average price for the period. As Capie (1983) notes, average rates for long periods must "be a great simplification".

Is it then possible to use price differentials to create annual estimates? As before, this will only be possible if markets are perfectly integrated and although Williamson's regression provides evidence that this was fulfilled on average for the periods he looks at, there is evidence that for some years the tariff was so high that this was not the case.

O'Rourke (1994)¹⁹ makes the point that the Corn Laws could have influenced UK grain prices in two ways. Either the tariff was so high that imports were excluded and prices were determined by domestic demand and supply, or grain entered Britain, and the Law of One Price held²⁰.

O'Rourke determines which scenario was relevant for each year by noting that both the Prussian price plus transport costs and the British price minus the tariff should both be equal to the free trade price of wheat in the UK if the law of one price holds, i.e. $P^{FT} = P^* + \tau = P - t$. He finds this not to be the case from 1832 to 1837, and this in itself presents difficulties if the Law of One Price is to be used as the basis for calculating annual AVEs.

However, there are a couple of problems with his method which if corrected for would reinforce this conclusion. First, the estimates O'Rourke uses for the transport costs (7.5s. from Fairlie and 10s. from Williamson) are not apparently based on any substantial evidence. The impact of this on his conclusions is unclear. More importantly, however, he uses Schlote's method to calculate the average tariff payable for each year. This will overemphasize the tariffs with the implication that markets would appear more integrated than they would if a more representative tariff was used.

In addition, the assumption of constant transportation costs is unlikely to be correct – cycles in transport costs are a well documented phenomenon (see for example North (1958) and Persson (2004)). Persson's data show that the barrier to trade due to transportation costs

¹⁹ See also O'Rourke & Williamson (1999, p. 83)

²⁰ In fact, there was grain imported and released from bond in every year, but the level was very low, especially in the mid-1830s.

could easily fluctuate by a factor of two or three from year to year. This could be the reason why Williamson's constant is insignificant in his aforementioned econometric analysis. Even ignoring this, there is still the problem, as suggested in section 3.1, that any estimates based on the Law of One Price must assume *perfect* market integration, i.e. that *all other costs*, except transportation costs, have been arbitrated away. There is nothing to suggest that markets were so efficient at this time.

The conclusion must be that annual estimates based on the assumption that the Law of One Price held are not appropriate for every year. Another method is necessary.

3.3 Annual estimates based on the revenue method

The revenue method, i.e. ratios of tariff revenue to import values, has the advantage that it does not rely on an assumption of market integration or on trade with specific countries. It is also possible to use this method to create annual estimates which more accurately reflect the proportion of the price paid in duty than Schlote's method.

The revenue method is a commonly used approach, for example by Imlah (1958) and more recently by Nye (1991) for more general studies of this period. It is also the method recommended by Capie (1983, p. 7), who states that “[d]uties as a percentage of total imports overcome the serious problem of the conversion of specific duties... to *ad valorem* equivalents. And... since this was a time when prices of many commodities were falling sharply, they are therefore clearly an improvement on simply looking at legislative changes in protection.” In relation to the Corn Laws, we should therefore not necessarily expect to see a fall in the *ad valorem* incidence between the 1828 and 1842 regimes, since prices were falling and this would make it more likely that wheat was paying higher rates of duty.

This approach has been extensively criticised, see for example Irwin (1993) and Estevadeordal (1997) and a detailed criticism is given in Board of Trade (1904, pp. 287-292). However, this is mostly directed towards its applicability as a comparative measure of protection between various countries and particularly when it is used as an average over many commodities. As a way of comparing the protection offered between different years for one commodity, it seems reasonable enough. Another common criticism is that it cannot account for prohibitive tariffs (Capie 1983, p. 7) – however, wheat was released from bond and imported in every year after 1828.

McCloskey (1980) uses the revenue method to present three estimates: for 1841 (5.6%), for 1854 (1.5%) and for 1881 (0%). Her estimates have been dismissed by Williamson (1990, p. 128n), who notes the sizeable difference between McCloskey's estimate of the average

tariff for 1841 (35 per cent) and, for example, that given for wheat – just 5.6 per cent. He explains that since “the fact that duties on wheat were at their lowest in 1841... the atypical low rates in 1841 can be ignored”. This is not, however, a general criticism of the method, but rather of taking 1841 as representative of the pre-1842 incidence. If it were possible to extend McCloskey’s analysis beyond her three data points, then a fuller picture would emerge.

With data from British parliamentary papers this is in fact possible. The formula is simple enough:

$$AVE_t = \frac{(Duties\ collected)_t}{(Value\ of\ imports)_t} \quad (7)$$

The duties collected in each year are available in official publications. “Value of imports”, however, presents some special difficulties.

Until 1849 “imports” should be taken to mean foreign wheat released from bond, since colonial wheat was subject to different duties and the duty was only payable when the wheat was released from the warehouse. From 1850, imports can be taken to mean total imports of wheat, both foreign and colonial, since the duty was payable on import, and colonial wheat no-longer enjoyed preferential rates of duty.

Data is available on volumes of the above for every year. The difficulty is then how to value it. McCloskey notes that the value of wheat imports is not reported prior to 1854²¹, but this is not entirely accurate. From 1696 records of overseas trade began to be systematically collected. Goods were valued using “official values” which were based on the average prices in 1694 – but these are obviously of little use here since prices were undoubtedly rather different by the nineteenth century²². However, from 1854 the method was changed, so that actual current prices²³, compiled by experts, were used each year. (For more detail, see Schlote 1952, section A).

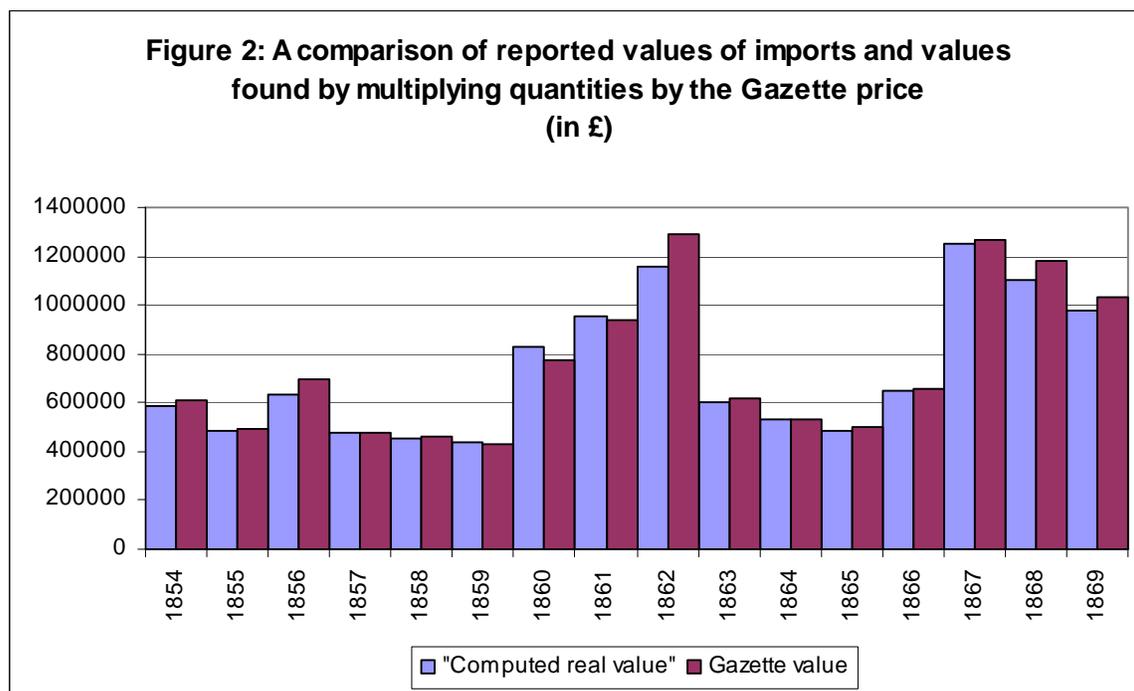
The best method for valuing wheat released from bond in the UK is the average domestic price, i.e. the *Gazette* price. This valuation has some other advantages. First, it allows the estimates to be directly comparable with Schlote’s, who also used the *Gazette* price in the denominator when calculating his AVEs. Second, this appears to have been the method used for valuing wheat after 1854 and thus makes my estimates consistent with those based on later valuations. That this is the case can be seen in figure 2, which compares valuations based on multiplying quantities with the *Gazette* price, and the official valuations from 1854.

²¹ She has one observation prior to this for 1841, which seems to have been taken from secondary literature.

²² Schumpeter (1938, p. 32) disputes this common explanation of the official value, and argues that it varied until 1725. This has little importance in the current context, however!

²³ These were, confusingly for the modern economist, referred to as “real values”.

The small differences could be due to discrepancies in the quantity data, which differs slightly depending on the source.



Source: See appendix

This may or may not be an appropriate valuation from 1850 when the duty was payable on import. However, an alternative measure will make little difference when calculating the value of the imported wheat relative to duties collected, since the difference between the two alternative evaluations will be relatively small in comparison to the volume of imports and the relatively small amount of revenue collected. Besides, with virtual free trade after 1849 and market integration, the *Gazette* price could be expected to be equal to the c.i.f. price of imported wheat, which is presumably the basis for the official valuations.

The revenue method is unfortunately not particularly helpful before 1828. The amount of duty received for years prior to 1828 is only given on wheat and flour combined in official statistics, and is entirely absent prior to 1814, since the records were destroyed in the Custom House fire of 1814²⁴. The information that does survive, and the AVE for each year, is however given in table 2.

²⁴ A tragedy for the economic historian almost equivalent to the destruction of the Library of Alexandria!

Table 2: AVEs 1814-1828 for Wheat and Wheat Flour

	[A]	[B]	[A*B]	[C]	[C/(A*B)]
	Gazette Price (s./qr.)	Quantity admitted (quarters)	Value of "imports" (£)	Duty collected (£)	AVE
1814	74.33	623086	2315803	31140	1%
1815	65.58	116382	381636	9411	2%
1816	78.50	225260	884146	0	N/A
1817	96.92	1023862	4961465	0	N/A
1818	86.25	1550606	6686988	0	N/A
1819	74.50	115697	430971	0	N/A
1820	67.83	1056	3582	0	N/A
1821	56.08	0	0	0	N/A
1822	44.58	0	0	0	N/A
1823	53.33	51	136	0	N/A
1824	63.92	914	2921	0	N/A
1825	68.50	399297	1367592	197519	14%
1826	58.67	287338	842858	170017	20%
1827	56.67	519268	1471259	591821	40%
1828	60.42	821794	2482503	67925	3%

Source: BPP (1849)

The duty collected in 1815 is presumably for the months prior to the passing of the new Law on March 23. The figures for 1814 and 1815 thus give a flavour of the low level of protection afforded by the Corn Laws during the Napoleonic Wars. From 1815 until the temporary Acts of 1825-7 no duty was collected. Wheat was either entered free of duty or prohibited. It is thus impossible to calculate AVEs for these years. The AVEs for 1825-7 are only applicable for the few months covered by the temporary Acts. Finally, the dramatic impact of 1828 is all too clear.

From 1828, the estimates of the annual *ad valorem* equivalents of the duties on wheat are constructed as below, where P_t is as usual the *Gazette* price in year t .

1828-1849:

$$AVE_t = \frac{(\text{Duties collected})_t}{(\text{Quantity released from bond})_t * P_t}, \quad (8)$$

where all values are for *foreign wheat only*.

1850- :

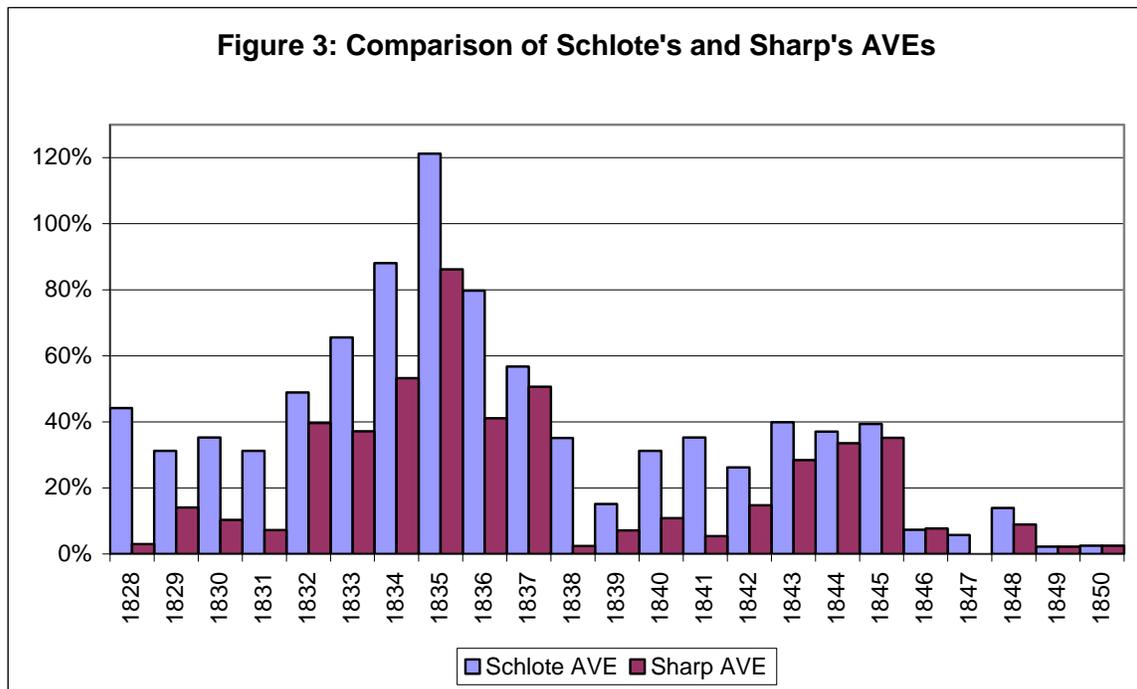
$$AVE_t = \frac{(\text{Duties collected})_t}{(\text{Quantity imported})_t * P_t}, \quad (9)$$

where all values are for *both foreign and colonial wheat*.

As admitted in the aforementioned WTO draft guidelines, "calculation of AVEs is not an exact science" and these estimates are no exception. They are, however, certainly an

improvement on previous attempts and must accurately capture the annual variation in the protection afforded.

The results of these calculations are given in figure 3, where they are compared to the Schlote estimates. The periods of highest tariffs are unsurprisingly similar in both series. However, my estimates are of course consistently lower, and the difference between the highest and lowest *ad valorem* rates is exaggerated. It should be noted that the figure for 1828 is only for the period after the introduction of the Duke of Wellington’s sliding scale, i.e. from July 15. Note also that the years of least protection before “repeal” were in 1828, 1838 and 1841 as stated in contemporary sources (Williamson 1990, p. 128n).



Source: See appendix

4. What can be learned from the new estimates

The discussion of the legislative history in section 2 has demonstrated the movement away from protection after 1828. The annual AVEs can also be used to illustrate this, but present a rather different picture than the estimates of other scholars. This is demonstrated in the following table, where the averages for each of the three sliding scale regimes are given:

	Fairlie ²⁵	Williamson	Schlote	Sharp
1828/9-41	20%	54%	51%	28% ²⁶
1842-45	10% ²⁷	22%	36%	28%
1846-48	4%	N/A	9%	6%

Initially, the most striking fact about these numbers is the variation between them. The differences between Schlote's and Sharp's estimates have already been explained. These are also directly comparable. Fairlie's and Williamson's estimates are also directly comparable, and the difference is of course due to Fairlie's large terms of trade effect.

The difference between Sharp's and Williamson's estimates will be accounted for by non-tariff barriers. Indeed, the workings of the Corn Laws themselves acted as a sort of non-tariff barrier, since the uncertainty surrounding the duties payable on wheat in the medium term and the costs of warehousing wheat in bond would certainly have added to the direct measures of protection detailed above.

An interesting conclusion to be drawn from the regime averages of the annual AVEs is that, even excluding 1828, it turns out that the average *ad valorem* impact of the Corn Laws did not fall after 1842 and in fact remained constant. Although scholars have hitherto assumed that the reduction in the duties payable must have given rise to a fall in protection, a fall in the domestic price of wheat meant that 1842 actually inaugurated a short period of high protection, compared to other years since 1838. This previously undocumented fact has important implications for historians of British politics: it sheds light on the urgency surrounding the debate on the repeal of the Corn Laws after 1842, despite the reform of the sliding scale.

For the true value of the annual AVEs, however, it is necessary to look beyond the regime averages. For the first time, the variation in the protection afforded by the Corn Laws from year to year, as recognized by Vamplew, has been documented. It turns out that the statutory protection varied quite substantially from year to year, reinforcing the point that any attempt to give an estimate for the whole period of a tariff regime is a gross oversimplification. For the same reason, a case could be made for saying that estimates based on yearly averages are also unsatisfactory, since duties varied on a weekly basis. However, for

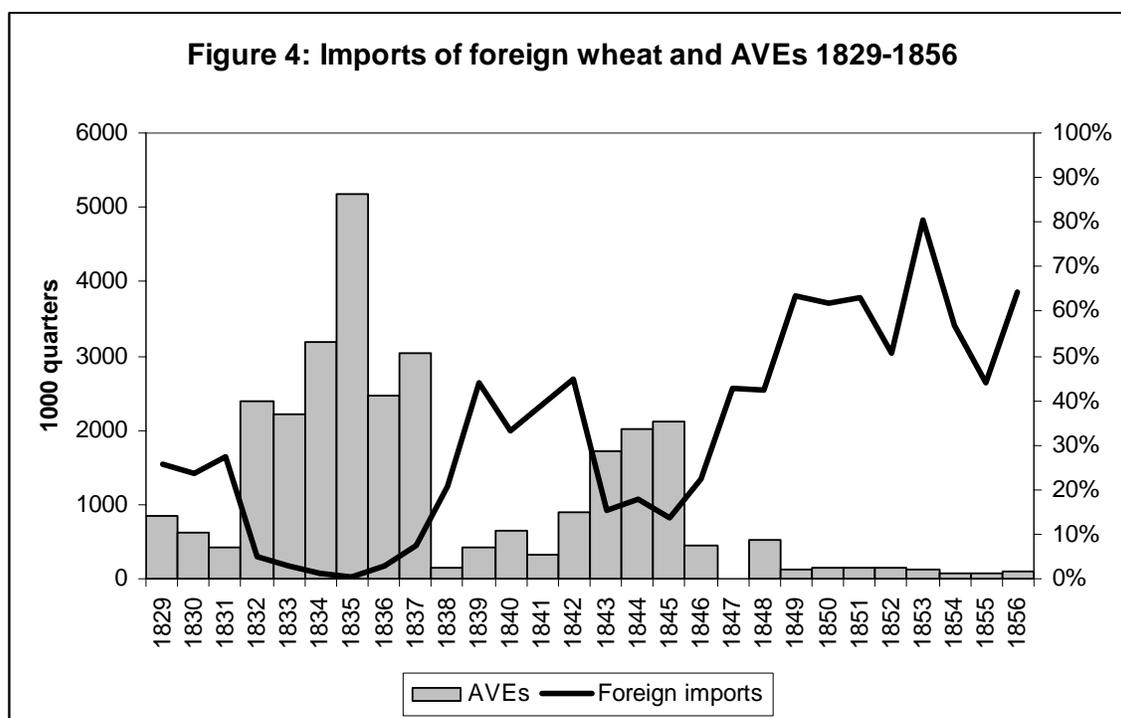
²⁵ These are recalculated using the relevant periods.

²⁶ The average for the first regime for Sharp's AVE is calculated without the level for 1828, since this was only for part of a year.

²⁷ The sizeable difference between this estimate and that reported by Williamson (1990) of 7.4 per cent is due to him having used the figures reported in Fairlie (1969) for the period 1842-48, which includes years after the "Repeal".

economic variables which were less important to the nineteenth century state, i.e. those not involved in raising revenue, the data is at most available in annual aggregates. So if import duties are to play the important role they deserve in empirical analyses of the nineteenth century, then they must be reported on an annual basis.

In addition, an annual series is perhaps the most frequent that has practical relevance when estimating the impact on imports. Traders might be able to respond to the weekly level of the tariff (or at least the expected level), but they could not necessarily rely on a supply: farmers need much longer to form supply decisions. The only real test of the relevance of the annual AVEs is to compare them to the volume of foreign imports for each year. Vamplew noted that “imports did not respond as strongly as bonded corn to either domestic prices or duties. Although imports peaked at the times of lowest duties, there was a flow of wheat into the bonded warehouses throughout the year” (Vamplew 1980, p. 385). However, the new estimates fit in remarkably well with the data on levels of foreign imports²⁸ after 1828. These are shown in figure 4.



Source: See appendix

The causality can only be satisfactorily established by formal econometric testing. However, the evidence for the importance of the AVEs for import decisions is striking. First, it is difficult to imagine, had the 1828 regime really been equivalent to e.g. a flat 54 per cent

²⁸ I.e. not wheat released from bond.

tariff rate, that imports would have reached the levels they did in the late 1830s and early 1840s (and to a lesser extent from 1829-31) – levels comparable to those in the years immediately following repeal. Also, if we are prepared to accept Vamplew’s well-documented assertion that grain merchants waited for periods of low duties before releasing their grain from bond, then it is not such a great leap of faith to believe that foreign grain exporters waited for years of low protection before sending grain to Britain. In fact, Vamplew noted that the official six-week average, together with time-lags in the regulatory process, meant that the duty was predictable: “A knowledge of market trends, which those involved in the corn trade should have had, ought to have made the prediction of the duty a fairly straightforward task. Holders and potential holders of foreign corn would thus be in a position to take action, if necessary, before the duty actually changed.” (Vamplew 1980, p. 384) It would thus be possible to arrange shipments of wheat to the UK in anticipation of a period of low duties.

The graph also seems to present a solution to the seeming puzzle as to why O’Rourke & Williamson (2005, p. 14), when assessing the importance of trade policy for the timing of a structural break in the relationship between English commodity prices and English endowments, i.e. England’s change from a closed to an open economy, find 1838 to be the most likely candidate. Figure 4 makes clear that this year marks the end of significant wheat protection due to the Corn Laws, except for three years. Indeed, it is possible to see the tariff protection as prohibitive from 1815 until 1837 (with the exception of half of 1828, 1829, 1830 and 1831) and low from 1838 (with the exception of just three years – 1843, 1844 and 1845). O’Rourke & Williamson note that 1838 also saw the start of the decline in the Harley freight index and the UK-US grain price gap. Of course the 1846 repeal was important, since it meant that the level of protection stayed permanently low, but the real break came in 1838 and imports clearly responded to that.

In summary, then, it seems that the AVEs accurately reflect the rise and fall of wheat protection after 1828. They thus have an important role to play in analyses of the nineteenth century. The famous contention that the nineteenth century political debate about the Corn Laws was “much ado about nothing” (Kemp 1962, p. 189), a claim largely based on the fact that the “repeal” did not immediately lead to reduced cereal acreage in Britain²⁹ can now be tested using annual data. Looking at imports, it seems that the level of protection was very important. At times of low duties imports reached levels not unlike those seen immediately

²⁹ See the discussion in Williamson (1990), p. 129.

after repeal, although numerous other factors certainly also played a role. The impact of the Corn Laws on market integration can perhaps also now be analyzed. Definitive answers must await formal econometric testing. My estimates support the work of Capie (1983, p. 9), who concludes for a more general survey of protection and import ratios, that “protection was not as high or not as effective as usually supposed”, which is also the natural conclusion to be drawn from the work of Vamplew.

5. Conclusion

By focussing on 1846, historians have tended to ignore the legislative progress towards free trade before and after that date. This is mirrored by a fascination with the Anti-Corn Law League, an organization which was first founded in 1838 by which time the British market was already open! We should not forget that, amongst the peaceful protestors demonstrating for parliamentary reform attacked by the British military in the famous Peterloo Massacre of 1819, were some holding banners proclaiming “No Corn Laws”. At this time Cobden was just a boy of 15.

Through an analysis of the legislation and estimates of the *ad valorem* incidence, it is possible to establish several facts about British wheat protection under the Corn Laws. First, prohibitive tariffs were a nineteenth century phenomenon, and statutory protection was in fact only significant for about twenty years after Waterloo. Second, the incidence of the Corn Laws after 1828 was, for most years, not as high as has previously been suggested. However, some of the years of highest protection occurred after the passing of the reformed sliding scale in 1842, a point that has not previously been understood. Third, Britain’s legislative movement towards free trade in wheat should be dated from the 1820s rather than the 1840s. Fourth, and related to the previous point, the famous repeal of 1846 marked neither the beginning nor the end of Britain’s progress towards free trade in grain.

As previously noted, none of this tells us whether Britain really led the European movement towards free trade. However, before 1815 Britain had been very open and, in an interesting parallel to later years, she was importing substantial amounts of grain and flour from the United States. Thus it was that Napoleon’s Continental System failed to starve Britain into submission (Galpin 1922 and 1925). This must surely have been a death blow to the traditional argument for European agricultural protection: that it was necessary in order to secure a home-grown supply of food in case of war. Britain’s example should have been a powerful and convincing one. The lesson took a while to sink in, even for the British, but once it did it would help change the world for ever.

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Appendix: Data sources

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Measures in hundredweight have been converted to quarters where necessary at the rate of 4.4 cwt. to the quarter.

Table 3: Schlote and Sharp AVEs

	[A]	[B]	[B/A]	[C]	[A*C]	[D]	[D/(A*C)]
	Gazette Price (s./qr.)	Implied Duty Payable (s.)	Schlote AVE	Wheat imports (quarters)	Value of imports (£)	Duty collected (£)	Sharp AVE
1828	60.42	26.67	44%	748750	2261849	66269	3%
1829	66.25	20.67	31%	1260683	4176013	587645	14%
1830	64.25	22.67	35%	1494382	4800702	493146	10%
1831	66.33	20.67	31%	1088797	3611178	260498	7%
1832	58.67	28.67	49%	166128	487308	193249	40%
1833	52.92	34.67	66%	1144	3027	1124	37%
1834	46.17	40.67	88%	264	609	324	53%
1835	39.33	47.67	121%	48	94	81	86%
1836	48.50	38.67	80%	972	2356	969	41%
1837	55.83	31.67	57%	210254	586959	297545	51%
1838	64.58	22.67	35%	1728453	5581462	134924	2%
1839	70.67	10.67	15%	2521494	8909280	631697	7%
1840	66.33	20.67	31%	2020215	6700379	724106	11%
1841	64.33	22.67	35%	2236153	7192959	384294	5%
1842	57.25	15	26%	2625491	7515467	1107700	15%
1843	50.08	20	40%	843739	2112864	601173	28%
1844	51.25	19	37%	781036	2001405	671033	34%
1845	50.83	20	39%	87701	222908	78344	35%
1846	54.67	4	7%	1903853	5203866	398550	8%
1847	69.75	4	6%	2622086	9144525	2047	0%
1848	50.50	7	14%	1818912	4592752	406935	9%
1849	44.25	1	2%	4450043	9845719	221441	2%
1850	40.25	1	2%	3682273	7410574	187712	3%
1851	38.50	1	3%	3754318	7227063	190714	3%
1852	40.75	1	2%	3013864	6140747	153002	2%
1853	53.25	1	2%	4840909	12888920	247569	2%
1854	72.42	1	1%	3379318	12235948	173140	1%
1855	74.67	1	1%	2627273	9808485	134312	1%
1856	69.17	1	1%	4011136	13871847	205401	1%
1857	56.33	1	2%	3385909	9536977	173770	2%
1858	44.17	1	2%	4177500	9225313	212091	2%
1859	43.75	1	2%	3940227	8619247	199814	2%
1860	53.25	1	2%	5791818	15420716	294178	2%
1861	55.33	1	2%	6808182	18835970	344886	2%
1862	55.42	1	2%	9325909	25840540	472998	2%
1863	44.75	1	2%	5537273	12389648	280870	2%
1864	40.17	1	2%	5272045	10588025	274973	3%
1865	41.83	1	2%	4764318	9965366	262098	3%
1866	49.92	1	2%	5262727	13134890	289340	2%
1867	64.42	1	2%	7874091	25361134	433056	2%
1868	63.75	1	2%	7418182	23645455	407548	2%
1869	48.17	0	0%	8567273	20632848	133059	1%
1870-1901			0%				0%
1902	28.08	1	4%	18409545	25850070	789763	3%
1903	26.75	0	0%	20029773	26789821	456424	2%
1904-1931			0%				0%

Notes:

For data sources see appendix.

1828 is from July 15.

Until 1849 all figures are based on foreign wheat released from bond.

From 1850 all figures are based on total imports.