When Britain turned inward: Protection and the shift towards Empire in Interwar Britain

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PROTECTION AND THE SHIFT TOWARDS EMPIRE IN INTERWAR BRITAIN

Alan de Bromhead
Alan Fernihough
Markus Lampe
Kevin Hjortshøj O'Rourke

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Alan de Bromhead, Alan Fernihough, Markus Lampe, and Kevin Hjortshøj O'Rourke
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ABSTRACT

International trade became much less multilateral during the 1930s. Previous studies, looking at aggregate trade flows, have argued that discriminatory trade policies had comparatively little to do with this. Using highly disaggregated information on the UK's imports and trade policies, we find that policy can explain the majority of Britain's shift towards Imperial imports in the 1930s. Trade policy mattered, a lot.

Alan de Bromhead
Queen's Management School
Riddel Hall
185 Stranmillis Road
Belfast
BT9 5EE
United Kingdom
a.debromhead@qub.ac.uk

Alan Fernihough
Queen's Management School
Riddel Hall
185 Stranmillis Road
Belfast
BT9 5EE
United Kingdom
a.fernihough@qub.ac.uk

Markus Lampe
Institute for Economic and Social History
Vienna University of Economics and Business
Welthandelsplatz 1, Geb. D4,
3. Stock, 1020 Wien/Vienna
markus.lampe@wu.ac.at

Kevin Hjortshøj O'Rourke
All Souls College
University of Oxford
Oxford OX1 4AL, UK
and NBER
kevin.orourke@all-souls.ox.ac.uk

1 Introduction

In a recent survey paper, Goldberg and Pavcnik (2016) note that trade economists have moved away from studying the impact of trade policy. They point out that this may partly reflect a belief that trade policy no longer matters, since by and large it has become so liberal.[1] But Pavcnik and Goldberg also note that studies estimating the impact of trade policies in the 1970s and 1980s, when these were not so uniformly liberal, suggest that they had no big effect then either. Does trade policy matter, they ask. Did it ever matter?[2]

If trade policy ever mattered, it surely did so during the interwar period. However, despite the ferocious reputation of interventions such as the United States' Smoot-Hawley tariff, the academic literature of the past twenty-five years has tended to downplay the impact of both tariff and non-tariff barriers to trade during the 1930s as well. Perhaps it is not so surprising that protection has emerged as a relatively minor contributor to the world trade collapse of 1929-33: world income and output fell by so much during this period that it can plausibly account for the majority of declining trade, leaving relatively little for rising trade barriers to explain.[3]

But the quantitative literature has also tended to downplay the impact of trade policy on a second striking feature of world trade during this period: its decreasingly multilateral nature. Table 1 gives the League of Nation's well-known data on the share of empires, or informal spheres of influence,

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[1]However, Bown and Crowley (2016) argue that substantial trade barriers in fact remain in place today.

[2]Goldberg and Pavcnik also suggest that economists may be reluctant to study the impact of trade policy because of endogeneity concerns regarding studies which relate bilateral aggregate trade flows to countries' membership, or otherwise, of the GATT or WTO – of which more later.

[3]See for example Irwin (1998). Irwin (2012) provides an excellent survey of the literature, and makes a spirited case for the importance of trade policy during the period. A companion paper to this one, focusing on the collapse in British trade during this period, will discuss this literature in detail.

Table 1: Share of formal and informal empire in trade, 1929-38

Trade of	Share of	In imports			In exports		
		1929	1932	1938	1929	1932	1938
United Kingdom	British Commonwealth, colonies, protectorates, etc.	30.2	36.4	41.9	44.4	45.4	49.9
United States	Phillippines	2.9	6.1	4.8	1.6	2.8	2.8
France	French colonies, protectorates and mandated territories	12	20.9	25.8	18.8	31.5	27.5
Belgium	Belgian Congo	3.9	3.8	8.3	2.6	1.3	1.9
Netherlands	Netherlands overseas territories	5.5	5	8.8	9.4	5.9	10.7
Italy	Italian colonies and Ethiopia	1.5	1.1	1.8	2.1	3.6	23.3
Portugal	Portuguese overseas territories	7.9	10.4	10.2	12.7	13.9	12.2
	Korea and Formosa	12.3	26.2	30	16.8	21.6	32.9
	Kwantung	6	4	1.6	4.8	6.8	13.7
Japan	Manchuria	1.9	2.7	9	2.5	1.5	8.1
	Rest of China	5.8	4	4.4	10.9	7.3	8
	Total Japanese sphere of influence	26	36.9	45	35	37.2	62.7
Germany	Bulgaria, Greece, Hungary, Romania, Turkey, Yugoslavia	4.5	5.5	12	5	3.9	13.2
	Latin America	12.2	11.2	15.6	7.8	4.3	11.5
	Total German sphere of influence	16.7	16.7	27.6	12.8	8.2	24.7

Source: League of Nations (1939, pp. 34-5)

in the trade of several leading countries between 1929 and 1938. As can be seen, these shares increased systematically in the wake of the Great Depression. Figure 1 shows the British Empire's share of UK imports between 1924 and 1938: the increase after 1931 is striking.[4] In the aftermath of World War II, policy-makers looking back at the period saw this tendency towards decreasing multilateralism as having been one of the most harmful features of the interwar economy, both economically and politically. Surely the trade policies of actual and aspirant empires had something to do with this shift in trade patterns?

In an early econometric contribution, Eichengreen and Irwin (1995) estimate cross-sectional gravity equations for 1928, 1935 and 1938, using aggregate trade data for 34 countries (and 561 bilateral flows). While they find that pairs of countries that both belonged to the British Commonwealth traded more heavily with each other, this effect was already present in 1928, before Britain moved to protection, and before the Ottawa agreements set in place preferential trade policies within the Empire (see Section 2 below). The coefficient on bilateral Commonwealth membership was higher in the 1930s than in 1928, but not greatly so: Eichengreen and Irwin conclude that "the tendency toward regionalization commonly ascribed to the formation of trade and currency blocs was already evident prior to the regional policy initiatives of the 1930s; to a considerable extent it is attributable to ongoing historical forces such as commercial and financial linkages between countries forged over many years. While there is some evidence that the formation of trade blocs diverted transactions toward fellow bloc members at the expense of trade with the rest of the world, this was only one of several factors at work" (p. 21).

Subsequent literature has largely reinforced this view. Wolf and Ritschl (2011) emphasise the fact that trade blocs, as well as the currency blocs

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[4]Ignore the series labelled "sample" for now. This refers to the Empire's share of UK imports in our data sample.

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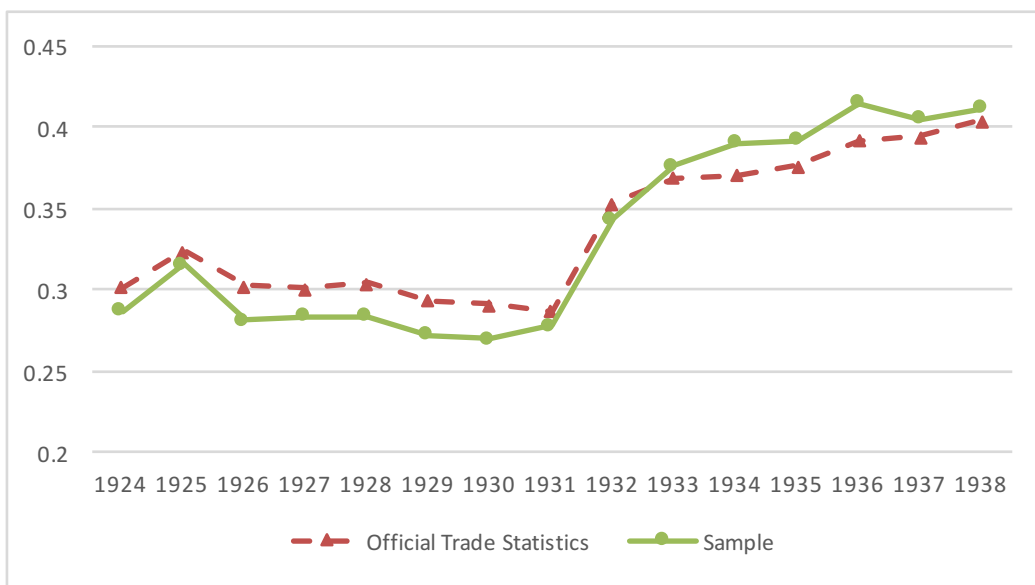
Figure 1: Share of British Empire in total UK imports, 1924-1938
Source: Statistical Office, H.M. Customs and Excise Department (1929; 1935; 1939).

that are the major focus of their paper, are endogenous; controlling for a bloc fixed effect, they find that the formation of the Ottawa trade bloc had no additional impact on trade flows between members.[5] Gowa and Hicks (2013), who use a much larger dataset on aggregate trade flows than the previous two studies, also conclude that "blocs made much less difference to trade than commonly assumed...None of them raised trade between their members as a whole...Nor do we find any evidence of the infamous beggar-thy-neighbor effects long attributed to them— that is, none diverted trade to member states from nonmembers" (p. 440). Gowa and Hicks do find that the British Imperial Preference System is a partial exception to this general rule, in that while it had no impact on trade between British Dominions, it did increase trade between the UK and the Dominions. (However, their analysis is potentially subject to the aforementioned objection that bloc membership was not randomly assigned across countries.) Surveying the literature, Irwin (2012, p. 141) concludes that "while discriminatory policies succeeded in shifting the pattern of trade, they may have been less important than might appear to be the case from table 3.2" (his version of Table 1).

In this paper we revisit the question of whether trade policy was responsible for the shift towards intra-Imperial trade, but adopt an entirely different empirical approach in tackling the issue. Rather than looking at the relationship between aggregate bilateral trade on the one hand, and country-pair bloc membership on the other, we study the actual (and discriminatory) trade policies pursued by one country, the United Kingom, in great detail. Rather than looking at whether trade blocs existed or not, we look at what one key member of one trade bloc actually did, and at what the effects of its policies were. Furthermore, since so much interwar protectionism consisted of non-tariff barriers to trade, affecting imports of particular commodities, and since tariff rates differed greatly across commodities, we use disaggregated, commodity-specific data on both trade and trade policies.

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[5]They use the same aggregate trade data as Eichengreen and Irwin (1995).

We therefore collected and digitized data on imports into the UK of 847 products from 42 countries between 1924 and 1938. These were then aggregated up, allowing us to construct an import database for 258 product categories that are consistently defined over time. We also collected bilateral, commodity and country-specific data on tariff and non-tariff barriers to trade for the same countries, products and years. The result is a dataset with 162,540 potential observations, although the value of many of these is of course zero. Because trade policies varied by commodity, year, and country, we can calculate elasticities of trade with respect to tariffs including both country times commodity, and commodity times year, fixed effects in the econometric specification.

Armed with these elasticities, we can then calculate a variety of counterfactual "free trade" or "constant policy" equilibria for individual years in the 1930s, which can be compared with the actual trade data. The model we use to calculate these counterfactual equilibria is straightforward: on the demand side we assume nested utility functions as in Broda and Weinstein (2006), while on the supply side a single production sector transforms the sole factor of production into domestically consumed output and exports via a constant elasticity of transformation (CET) production function.[6] In this manner we obtain estimates of the impact of protection on the share of the British Empire in the UK's imports.

We find that more than half of the increase in the Empire's share of UK imports can be attributed to trade policy. Policy accounted for almost 70% of the increase between 1930 and 1933. Our results are a vindication of traditional historical accounts, which argue that the increasingly bilateral nature of interwar trade was largely due to the policies pursued by governments.

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[6]The model is thus similar to that used by Anderson and Neary (1996) to calculate their Trade Restrictiveness Index, and like theirs it can be calibrated using information on just GDP and imports. It is simpler in that it only includes one, domestic input into production; it is more complicated in that there is a three tier nesting structure on the demand side, to take account of the fact that trade policies varied not only by good but also by country.

Whatever about the impact of trade policies on trade flows today, British trade policy mattered, a lot, during the 1930s.

Section 2 describes the dramatic shift in British trade policy which occurred between 1931 and 1933. The subseqent section describes the dataset which will be used to analyse the consequences of this shift. We will do so using the fairly standard theoretical framework described in Section 4, while Section 5 derives the key trade elasticities embedded in our model. Section 6 estimates the impact of British trade policies on the composition of British imports, and Section 7 concludes.

2   British interwar trade policy

Britain's long-standing free trade policy was abandoned during World War I. More importantly for our purposes, free trade did not resume in 1918. The 1915 McKenna Duty imposed a $33^1/3$ % *ad valorem* tariff on cars, clocks and watches, films and musical instruments, and was retained after the war. The 1920 Dyestuffs Industry Act required dyestuffs to be imported under license (National Institute of Economic and Social Research, 1943, 2-3). The 1921 Safeguarding of Industries Act introduced not only anti-dumping duties but tariffs, again usually $33^1/3$ % *ad valorem*, on imports of "key" goods considered to be essential for national security (including some chemicals, optical glass, magnets and tungsten) (Gordon, 1941, 10, 216-7). The Act also allowed industries to apply to the Board of Trade for "safeguarding" protection, although there were strict conditions attached and few industries benefitted from this provision. Post-war revenue duties were modestly protective in the cases of artificial silk, petrol and sugar. In 1925 a new set of duties for revenue purposes was introduced on (raw) silk, artificial silk and articles made thereof. In 1928 a new duty on imported hydrocarbon oils (crude and refined petroleum) was introduced, again for revenue purposes. This was initially levied on light oils only, but was subsequently extended to include heavy oils

as well (National Institute of Economic and Social Research, 1943, pp. 17-8). In 1926 pork imports from the European Continent were embargoed on veterinary grounds (Ashby and Jones, 1938b, p. 225). The 1927 Cinematograph Films Act included minimum quotas for British (or British Empire) films.[7]

There was a modest degree of Imperial Preference during this period: revenue duties were one sixth lower on goods produced in the Empire, McKenna duties were one third lower, "key" goods from the Empire were exempt from the 1921 duties, and safeguarding duties were also lower on Imperial products (Richardson 1936, pp. 88-90; National Institute of Economic and Social Research 1943, p. 3).

Notwithstanding these departures from 19th century practice, British trade policy remained predominantly liberal until 1930. The change that occurred in 1931 and 1932 was therefore all the more dramatic. In November 1931 the Abnormal Importations Act allowed the Board of Trade to impose tariffs of up to 100% *ad valorem* on manufactured goods from outside the Empire, and tariffs of 50% were immediately imposed on many of these. The Horticultural Products (Emergency Duties) Act soon followed, allowing the Minister of Agriculture to impose similar duties on non-Empire fruit, flowers and vegetables.

In February 1932 an Import Duties Act imposed a general 10% tariff on goods not already subject to duties, though some important primary imports were exempted. These included not only raw materials such as raw cotton, raw wool, hides and skins, iron ore, and scrap iron, but also tea, animals, and foodstuffs such as meat and wheat that would later become important in the Ottawa negotiations (Gordon, 1941, p. 219). Goods from British colonies were exempted, while imports from the self-governing Dominions were temporarily exempted pending the outcome of the Ottawa conference due to begin in July. The 10% general tariff was a minimum tariff, in the sense that a new Import Duties Advisory Committee could impose additional

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[7]Plant et al. (1939, p. II-41); Miskell (2005).

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duties.[8] They did so beginning in April and continued to do so subsequently, with Imperial goods generally being exempted.

The Ottawa conference opened on the 21st of July, and negotiations continued for roughly a month. Britain sought improved access in Dominion markets, while the Dominions sought preferential access to the UK market. As long as the UK maintained a free trade policy this had been impossible; however, as we have seen, the Import Duties Act had established Imperial Preference for those goods protected under its provisions. The Dominions' aim was thus to secure and if possible to improve their margin of preference for goods where preference had already been secured; and to establish a margin of Imperial Preference in markets for goods, such as meat and wheat, which were still admitted duty-free into the British market, and were of particular importance to them. The British, on the other hand, wished to improve their access to Dominion markets, and to retain a margin for manoeuvre when it came to potential future trade agreements with foreign countries.

The outcome was a series of bilateral trade agreements between the participants, the UK signing agreements with Canada, Australia, New Zealand, South Africa, Newfoundland, India and Southern Rhodesia (British Parliamentary Papers, 1931-32).[9] In broad terms, Britain agreed to maintain or raise tariffs imposed on foreign imports under the terms of the 1932 Import Duties Act, and not to reduce the 10% *ad valorem* tariff without the consent of the Dominions; to continue to exempt Empire products from these tariffs; and to introduce or enhance Imperial Preference on a wide range of agricultural commodities and raw materials of special interest to the Dominions, by raising duties or by protecting goods that had previously been duty free

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[8]The IDAC had to consult with the Board of Trade, and its decisions had to be sanctioned by the Treasury and Parliament (National Institute of Economic and Social Research, 1943, p. 5).

[9]Good accounts of the Ottawa negotiations and the eventual agreements are to be found *inter alia* in Drummond (1974), Gordon (1941, pp. 458-63), Richardson (1936, pp. 138-55), Richardson (1938), and Rooth (1993), on whom this account draws.

such as wheat (Drummond, 1974, pp. 266-268).

Quotas were introduced for several agricultural commodities, on the basis that policy needed to serve the interests of "the home producer first, Empire producers second, and foreign producers last" (Richardson, 1936, p. 138). Thus, imports from foreign countries of frozen mutton and lamb, and frozen and chilled beef, were to be subject to quotas from January 1 1933 (with total quantities reduced by 10% in the first year and 35% from 1934 to 1937, and then slightly increased), while Australia and New Zealand agreed to voluntarily restrain their exports to a certain extent.[10]

A report issued soon after the passage of the 1932 Import Duties Act on the future of the British pig industry recommended that imports of bacon and ham also be regulated quantitatively, and quantitative restrictions came into force during 1932: first via voluntary export restraint agreements with the eleven major supplying countries, notably Denmark, and from December 1933 onwards via quotas (Carter Murphy, 1957, p. 367; Cohen, 1934, p. 450; Plant et al., 1939, p. II-44).These restrictions were only enforced for non-Empire countries, although an agreement with Canada in 1932 had fixed a limit of 2.5 million cwt per year. This limit never became binding, however, since Canadian exports to Britain remained below that quantity.[11]

As the example of the bacon industry shows, domestic policies regulating individual agricultural industries could restrict trade, although protection was only adopted in some instances. For example, in May 1932 the Wheat Act guaranteed minimum prices to British wheat growers, and established the practice of deficiency payments that would continue into the post-1945

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[10]Both agreed to restrain their 1933 exports of frozen mutton and lamb to the level prevailing in the previous year, while New Zealand "estimated" that its frozen beef exports would increase by no more than around 10%. At least in 1934, these voluntary restrictions seem to have been ineffective. Initially not subject to the restrictions, imports of beef offal soon became subject to the beef quota system, so as to combat evasion of the quotas (National Institute of Economic and Social Research, 1943, pp. 108, 110)

[11]Due to the Anglo-Irish trade war substantial duties were imposed on Irish bacon between 1932 and 1938 (National Institute of Economic and Social Research, 1943, p. 98).

period. These were financed by levies on flour sales. The Act is sometimes described as protectionist (National Institute of Economic and Social Research, 1943, p. 6) and it did protect British wheat farmers by guaranteeing them higher prices, but it was not protectionist in the sense of restricting imports (Royal Institute of International Affairs, 1932, p. 189).

There were several other commodity-specific schemes introduced during the next few years following the introduction of the Agricultural Marketing Acts of 1931 and 1933.[12] The 1933 Act permitted the regulation of imports, and this was done in some cases (hops, potatoes, cured pork).[13] In 1935, imports of frozen and chilled pork became subject to quantitative controls under the terms of the Pork (Import Regulation) Order of 1935, based on the 1933 Agricultural Marketing Act (quotas in the case of foreign countries, and voluntary, if ineffective, export restraints in the case of Australia, Canada and New Zealand).[14] Imports of fish became subject to quantitative restrictions under the terms of the 1933 Sea Fishing Industry Act (Plant et al., 1939, pp. II-39, 40).

However, quantitative restrictions were not always introduced, despite New Zealand attempts to have quotas instituted in the cases of cheese and butter (Wheeler, 1937; Hancock, 1937, pp. 233-4). Under the terms of the Ottawa Accords Britain retained the right to impose quotas on the importation of dairy products, eggs and poultry, but in the case of butter and eggs never exercised this right, implying that Imperial Preference for these goods was the result of tariffs alone (Gøtrik, 1939, p. 47; National Institute of Economic and Social Research (1943, pp. 113-4)).[15] Nonetheless, there was

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[12]There were actually two such acts in 1933, although the second introduced "only minor modifications" (Cohen, 1934, p. 434).

[13]On hops and potatoes, which are not in our sample, see National Institute of Economic and Social Research (1943, pp. 99-105) and Wheeler (1937, p. 265).

[14]Ashby and Jones (1938b, p. 214); National Institute of Economic and Social Research (1943, p. 109).

[15]There were however some "negotiated standstill agreements" regulating the importation of eggs between 1933 and 1935 (Ashby and Jones, 1938b, p. 208). "Up to 30th September, 1934, there was a standstill arrangement on the basis of imports during the

some "voluntary" restriction of dairy products by some exporters "with the shadow of the 1933 Act behind them" Sorenson and Cassels (1936, p. 277).[16]

From 1933 onwards there was a series of trade agreements with various countries, notably the Scandinavian countries and Argentina. These typically secured trade concessions for Britain in return for her not worsening the positions of these countries any further in the British market than had already been done at Ottawa. In most cases agreements also included clauses regarding specific goods, in order to ensure that Britain would not discriminate in the future against important treaty partner export commodities. In most cases, these clauses remained ineffective since Britain did not greatly extend its quota and tariff system after 1932/33. For example, Denmark was guaranteed a minimum share of British imports of bacon and ham from foreign countries, but with no guarantee as to how large those foreign imports should be; and it was granted minimum quotas for butter and eggs in the event that imports of these commodities became subject to quantitative restriction – which eventuality did not arise, as we have seen. In May 1933 and December 1936 agreements were concluded with Argentina that guaranteed that country a minimum quantity and minimum quota of chilled beef

corresponding period of 1933. Subsequent arrangements provided for small reductions of varying amounts in total imports, but for the last quarter of 1935 there was a reversion to the standstill arrangement. The requests were not complied with in all cases, and no request was made to foreign countries after the end of 1935, since by that time the Reorganisation Commissions for Eggs and Poultry had reported and had not recommended the introduction of a general system of quantitative regulation of imports of eggs." Statement by Dr. Burgin, President of the Board of Trade, to the House of Commons, 16 February 1937 (http://hansard.millbanksystems.com/commons/1937/feb/16/eggs-imports, accessed 25 January 2015).

[16]The items concerned included condensed milk (whole and skimmed), milk powder and cream (Ashby and Jones, 1938a, p. 198), on which quotas were fixed based – for non-Empire countries – on imports between June 1932 and May 1933, stipulating annual percentage reductions in comparison to the base year. These reductions were initially between 25 and 40% depending on the product. In 1937 about 50 percent less cream and condensed milk, and approximately 20 percent less milk powder, was imported from foreign countries compared to the base year (National Institute of Economic and Social Research, 1943, p. 85). Special provisions were in force for Ireland from 1933 until the Irish Agreement of April 1938 gave Irish imports Empire status again (*ibid.*).

imports, and a minimum quantity of frozen beef imports (National Institute of Economic and Social Research, 1943, pp. 73, 107-8, 197-8).

Imports were sometimes blocked for more political reasons. Britain participated in the ill-fated League of Nations sanctions campaign against Italy, as a result of which imports from that country were banned between November 1935 and June 1936 (Ristuccia, 2000). Mention should also be made of the Anglo-Irish trade war which began in 1932, and which led to the imposition of emergency duties on imports of Irish agricultural commodities, notably cattle; duties were reduced in 1934, and the dispute ended in 1938, on terms highly favourable to the Irish (O'Rourke, 1991).[17]

3   Data

The basic problem with historical trade data is that the trade classifications used by the relevant national authorities are consistent neither across countries, nor over time. However, it is sometimes possible to construct import

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[17]In our econometric specifications we will also control for various cartel agreements that restricted imports, albeit as a result of private sector rather than government decisions. For example, a December 1934 agreement between the British and Polish coal industries established understandings regarding the two countries' coal exports. In June 1937 an International Coke Agreement limited coke exports for the main exporting nations (Plant et al., 1939, p. II-45). The best known of these cartels is the European Steel Cartel, which British iron and steel manufacturers joined in 1935. This included producers from Belgium, France, Germany and Luxemburg. As a result of Britain's joining the cartel iron and steel imports were limited, although cartel members benefitted in that they did not have to pay the higher tariffs imposed on the exports of non-cartel-members (Richardson, 1938, p. 130; Benham, 1941, pp. 69-70). Poland joined the cartel at about the same time as Britain, Czechoslovakia joined in 1936/7, and the US industry reached an agreement with the cartel in 1938 (Hexner, 1943, pp. 88-9, 207-8). (The Czech industry had earlier (1934) made agreements with the cartel concerning thick plates, medium plates and universal steel: *ibid.* p. 128.) The agreement initially ran from 8 August 1935 to 7 August 1938, and was eventually extended to 1940. The Import Duties (Iron and Steel) Regulation of 1936 substantiated this lower duty and limited the imports of steel from countries outside the agreement, especially the United States, to their 1934 level of imports (National Institute of Economic and Social Research, 1943, pp. 147-9; Benham, 1941, pp. 69-70). Details of the cartels in operation during this period, of relevance to our sample of commodities, are given in Appendix 4.

data that correspond to SITC categories: doing so requires that the trade categories reported at the time fall entirely within particular SITC categories, and that the available data allow us to capture all imports falling within a given SITC category. We collected data on all British imports, between 1924 and 1938, in 38 distinct 3-digit SITC categories.[18] These categories were chosen because of their importance in world trade generally, and also because it was possible to consistently calculate import values for each.[19]

In order to accomplish this goal we typed into spreadsheets import data from various volumes of the Annual Statement of Trade of the United Kingdom (Statistical Office, H.M. Customs and Excise Department 1929; 1935; 1939). For each year we collected import values for 847 individual product categories from 42 countries. For three of these countries (Spain, Malaysia, and the Dutch East Indies), we had to type in data for a total of 10 sub-regions, implying that we entered data for a total of 49 countries or sub-regions.[20] In principle this implied collecting 622,545 datapoints, although product categories tended to change over time, some vanishing and others appearing, implying that the actual number of datapoints collected was rather smaller. In addition, the value of many observations was zero. We excluded 34 of these items because of a variety of classification problems, or because no tariff data were available, or because there were no imports listed from our 42 country sample (just from "other" countries). This left a total of 812 products, which we were able to aggregate to produce import data which are consistently defined over time for 258 product categories. It is these 258 product categories that can be aggregated up to provide data

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[18]We are using the original Standard International Trade Classification, Revision 1, based on Statistical Office of the United Nations (1951; 1953).

[19]That is, the sub-categories of trade we needed to compute these values fell neatly within our 3-digit SITC categories, rather than spanning two or more categories; and we were able to capture all of the imports within each 3-digit category.

[20]In addition, imports from Burma were shown separately from 1937, and had to be added to imports from British India so as to produce consistent series. Appendix 2 lists the countries in our sample.

for our 38 SITC 3-digit categories. (Full details are provided in Appendix 1.) For example, our good number 232, "Wool. Raw. Sheep's and lambs' wool", was constructed using data for 22 separate items that appear in the trade statistics between 1924 and 1938. These include "Raw Materials and Articles Mainly Unmanufactured. Wool, raw, and waste, and woollen rags. Wool, raw, sheep's and lambs' wool, merino, scoured or carbonized; sliped or pulled"; "Wool, raw, sheep's and lambs' wool, merino, greasy"; "Wool, raw, sheep's and lambs' wool, crossbred. Greasy"; "Wool, raw, sheep's and lambs' wool, Other Sorts. Greasy"; and "Wool, raw, sheep's and lambs' wool, Cross-bred, Wool in the Fleece. Greasy". A complicating factor for this good was the fact that the statistics reported an increasingly detailed disaggregation over time. Good 232 falls under the 3-digit SITC heading 262 ("Wool and other animal hair"), as do our goods 222 to 235, which include the hair of other animals (alpaca, camel, mohair, horse, cow, goat, etc) and wool in different conditions (such as noils, waste, rags, flocks and tops). Thankfully, there are also series which are presented consistently over time, and for which there is only one original trade statistics item coresponding to one of our 258 goods.

The products span the entire range of the goods imported by Britain. In the analysis that follows, we will often distinguish between four broad categories: agricultural products such as wheat or meat; manufactured goods such as copper or machinery; raw materials such as coal, fertilizers, raw cotton or oilseeds; and "exotic" or "colonial" goods, on which revenue tariffs were levied. (Tariffs on goods such as tea, coffee, sugar and tobacco were traditionally very high, reflecting highly inelastic demand.)[21]

As Figure 2 indicates, our sample accounts for a relatively stable percentage of total British imports in each year. On average, our 258 commodity

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[21]Raw silk and petroleum were also included in this category, since although they were raw materials, they became subject to tariffs that were much higher than the tariffs applied to raw materials generally, presumably for revenue-raising reasons. Full details of this four-category classification are provided in Appendix 1.
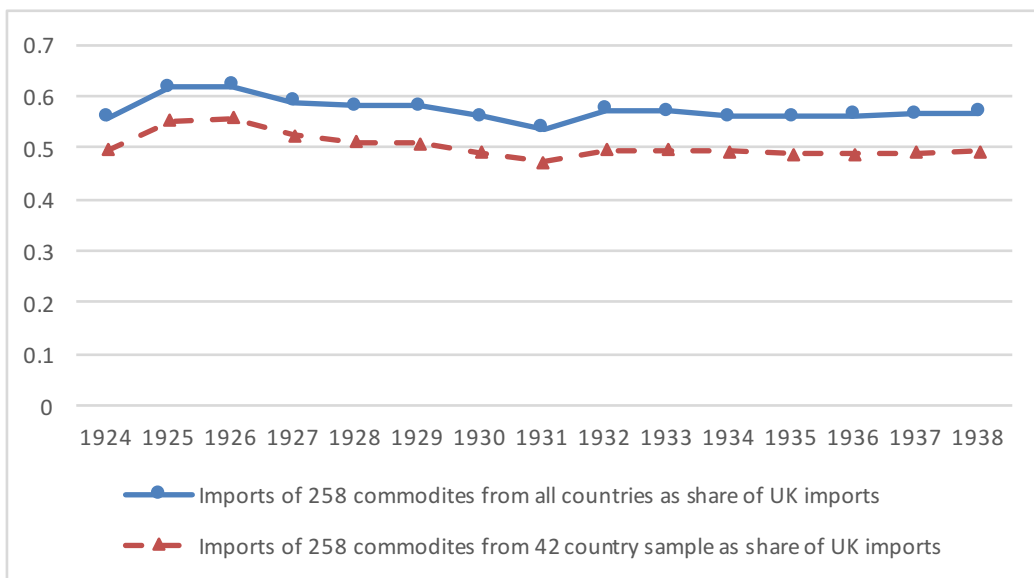
Figure 2: Percentage of total imports covered by our sample, 1924-1938
Source: see text.

sample accounts for about 57% of British imports during the period, while imports of these 258 commodities from our 42 country sample accounts for roughly 50%. The sample thus mirrors the fall and rise of British imports in the years after 1929. Table 2 shows that our sample roughly matches the aggregate data in terms of its percentage breakdown between our four broad categories (agricultural goods, manufactured goods, raw materials, and revenue imports), although we are under-sampling manufactured imports, and to a lesser extent raw materials, and over-sampling revenue imports.[22] As Figure 1 shows, our sample faithfully tracks the share of the British Empire in UK imports over time.

Following Broda and Weinstein (2006), we will refer in what follows to

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[22]This is because imports of manufactures are extremely heterogeneous, and disaggregated into a large number of individual items in the trade statistics. This is also the case for some raw materials (e.g. there are many varieties of medicinal plants and chemical substances). On the other hand, revenue goods are rather concentrated.

Table 2: Percentage of total imports by broad category

	Agriculture	Manufactures	Raw materials	Revenue goods
In our sample				
1924	35.9	13.6	32.5	18.0
1925	35.9	14.7	33.8	15.6
1926	34.5	14.5	34.6	16.5
1927	37.3	17.1	28.0	17.6
In the official trade statistics				
1924	35.4	20.6	30.9	13.2
1925	34.6	21.7	31.7	12.0
1926	34.3	21.8	31.2	12.7
1927	34.8	23.5	28.2	13.4

Source: see text.

each of our 258 product categories as a *good*, and to imports of each of these goods from a particular country as a *variety*. Unfortunately, successive volumes of the British trade statistics seem to have differed in the extent to which they separated out imports of particular goods from marginal suppliers; over time they seem to have increasingly lumped these into the "Other countries" category. This makes it impossible to replicate Broda and Weinstein's analysis of the evolution of the intensive and extensive margins. The number of goods imported into the UK diminished over time: from 255-258 in 1924-8, to 247 or 248 in 1929-1932, to 237 or 238 in 1934-38. Again, these successive declines correspond with successive volumes of the trade statistics.

Nonetheless, it seems that the intensive margin accounted for essentially all of the trade collapse, and subsequent recovery. For example, take the volume of trade statistics covering the years 1929-33: within this volume, the reporting of countries and goods was consistent over time. The number of varieties imported into the UK was 1338 in 1929, 1354 in 1930, 1339 in 1931, 1319 in 1932 and 1298 in 1933. The total number of varieties imported thus fell by only 3% between 1929 and 1933.[23] More systematically, we can

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[23]In the 1924-28 volume, the number of varieties ranged from 1605 to 1645; in the

decompose the decline in UK imports between 1929 and 1933 in the manner of Kehoe and Ruhl (2013, p. 380). When we compute the log change of the total imports of those varieties which are traded in both years, which we take to be the intensive margin, and compare this with the log change in the total value of all imports, we find that the intensive margin can account for the entire decline in trade. When we repeat the exercise for 1929-36, we find that the intensive margin can still account for 98.9% of the decline in trade – despite the classification problems associated with moving across volumes.[24] Our modelling strategy will thus focus on the intensive margin.

Tariff information was also reported in the Annual Statement, but in a different table from the trade data, and unfortunately not at as disaggregated a level as the 847-product import data. Additional information on rates of duty and exemptions was obtained from schedules included in National Institute of Economic and Social Research (1943) and H.M. Customs and Excise (1933, 1938).

Some matching of tariff rates to individual products was required, which was done at the closest level possible to the import data. For example, tariff information was given for "Cotton Linters and Cotton Waste". This rate was then applied to all individual series covered by this category (e.g. Cotton Linters, bleached) unless a specific exemption was identified.

To calculate *ad valorem* tariff rates for each item, two approaches were implemented. Where possible, the tariff rate was calculated as the total amount of duty raised, divided by the value[25] of non-Empire goods charged with duty as recorded in the Annual Statement. In the small number of cases where the rate could not be determined by this method, it was calculated as the specific duty rate divided by the unit value (import value divided by import quantity).

Quantitative restrictions, including the veterinary embargos from 1926

1934-38 volume, it ranged from 1107 to 1127.

[24]Details available on request.

[25]Or the quantity subject to duty multiplied by the average price.

and the ban on imports from Italy in 1935-6[26], were coded based on National Institute of Economic and Social Research (1943, pp. 95-114, 267). We also used this source to code voluntary export restraints, alongside the more detailed sources given in Section 2 above. In all cases quantitative restrictions were coded simply as dummy variables, indicating whether or not a particular restriction affected imports of a particular good from a particular country in a particular year. Details are given in Appendix 3.

As mentioned in Section 2, Britain signed a number of trade treaties with countries such as Argentina and Denmark. We therefore coded two variables relating to these treaties. The first simply indicates whether a trade treaty had been signed and was in force between the UK and the country in question in a particular year (it thus varied across countries and years, but not across commodities). The second indicates whether such a treaty explicitly mentioned a commodity, imports of which from that country were subject to British quota restrictions in that year. It therefore varies across countries, years and commodities, and is designed to test whether treaties muted the impact of quotas on imports. Full details of these two variables, and the sources used to code them, are given in Appendix 5.

In our regressions, we also controlled for exchange rates and nominal GDP. Nominal exchange rates were calculated as annual averages of closing daily exchange rates, and were taken from Global Financial Data.[27] Nominal GDP was taken from Klasing and Milionis (2014), adjusted for interwar borders using the adjustment coefficients from Broadberry and Klein (2012).

4 Theoretical framework

As Broda and Weinstein (2006) (whose notation we largely use) and others do, we consider a representative agent with a nested CES utility function

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[26]Except for gold, silver, bullion, books, magazines and newspapers.
[27]https://www.globalfinancialdata.com/index.html, accessed June 2013.

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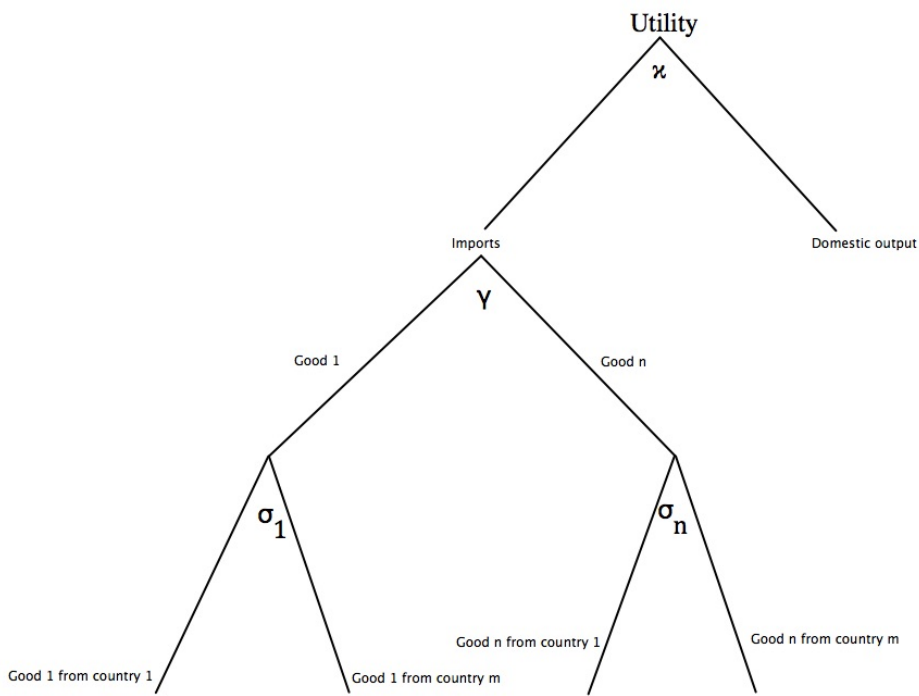
Figure 3: Nested utility function

(see Figure 3). At the top level, utility in period t, U_t, depends on the consumption of a domestic good D_t, and of an aggregate imported good M_t:

$$U_t = (\alpha_{Dt} D_t^{(\kappa-1)/\kappa} + (1 - \alpha_{Dt}) M_t^{(\kappa-1)/\kappa})^{\kappa/(\kappa-1)} \qquad (1)$$

where κ is the elasticity of substitution between the two goods.

At the second level, the aggregate imported good is defined as being a CES composite of imported goods $g \in G_t$ where G_t is the set of all goods imported in period t:

$$M_t = (\sum_{g \in G_t} \alpha_{gt} M_{gt}^{(\gamma-1)/\gamma})^{\gamma/(\gamma-1)} \qquad (2)$$

γ is the elasticity of substitution between imported goods, while M_{gt} represents total imports of good g in year t.

Finally, M_{gt} is defined as an Armington aggregate of imports of good g from different countries c, each of which (following Broda and Weinstein) we refer to as a *variety*:

$$M_{gt} = (\sum_{c \in I_{gt}} \beta_{gct} m_{gct}^{(\sigma_g-1)/\sigma_g})^{\sigma_g/(\sigma_g-1)} \qquad (3)$$

Here m_{gct} represents imports of good g from country c in year t; $I_{gt} \subset C$ is the subset of all countries C supplying good g to the UK in year t; the β_{gct}'s are taste parameters; and σ_g is the Armington elasticity of substitution between different varieties of good g. For the sake of simplicity, we will assume that I_{gt} (and also G_t) is fixed $\forall g, t$: we are therefore holding the extensive margin of trade fixed. This should not greatly influence our results, given that, as Section 3 showed, Britain's trade collapse and subsequent recovery occurred almost entirely along the intensive margin.

On the supply side, we adopt a simplified version of the model suggested by Anderson and Neary (1996). The economy is endowed with just one factor of production, which we will label GDP_t. This is transformed into two

goods, an export good X_t and the domestic good D_t, via a constant elasticity of transformation production function:

$$GDP_t = (\alpha^D D_t^{(1+\eta)/\eta} + (1 - \alpha^D)X_t^{(1+\eta)/\eta})^{\eta/(1+\eta)} \tag{4}$$

where η is the elasticity of transformation between the two outputs, and α^D is the benchmark share of domestic good production in GDP.

We will initially assume that the UK takes world import prices, *inclusive of non-policy-related transport costs*, p_{gct}^W, as given. Domestic prices are then given by

$$p_{gct}^D = \tau_{gct} \times p_{gct}^W \tag{5}$$

where $(\tau_{gct}-1)$ is the *ad valorem* policy-related trade cost (that is to say, costs associated with tariff and non-tariff barriers to trade) applying to imports of good g from country c in year t. Let these policy-related trade costs be defined as follows:

$$\tau_{gct} = (\prod_{i=1}^{n} b_i^{\delta_{igct}}) \times (1 + t_{gct}) \tag{6}$$

where $b_i - 1$ is the *ad valorem* equivalent of facing non-tariff barrier i; δ_{igct} is an indicator variable taking the value 1 if imports of good g from country c face barrier i in year t, and zero otherwise; and t_{gct} is the *ad valorem* tariff imposed on imports of good g from country c in year t.

Given domestic prices p_{gct}^D, it is straightforward to derive prices of the Armington aggregates M_{gt}, $p_{M_{gt}}$, and of the composite aggregate imported good M_t, p_{M_t}. The representative agent is endowed with GDP_t and receives all tariff revenue, as well as any rents associated with non-tariff barriers to trade (i.e. quota rents). He/she maximises utility given by equation (1) subject to the usual budget constraint, while producers maximise $p_{D_t}D_t + p_{X_t}X_t$ subject to (4).

Units are defined so that all domestic prices are initially one, implying that world prices are equal to $1/\tau_{gct}$. Given data on τ_{gct}, m_{gct}, and GDP_t, all remaining parameters in the model (in particular the β_{gct}'s and α^D) can be pinned down, and the general equilibrium for the economy solved. For example, this can be done for a year when protection was in place, say 1935. We can then compute a variety of counterfactual equilibria. For example, we could set $\tau_{gc1935} = 1 \forall g, c$ and $\delta_{gc1935} = 0 \forall g, c$ and compute a counterfactual, free trade equilibrium for 1935.

Our main interest is in the share of imports coming from the Empire. Given our nested CES demand structure, κ and η are irrelevant to this, although they matter for the total level of imports. We therefore set the elasticity of transformation to 5, as in Anderson and Neary (1996); and set κ equal to 1.5, as in Levchenko et al. (2010, p. 227). This allows us to focus on the other two elasticities in the model, which matter for our results. We will estimate σ_g econometrically, and explore the sensitivity of our results to changes in γ.

5 Econometric results

In order to estimate the σ_g's in equation (3) above, we begin with the structural gravity equations (4)-(6) presented in Anderson and Yotov (2010, pp. 2159-60), bearing in mind that in all cases the destination country is the UK. Using our notation, their equation (4) becomes:

$$V_{gct}^D = \frac{M_{gt} \times Y_{gct}}{Y_{gt}} \times \left(\frac{\tau_{gct}}{P_{gt} \times \Pi_{gct}} \right)^{1-\sigma_g} \tag{7}$$

where $V_{gct}^D = p_{gct}^D \times m_{gct} = \tau_{gct} \times p_{gct}^W \times m_{gct}$ is the value of imports of good g from country c in year t, measured in domestic (UK) prices; Y_{gct} is the output of good g in country c in year t; Y_{gt} is world output of good g in year t; P_{gt} is the inward multilateral resistance term for good g in the UK in year

23

t; and Π_{gct} is the outward multilateral resistance term for good g in country c in year t.

One issue that we have to confront is that our import data are c.i.f., and valued at world prices, inclusive of transport and other trade costs not related to British trade barriers. We are not interested in these other trade costs, since we are holding them fixed in our analysis. We cannot multiply our import value data by τ_{gct}, to obtain imports valued at (policy-inclusive) domestic prices as do Caliendo and Parro (2014, p. 15), since τ_{gct} includes quota rents which we will be estimating econometrically. We therefore prefer to work with the original c.i.f. trade data. Our dependent variable is thus:

$$
V_{gct}^{W} = p_{gct}^{W} \times m_{gct} = V_{gct}^{D}/\tau_{gct} = \frac{M_{gt} \times Y_{gct}}{Y_{gt}} \times \tau^{-\sigma_g} \times \left(\frac{1}{P_{gt} \times \Pi_{gt}} \right)^{1-\sigma_g} \quad (8)
$$

Substituting (6) into (8), and taking logs, we obtain:

$$
ln(V_{gct}^{W}) = ln(M_{gt}) + ln(Y_{gct}) - ln(Y_{gt}) - \sigma_g ln(1 + t_{gct}) - \sigma_g \sum_{i=1}^{n} ln(b_i)\delta_{igct}
$$

$$
- (1 - \sigma_g)ln(P_{gt}) - (1 - \sigma_g)ln(\Pi_{gct}) + u_{gct} \quad (9)
$$

where u_{gct} is the error term. Good times year fixed effects are used to control for M_{gt}, Y_{gt} and P_{gt}. Intuitively, by controlling in this manner for total imports of a given good in a given year (e.g. wheat in 1933), we are focussing on the choice between, say, Canadian and Argentinian wheat in 1933, which is what we want to do in order to estimate σ_g. Since we do not have data on foreign outputs of individual commodities, we are forced to use GDP instead (so we replace Y_{gct} with GDP_{ct} in equation (9) above). We also control for the bilateral exchange rate, E_{ct}. Finally, since we only have data for one country, the UK, we are unable to include time-varying outward multilateral

resistance terms. We therefore include good times country (i.e. variety) fixed effects, in the place of Π_{gct}. Our estimating equation is thus:

$$ln(V_{gct}^W) = ln(GDP_{ct}) + ln(E_{ct}) - \sigma_g ln(1+t_{gct}) - \sigma_g \sum_{i=1}^{n} ln(b_i)\delta_{igct} + d_{gt} + d_{gc} + u_{gct}$$
(10)

where d_{gt} and d_{gc} represent good times year, and good times country, fixed effects.

In principle equation (10) should be estimated for every good (in which case the good times country, and good times year, fixed effects would collapse into country and year fixed effects), but we lack sufficient observations to do this. We therefore estimate across categories of goods g, assuming a common elasticity σ_g for all goods within this category. We begin by computing the elasticites for four broad categories: agricultural goods; manufactures; raw materials; and "colonial" goods subject to revenue tariffs. We follow Santos Silva and Tenreyro (2006), and use a PPML estimator to estimate (10). Since we are including both good times country and good times year fixed effects, we estimate the equations using the poi2hdfe estimator available in Stata (Guimaraes and Portugal, 2010; Figueiredo et al., 2015). Appendix 6 establishes that our econometric and simulation results are robust to alternative estimators.[28]

The results, given in Table 3, seem reasonable. We control for the Italian trade sanctions of 1935-6, and the foot and mouth disease embargo instituted in 1926. Both had a severe negative impact on trade flows. Signing a trade

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[28]A potential concern might be that tariffs rose disproportionally on goods whose imports rose more, or fell less, during the preceding period. If rising imports prior to 1931 were for some reason correlated with import trends after 1931, our estimated trade elasticities would be biased. Table 10 in Appendix 6 shows that this is not an issue: there was absolutely no correlation between import trends during 1928-31 and the change in tariff rates after 1931. Note also that the UK does not fit the argument in Eichengreen and Irwin (2010) according to which countries that stayed on the gold standard longer were more protectionist.

Table 3: PPML gravity estimates by broad category, 1924-1938

Broad category	(1) Agricultural	(2) Manufacturing	(3) Raw Materials	(4) Revenue
Log(1 + tariff)	-5.174***	-6.411***	-17.47***	-1.690***
	(1.818)	(1.275)	(2.669)	(0.458)
Quota	-1.008***			
	(0.337)			
Embargo	-3.858***			
	(0.645)			
VER	-0.165			
	(0.187)			
Treaty	0.0425	0.0772	0.239*	0.185
	(0.192)	(0.291)	(0.134)	(0.328)
Quota*treaty	0.0865			
	(0.150)			
Cartel		-0.892***	-0.643	0.280
		(0.246)	(0.446)	(0.199)
Italian sanctions	-2.655***	-2.271***	-5.739***	-2.803***
	(0.173)	(0.193)	(0.253)	(0.236)
Log(GDP)	0.493	-0.816	-2.127**	2.131***
	(0.483)	(0.831)	(0.935)	(0.790)
Log(exchange rate)	0.110	0.114	0.129	0.270
	(0.213)	(0.238)	(0.286)	(0.242)
Observations	3,853	13,468	8,820	2,906

Note: dependent variable is the value of imports, by good, country and year. Estimates control for good*country and good*year fixed effects. Estimates computed using poi2hdfe. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

treaty with the UK boosted raw materials exports to Britain, but otherwise had no direct impact on trade. As mentioned in Section 3, we also coded a second variable relating to trade treaties: this was equal to one if a trade treaty that a country signed with the UK mentioned a good which was subject to quotas at that time. Neither this variable, which is something like an interaction effect between treaties and quotas[29], nor a dummy indicating whether imports of commodities were subject to a voluntary export restraint, had any effect on trade flows.[30]

Our main interest, however, is in the impact of British trade policy. All the elasticities of trade with respect to tariffs are negative and highly statistically significant. The fact that the elasticity is so much lower for goods subject to revenue tariffs makes sense, as is the fact that the raw materials elasticity is so high. On the other hand, we were surprised that the agricultural elasticity was slightly lower than the manufacturing one. Quotas also had a highly significant impact on agricultural imports. The coefficient on the agricultural tariff variable ($-\sigma_g$) and on the quota dummy variable jointly imply (from equation (10)) that quotas were equivalent to a 21.5% ad valorem tariff. Interestingly, cartel membership had almost as big an impact on manufactured imports.[31]

Table 4 provides similar estimates for nine narrower categories. 'Grain' includes barley, maize, wheat and rice (SITC categories 041-044); 'Animal' includes butter, eggs and meat (SITC categories 011, 012, 023, and 025); 'Machinery' includes SITC categories 711, 712, 714-716, and 721; 'Minerals' includes metals, coal and petroleum (SITC categories 311-313, 681, and 682); 'Textiles' includes both yarn and cloth (SITC codes 651-653); 'Miscellaneous

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[29]Although it is separately coded, rather than being mechanically computed as an interaction effect, since not all treaties mentioned the same goods.

[30]The coefficients are correctly signed, but small and statistically insignificant.

[31]One possible reason for the lower agricultural elasticities might in principle be the presence of binding quotas. However, estimating equation (10) without those agricultural goods subject to quotas did not change our results. (Romalis (2007, p. 424) finds something similar.)

Table 4: PPML gravity estimates by narrow category, 1924-1938

Narrow category	(1) Grain	(2) Animal	(3) Machinery	(4) Minerals	(5) Textiles	(6) Misc. inputs	(7) Misc. industry	(8) Food oils	(9) Colonial
Log(1 + tariff)	-9.567**	-3.908***	-4.533**	-2.533***	-1.861	-4.905*	-7.995***	-23.47***	-1.468***
	(4.829)	(1.489)	(1.951)	(0.779)	(3.350)	(2.787)	(2.509)	(3.098)	(0.533)
Quota		-0.900***							
		(0.225)							
Embargo		-3.808***							
		(0.684)							
VER		-0.0554							
		(0.193)							
Treaty	0.161	-0.0905	-0.0322	-0.404	-0.121	0.222**	-0.0906	0.777***	-0.799
	(0.263)	(0.194)	(0.0739)	(0.312)	(0.186)	(0.108)	(0.642)	(0.293)	(0.530)
Quota*treaty		0.234							
		(0.216)							
Cartel			-0.123	-1.011***	-0.0964				0.352***
			(0.254)	(0.321)	(0.583)				(0.131)
Italian sanctions	-7.174***	-2.435***	-2.581***	-21.53***	-2.309***	-3.952***	-2.654***	-3.526***	-19.21***
	(0.372)	(0.172)	(0.0700)	(0.244)	(0.227)	(0.159)	(0.233)	(0.348)	(0.418)
Log(GDP)	1.287	0.106	0.996***	1.763**	1.766***	0.620	0.953	0.429	1.590**
	(0.794)	(0.456)	(0.309)	(0.810)	(0.373)	(0.576)	(0.765)	(0.721)	(0.709)
Log(exchange rate)	0.135	0.103	0.132	0.277	0.103	0.0622	0.542	0.0755	0.492
	(0.367)	(0.153)	(0.167)	(0.240)	(0.257)	(0.241)	(0.684)	(0.310)	(0.354)
Observations	1,122	2,731	6,186	4,334	3,595	6,202	700	2,795	1,197

Note: dependent variable is the value of imports, by good, country and year. Estimates control for good*country and good*year fixed effects. Estimates computed using poi2hdfe. Robust standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

inputs' includes such items as fertilisers, rubber, hides and skins, raw cotton and silk, and hair (SITC codes 211, 231, 261-263, 271, and 561); 'Miscellaneous industry' includes vehicles and rubber manufactures, including tyres (SITC codes 629, 713, and 732); 'Food oils' includes oils and oilseeds of various kinds (SITC codes 221 and 412); and 'Colonial' includes coffee, sugar, tea and tobacco (SITC categories 061, 071, 074, and 121). Once again the results seem fairly sensible; trade elasticites were particularly high for grains and food oils, and particularly small for textiles and colonial goods.[32] Trade treaties were associated with higher imports in the cases of miscellaneous inputs and food oils; cartel membership lowered imports of "mineral" products; curiously, the cartel coefficient is positive for colonial goods.[33] The coefficients in column (2) imply that the presence of a quota was equivalent to an *ad valorem* tariff of 25.9%.

6   Trade policy counterfactuals

Armed with the trade elasticites estimated in the previous section, we can now turn our attention to calculating the impact of Britain's adoption of protection in 1931, and the subsequent Ottawa accords, on the pattern of British imports, using the model outlined in Section 4. For each year, we solve the model using the actual tariffs and quotas in place during that year, and then compute equilibria for various counterfactual sets of tariffs and quotas.[34]

First, we explore the impact of the changes made to British trade policy from 1931 onwards, using the elasticities for our four broad categories of goods implied by Table 3. We start with the impact of tariffs. To this end,

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[32]On the other hand, the coefficient is also relatively small for minerals. Perhaps this might be due to the widespread cartels in the sector.

[33]The cartel in question was the Chadbourne sugar agreement, which the UK joined in late 1937.

[34]The model is solved using MPSGE as a subsystem of Gams (Rutherford, 1999). The GAMS code is available on request.
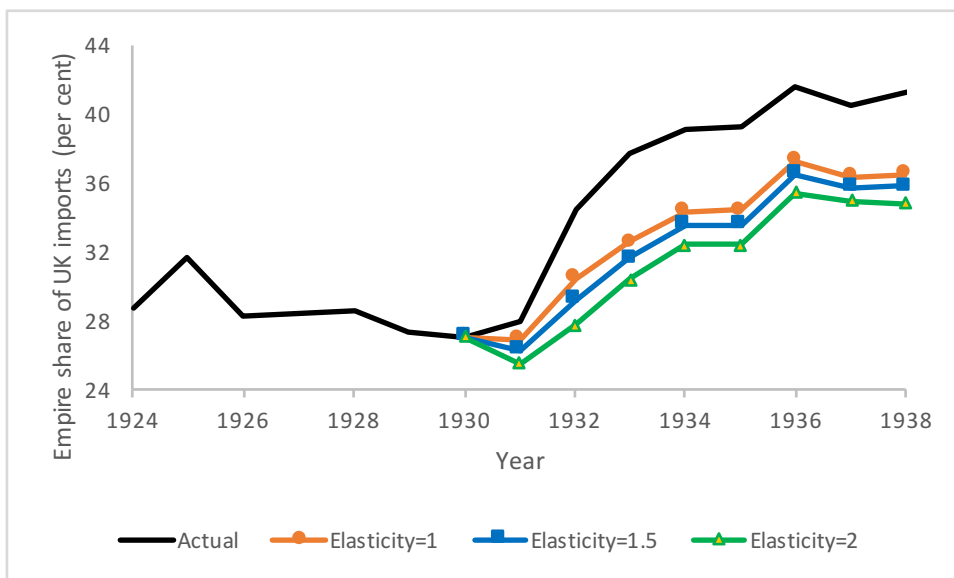
Figure 4: The impact of changes in tariff policy after 1930

we begin by setting tariffs and quotas equal to their actual values for every year between 1924 and 1930. However, in 1931 and subsequent years, *ad valorem* tariffs for each commodity and country are frozen at their 1930 values. (Quotas are however maintained at their actual levels, so as to focus on the impact of tariffs only.) Figure 4 graphs the actual Empire share of British imports between 1924 and 1938, and the counterfactual share holding tariffs fixed at their 1930 levels. It does so using the Armington elasticities, σ_g, estimated in Table 3, and using three values for γ, the elasticity of substitution in the "middle level" CES utility nest defined by equation (2) above.

As can be seen, tariffs mattered a lot for the evolution of the Empire's share of British imports. For example, between 1930 and 1935 this share rose from 27% to 39%. However, if Britain had not instituted higher and more discriminatory tariffs from 1931 onwards, it would only have increased to 34% (assuming an elasticity of substitution between goods of 1) or to as little as 32% (assuming $\gamma = 2$).

What if tariffs had not been increased after 1930, and quotas had not
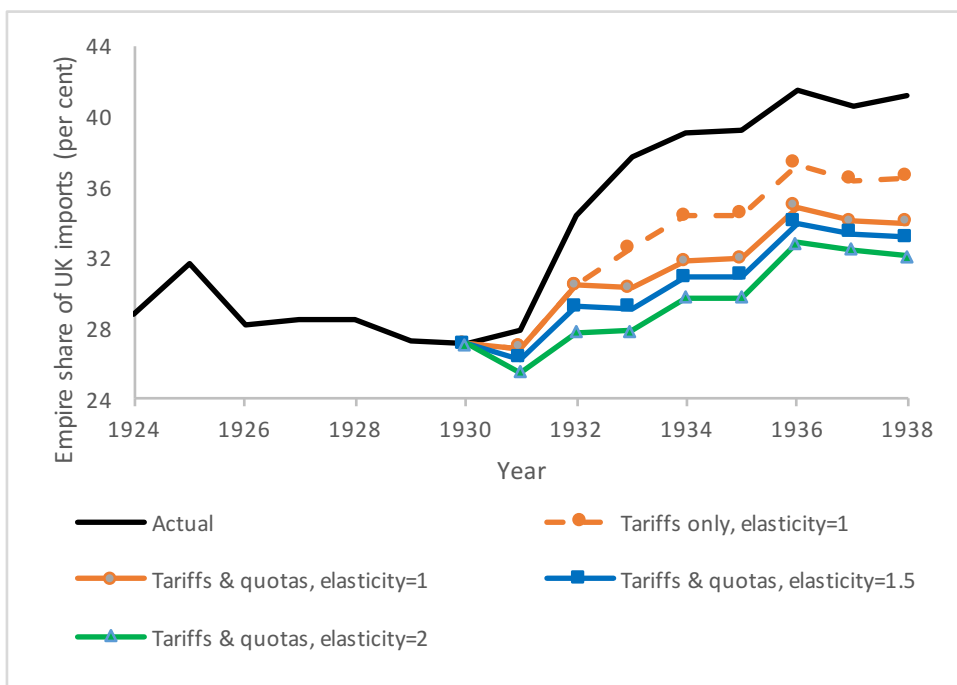
Figure 5: The impact of changes in trade policy (tariffs and quotas) after 1930
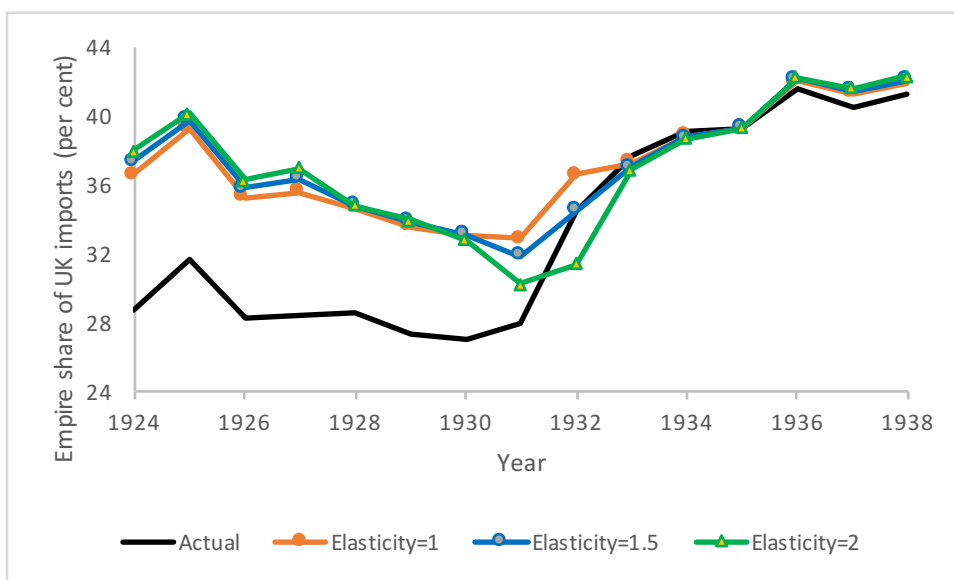
Figure 6: Impact of imposing 1935 trade policies throughout the period

been introduced either? Figure 5 shows what the share of Empire would have been under this counterfactual scenario; for the sake of comparison, it also plots the impact of freezing tariff policies only, as in Figure 4. As can be seen, quotas further increased the Empire's share of British trade, by some two percentage points. If trade policy had remained frozen at its 1930 level, the Empire would have accounted for between 30% ($\gamma = 2$) and 32% ($\gamma = 1$) of UK imports in 1935, whereas in fact it accounted for 39%. Assuming that γ was equal to 1, trade policy accounted for 70% of the shift between 1930 and 1933, and 60% of the shift between 1930 and either 1934 or 1935. On the other hand, as Figures 4 and 5 show, the Empire would have continued to increase its share of British imports in the late 1930s, perhaps reflecting geopolitical tensions, or the trade diversion associated with other trade blocs.

An alternative is to ask: what would the share of the Empire in UK imports have been before 1930, had the policy shift of 1931-1932 happened earlier? To answer this question, we fix all tariffs and quotas at their 1935 levels for each year. Not surprisingly, the Empire's share would have been a

32

lot higher under this scenario: between 34 and 35% in 1928, as opposed to the actual figure of 28.5% (Figure 6).

Finally, we can ask what the Empire's share of UK imports would have been if Britain had pursued strictly free trade policies thoughout. Setting all tariffs and quotas equal to zero leads to the counterfactual Imperial shares plotted in Figure 7. As can be seen, these are substantially lower than the shares actually observed: under free trade the Empire's share would have been 25% in 1935 if $\gamma = 1$, or as low as 13% if $\gamma = 2$. Two features of this counterfactual experiment are particularly noteworthy. First, there would only have been a very modest increase in the Empire's share under free trade during the 1930s. Second, while γ had only a small impact on the counterfactuals plotted in Figures 4 through 6, it matters a lot for the free trade counterfactual. This is consistent with the observation that changes in trade policy over time varied less across goods than the level of trade policy.[35]

Finally, what if we had used the elasticites implied by Table 4? It would be disconcerting if our results depended greatly on the level of aggregation used in computing elasticites. Fortunately, little changes (although more disaggregation strengthens our results). The counterfactual Empire shares under the "no policy shift in 1931" scenario are lower than those plotted in Figure 5, implying that policy mattered more than the previous discussion suggested. However, the effect is small.[36] Basing our counterfactual analysis on Table 3 is conservative, but not excessively so.

7   Conclusion

Previous papers have looked at the interwar relationship between trade bloc membership and bilateral trade flows, and concluded that trade blocs mat-

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[35]For example, the variance across goods in the unweighted tariff was 0.031 in 1929 and 0.035 in 1935, whereas the variance across goods in the change in the tariff between 1929 and 1935 was 0.011.

[36]See Appendix 6.
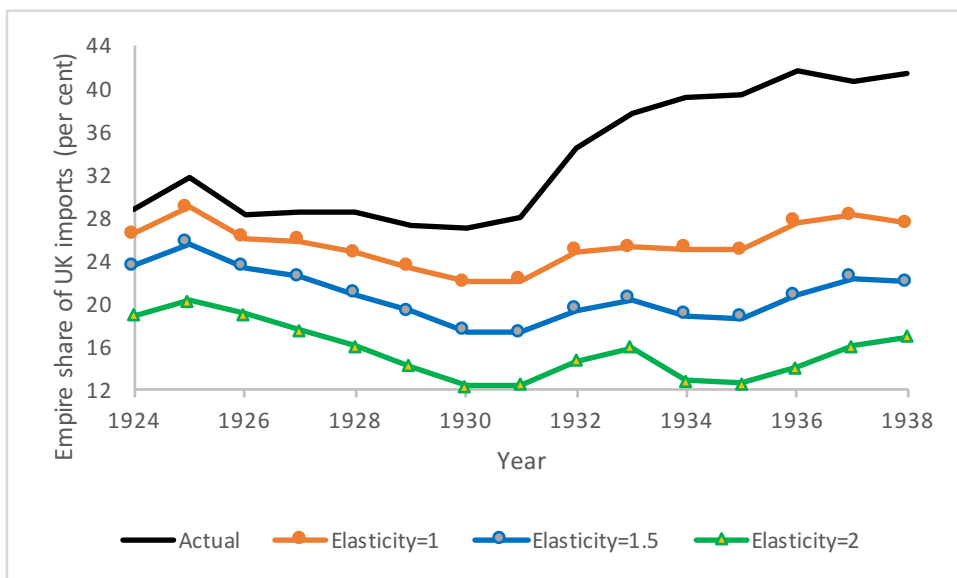
Figure 7: Impact of imposing free trade throughout

tered less than traditionally thought. Membership in these blocs was not randomly assigned; controlling for a "trade bloc" fixed effect, equal to one both before and after the formation of the bloc, leaves little for the formation of the bloc to explain.

In this paper we have looked at the relationship between British trade policies, and British imports, using detailed information on 258 product categories. Controlling for country times product (or "variety") fixed effects, as well as for product times year fixed effects, we have found that the shift towards protection in 1931 and 1932 substantially increased the share of UK imports coming from the British Empire. Changing British trade policies can explain about 70% of the increase in the Empire's share of UK imports between 1930 and 1933. Later on in the decade, other forces served to increase that share still further, but the impact of British protectionism, and the discriminatory trade policies agreed at Ottawa, remained substantial. As late as 1938, those policies can still account for around 50% of the shift towards Empire experienced since 1930.

Methodologically, this paper suggests that there are substantial advantages to using disaggregated data, and to looking at what trade blocs do, as opposed to simply looking at whether they exist or not. Historically, the paper suggests that interwar trade policy mattered more for trade patterns than the cliometric literature has suggested. It certainly mattered a lot in the British case; whether what was true for the UK was true elsewhere as well is a question which we hope that future research will address.

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Appendix 1. Commodity classification

An Appendix Table, available at http://tinyurl.com/hlx9v4b, contains a list of the 812 products which entered our dataset, and indicates how these data were subsequently aggregated. The first column gives the original product categories for which we collected data. The second column shows, for each of these products, what the product category was in which it was eventually included. There are 258 of these product categories. The third column shows the SITC 3-digit category in which each of our 258 product categories belong, and the fourth column indicates whether the product was classified by us as being agricultural, manufactured, a raw material, or a "colonial" or revenue good. We are using the original Standard International Trade Classification,

Revision 1, based on Statistical Office of the United Nations (1951; 1953), since this is more appropriate for this period than more recent revisions.

In order to compare our sample with the (aggregate) official trade statistics, as in Table 2, we needed to provide definitions for these four categories that applied to the aggregate trade statistics as well as to our sample. We did so as follows:

- Agricultural: defined as SITC 0-1 (incl. alcoholic and non-alcoholic beverages and tobacco), but some items were subsequently classified as "revenue imports" and classified separately (see below). For practical reasons we also included living animals not used for food (SITC category 921), which in the British case mainly means bees (but none of these were in our sample).

- Raw materials: SITC 2-4

- Manufactures: SITC 5-8.

- We defined the following items as tropical foodstuffs (often subject to revenue duties) and revenue goods (commodities in italics are part of our sample):

  - Tapioca, arrowroot, sago, and the like (duty-free in 1924)

  - Cotton seed cake and meal (duty-free in 1924)

  - Seeds, feeding: Dari or Durra, Dhol or Pigeon Pea, Gram or chick; Millet (duty-free in 1924)

  - Fruits and nuts: Bananas, Brazil nuts, Pineapples (duty-free in 1924)

  - Spices (cinnamon, ginger, pepper, cloves, other) (duty-free in 1924)

  - Cocoa (raw, husks and shells, butter), as well as Cocoa preparations: bars and blocks, confectionary, etc. (dutiable in 1924)

- *Coffee* (all sorts, also prepared and mixed with chicory) (dutiable in 1924)

- Rum (dutiable in 1924)

- *Sugar, unrefined* (this includes beetroot sugar), refined, molasses (all dutiable in 1924) as well as Glucose, Saccharin, Caramel (dutiable in 1924)

- Chutney (dutiable in 1924)

- Coconuts, sugared (dutiable in 1924)

- Fruit, preserved in sugar: Pineapples (dutiable in 1924)

- Ginger, preserved in sugar or syrup (dutiable in 1924)

- *Tea* (dutiable in 1924) and Tea for the manufacture of caffeine (dutiable in 1924)

- *Tobacco*, unmanufactured (dutiable in 1924) and tobacco, manufactured (dutiable in 1924)

- *Sugar, articles containing*, not for use as food. (duty-free in 1924)

- *Petroleum* (lamp oil, motor spirit, lubricating oil, gas oil, fuel oil, etc); mineral jelly; paraffin wax; lubricating oils, mixed, n.e.s (all dutiable from 1924)

- *Crude petroleum* (dutiable from 1928 only)

- *Raw silk under different names* (changing in 1925): Silk raw, knubs, noils and waste; Silk cocoons and waste of all kinds (undischarged, wholly or partly discharged; noils); Silk raw, discharged, wholly or in part discharged. (all dutiable from 1 July 1925)

Imitation rum and other alcoholic beverages (brandy, etc.) were not classified as revenue imports, but are not in our dataset anyway.

Another problem is that the SITC classification was not in use at the time. Fortunately, the British classification is quite similar to the SITC

Rev. The broad group I (Food drink and tobacco) corresponds to SITC 0+1; II (Raw materials and articles mainly unmanufactured) matches SITC 2-4 and III matches SITC 5-8 (Manufactures). Category IV, animals, not for food, includes items (breeding animals) that SITC groups under 0, and some other animals (bees, elephants, etc.) that fall under SITC 9. We include these in food for our purpose, but the overall amount is very small and as mentioned earlier they are not in our sample. We ignore item V (Parcel post) since its composition is unknown; this would fall under SITC category 911. Small values of platinum and gold leaves are included in the British statistics under III.D (non-ferrous metals and manufactures thereof), and should probably be excluded as per SITC, but we have not taken them out. Deviations between SITC and British classification led to the following regrouping: 1. From I.E (food) into SITC 412 (raw materials): vegetable oils, other than essential, refined, edible (coconut oil, cottonseed oil, ground nut oil, olive oil, palm oil, palm kernel oil, other sorts, n.e.s); 2. From II.N (raw materials) to SITC 074 (food): tea for the manufacture of caffeine; 3. From III.A. (manufactures) to SITC 311 (raw materials): coke, manufactured fuel; 4. From III.N. (manufactures) to SITC 292 (raw materials): ipecacauanha, other roots, chinchona bark, nux vomica, aloes, ergot of rye, opium, senna, etc.; 5. From III.T (manufactures) to SITC 271 (raw materials): guano, manufactured, and compound manufactures (including bonemeal, etc.); 6. From III.T (manufactures) to SITC 061 (food): sugar, articles containing, not for use as food; 7. From IV.T (Animals, not for food) to SITC 001-09 (food): breeding animals (bulls, cows and heifers, calves, sheep and lambs, swine); horses; others (bees, etc. the latter should officially be under 921, but their total amount is negligible). Unclear, but left in food: 8. I.E oleo-margarine and oleo-oil, and refined tallow (premier jus et al.). Margarine is in 091-01 (food); oleo-oil and premier jus would be in 411-02 (raw materials).

Appendix 2. List of countries used in the analysis

The table below provides a list of the 42 countries used in our analysis, and indicates how they were described in the original sources. In some cases we had to type in data for several regions to calculate the data for one country. In the case of Spain, we summed over the Canary Isles and Spain; in the case of Malaysia, we summed over British Borneo, the Malay States, the Straits Settlements, and (if reported as such) the British East Indies ; and in the case of the Dutch East Indies we summed over Dutch Borneo, Dutch New Guinea, Java, and other Dutch possessions in the Indian Seas.

Countries in dataset	As described in original sources
Algeria	Algeria
Argentine Republic	Argentine Republic
Australia	Australia
Austria	Austria
Belgium	Belgium
Brazil	Brazil
British India	British India
British West India Islands - Bahamas, Jamaica and Dependencies, Trinidad and Tobago, and others	British West India Islands - Bahamas, Jamaica and Dependencies, Trinidad and Tobago, and others
Canada	Canada

Chile	Chile
China (exclusive of Hong Kong, Macao and leased territories)	China (exclusive of Hong Kong, Macao and leased territories)
Colombia	Colombia
Cuba	Cuba
Czechoslovakia	Czechoslovakia
Denmark (incl. Faroe Islands)	Denmark (incl. Faroe Islands)
Dutch East India	Dutch Borneo; Dutch New Guinea; Java,; Other Dutch Possessions in the Indian Seas
Dutch West India Islands	Dutch West India Islands
Egypt	Egypt
France	France
Germany	Germany
Hong Kong	Hong Kong
Hungary	Hungary
Italy	Italy
Japan (including Formosa and Japanese leased territories in China)	Japan (including Formosa and Japanese leased territories in China)
Luxemburg	Luxemburg

Malaysia (British Borneo, Malay States, Straits Settlements, British East Indies)	British Borneo - State of North Borneo, Brunei, Sarawak; Malay States - Federated and Unfederated (Johore, Kedah, Perlis, Kelantan, Trengganu); Straits Settlements and Dependencies (incl. Labuan); British East Indies
Mexico	Mexico
Netherlands	Netherlands
New Zealand	New Zealand
Norway	Norway
Persia	Persia, Iran
Poland (incl. Dantzig)	Poland (incl. Dantzig)
Roumania	Roumania
Soviet Union (Russia)	Soviet Union (Russia)
Spain	Spain, Canary Islands
Sweden	Sweden
Switzerland	Switzerland
Turkey, European and Asiatic	Turkey, European and Asiatic
Union of South Africa (incl. South West Africa Territory)	Union of South Africa (incl. South West Africa Territory)
United States of America	United States of America
Venezuela	Venezuela
Yugoslavia	Yugoslavia

Appendix 3. Non-tariff barriers to trade

The table below lists the non-tariff barriers to trade in operation during our period, affecting imports of those goods which are in our sample. In each case, the table provides the product categories, countries, and years concerned.

Panel A. Quantitative Restrictions		
Good (see Appendix 1)	Countries	Years
Meat. Bacon	All non-empire	1933-8
Meat. Beef	All non-empire	1933-8
Meat. Ham	All non-empire	1933-8
Meat. Lamb. Frozen	All non-empire	1933-8
Meat. Mutton	All non-empire	1933-8
Meat. Pork. Frozen	All non-empire	1935-8
Panel B. Voluntary Export Restraints		
Good (see Appendix 1)	Countries	Years
Eggs. in Shell	All non-empire	1934
Eggs. not in Shell. Albumen	All non-empire	1934
Eggs. not in Shell. Dried (except Albumen)	All non-empire	1934
Eggs. not in Shell. Liquid or Frozen	All non-empire	1934
Meat. Bacon	Canada	1933-8
Meat. Lamb. Frozen	Australia, New Zealand	1933-8
Meat. Pork. Frozen	Australia, Canada, New Zealand	1935-8
Panel C. Embargo		
Good (see Appendix 1)	Countries	Years
Meat. Lamb. Fresh	All continental Europe (Austria, Belgium, Czechoslovakia, Denmark (incl. Faroe Islands), France, Germany, Hungary, Italy, Luxemburg, Netherlands, Norway, Poland (incl. Dantzig), Romania, Soviet Union (Russia), Spain, Sweden, Switzerland, Yugoslavia)	1926-38
Meat. Pork. Fresh	All continental Europe (as above)	1926-38
Panel D. Italian Sanctions		
Good (see Appendix 1)	Countries	Years
All 258 goods	Italy	1936

Source: National Institute of Economic and Social Research (1943, pp. 75-121, p. 267).

Appendix 4. Cartels

The table below provides data on the cartels with British membership in operation during this period, affecting the goods in our sample. International producer cartels in which the United Kingdom (mostly through significant business associations) was a member were coded from Suslow (2005, Appendix 1). This was supplemented by information on primary goods, and especially international sugar cartels, in Dye and Sicotte (2006), US Secretary of Agriculture (1933), and Rowe (1965); and by details on individual manufactured goods cartels in Benham (1941, pp. 69-70), Barbezat (1989, 1991), Kudo (1994), Schröter (2012), and British Parliamentary Papers (1937, p. 117). We only include formal cartel agreements concluded by UK domestic producers, trade organizations, or the government; we exclude unsuccessful "attempts at cartelization" as defined by Haussmann and Ahearn (1944), such as that in petroleum, as well as cartels in which the UK was not involved.

Cartel	Countries	Good (see Appendix 1)	Years
International Agreement Regarding the Regulation of Production and Marketing of Sugar, September 1937	Australia; Belgium; Brazil; British India; China (exclusive of Hong Kong, Macao and leased territories); Cuba; Czechoslovakia; Dutch East; India; France; Germany; Hungary; Poland (incl. Dantzig); Soviet Union (Russia); Union of South Africa (incl. South West Africa Territory); United States of America; Yugoslavia	Molasses and invert sugar; Sugar. Articles containing. Not for use as food; Sugar. Refined; Sugar. Unrefined. Beetroot; Sugar. Unrefined. Cane and other sorts	1938
Coal	Poland (incl. Dantzig)	Coal	1935-8

Phosphate rock	Algeria, Egypt, France, Netherlands, United States	Fertilizers. n.e.s.. Phosphate of lime and rock phosphate	1933-8
Nitrogen, Convention Internationale de l'Azote (CIA), 1	China (exclusive of Hong Kong, Macao and leased territories); Germany; Netherlands	Potassium compounds. Nitrate; Sodium compounds. Nitrate	1929-30
Nitrogen, Convention Internationale de l'Azote (CIA), 2	Belgium; Czechoslovakia; France; Germany; Italy; Norway; Netherlands; Poland (incl. Dantzig)	Potassium compounds. Nitrate; Sodium compounds. Nitrate	1930-1
Nitrogen, Convention Internationale de l'Azote (CIA), 3	Belgium; Czechoslovakia; France; Germany; Italy; Norway; Netherlands; Poland (incl. Dantzig); Switzerland; China (exclusive of Hong Kong, Macao and leased territories); Japan (including Formosa and Japanese leased territories in China) (China and Japan from 1934)	Potassium compounds. Nitrate; Sodium compounds. Nitrate	1932-8
Synthetic nitrogen	China (exclusive of Hong Kong, Macao and leased territories); Germany; Norway, United States	Potassium compounds. Nitrate; Sodium compounds. Nitrate	1926-38

Ferrosilicon	Czechoslovakia, France, Germany, Norway, Sweden, Switzerland, United States, Yugoslavia	Ferro-Alloys. Other Descriptions	1929-38
Linen Thread	Czechoslovakia, France, Germany, Switzerland	Linen Thread	1926-38
Rayon	Germany, Italy	Silk and artificial silk yarn	1927-38
European or Inter-national Steel Cartel	Austria, Belgium, Czechoslovakia, Germany, Hungary, Luxemburg, Netherlands, Poland (incl. Dantzig)	Ingots. Other than of special steel; Iron and Steel. Hoop and Strip; Iron and Steel. Plates and Sheets; Iron. Blooms, Bars, Angles, shapes, sections etc.; Special steel. Ingots, Blooms, Bars, Angles etc.; Steel. Blooms, Bars, Angles, shapes, sections etc.	1935-8
Copper (refined) 1	France, Germany, United States	Copper. Bars, blocks, slabs, ingots, and cakes - Elektrolytic; Copper. Bars, blocks, slabs, ingots, and cakes - Other	1927-1929
Copper (refined) 2	Belgium, France, United States	Copper. Bars, blocks, slabs, ingots, and cakes - Elektrolytic; Copper. Bars, blocks, slabs, ingots, and cakes - Other	1932

Copper (refined) 3	Belgium, France, United States	Copper. Bars, blocks, slabs, ingots, and cakes - Elektrolytic; Copper. Bars, blocks, slabs, ingots, and cakes - Other	1935-8
Electric cables (high tension)	Austria, Belgium, Czechoslovakia, Denmark (incl. Far_e Islands), France, Germany, Hungary, Italy, Netherlands, Norway, Poland (incl. Dantzig), Spain, Sweden, Switzerland	Electric wires and cables, insulated	1928-1938
Heavy electrical equipment	Germany, Switzerland, United States	Converters and transformers, incl. Coils, Rotary; Converters and transformers, incl. Coils, static; Electrical machinery. Generators; Starting, control, magnetos and switch gear	1931-8
Incandescent electric lamps	France, Germany, Hungary, Netherlands	Electric Lamps and parts thereof	1925-38

Appendix 5. Trade treaties

We have coded two variables to take account of the existence of trade treaties. The first, labelled "Treaty" in Tables 3 and 4, is designed to account for the existence of treaties concluded to mitigate the impact of the Import Duties Act and the Ottawa Agreements from 1932. We identified such treaties on the basis of National Institute of Economic and Social Research (1943, pp. 172-9). We then read the original treaty texts as published in the British Parliamentary Papers (http://parlipapers.proquest.com/; see below for the Command Paper Number identifying them). Based on this reading, we constructed a second dummy variable, labelled "Quota*treaty" in Tables 3 and 4, which is equal to one if a treaty in force mentions the good in question, in the context of quantitative restrictions on imports of that good into Britain, if indeed such quantitative restrictions are in force. For example, the Roca-Runciman treaty of May 1933 secured a certain level of market access for chilled beef from Argentina. Quantitative restrictions on beef imports had been in force in Britain since 1 January 1933, so "Quota*treaty" was coded as '1' for "beef" imported from Argentina between 1933 and the end of the sample (the treaty was renewed in 1936). On the other hand, "salted beef", which is a separate good, was not mentioned in the treaty (and was not in any case subject to quantitative restrictions). It was thus coded as '0' throughout. For both variables, treaties had to be in force during at least six months in a year to be taken into account. A treaty concluded with the US in November 1938 was therefore too late to be entered into the dataset.

Note: The command number in the table below identifies the treaty document in the House of Commons Parliamentary Papers dataset.

	Panel A. Treaty		
Country	Years	Goods	BPP command number
Argentine Republic	1932-38	Eggs. in Shell / Hair. Horse / Maize / Meat, Lamb, Frozen / Meat. Beef / Meat. Mutton / Wheat / Wool. Raw. Alpaca, Vicuna and Llama / Wool. Raw. Camels' Hair / Wool. Raw. Mohair / Wool. Raw. sheep's and lambs' wool / Wool. Raw. Wool noils / Wool. Raw. Wool waste	4492; 4494; 5324
Denmark	1933-38	Butter / Eggs. in Shell / Eggs. not in Shell. Albumen / Eggs. not in Shell. Dried (except Albumen) / Eggs. not in Shell. Liquid or Frozen / Meat. Bacon / Meat. Ham	4424; 5400
France	1934-38	Silk and artificial silk textiles	4632
Norway	1933-38	Butter / Eggs. in Shell / Eggs. not in Shell. Albumen / Eggs. not in Shell. Dried (except Albumen) / Eggs. not in Shell. Liquid or Frozen / Meat. Bacon / Meat. Ham / Meat. Poultry and Game	4500
Poland	1936-38	Butter / Eggs. in Shell / Eggs. not in Shell. Albumen / Eggs. not in Shell. Dried (except Albumen) / Eggs. not in Shell. Liquid or Frozen / Meat. Bacon / Meat. Ham / Meat. Poultry and Game / Sugar. Unrefined. Beetroot	4984; 5599
Sweden	1933-38	Butter / Eggs. in Shell / Eggs. not in Shell. Albumen / Eggs. not in Shell. Dried (except Albumen) / Eggs. not in Shell. Liquid or Frozen / Meat. Bacon / Meat. Ham	4401

Appendix 6. Robustness exercises and pre-trends

Our benchmark results, reported in the body of the paper, use PPML methods to estimate trade elasticities, in line with the literature. However, we are mindful of the injunction in Head and Mayer (2014) to use a variety of methods when estimating these elasticities. Unfortunately, our specification involves so many fixed effects that we are unable to use the Gamma PML or EK Tobit estimators (we were only able to implement PPML methods because of the poi2hdfe routine developed by Guimaraes and Portugal (2010) and Figueiredo et al. (2015)). However, we did re-estimate the trade elasticities using OLS methods and observations with positive trade values. We also re-estimated them by interacting category dummies with tariff rates, in the context of regressions using all available observations (as opposed to splitting the sample and running one regression per category, which is our preferred method and the one used in the results reported in the main body of the text). Tables 7 and 8 show that while the trade elasticities for particular commodity categories change when different methods are used, the results are broadly speaking quite robust.

What is more important for our purposes is to establish to what extent our estimates of the impact of British trade policy on the direction of trade depend on the econometric methods used to estimate the trade elasticities. Table 9 therefore reports the share of the shift towards the Empire, between 1930 and 1933, that can be explained by the trade policy shift after 1930. It does so using the trade elasticities produced by all four estimation methods, for both our four broad and nine narrower commodity categories.[37] As can be seen, our results are extremely robust, with the results clustering around the 70 per cent figure cited in the main body of the text. Note that as the level of disaggregation used increases, the importance of policy rises.

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[37]There are two coefficients in Table 8 which are insignificantly positive. Both occur in specifications pooling across all commodity categories. In these two cases, we assume that the relevant trade elasticity is zero.

Table 7: Robustness excercises: trade elasticities, broad categories

Method	(1) Agriculture	(2) Manufacturing	(3) Raw materials	(4) Colonial
PPML	-5.174***	-6.585***	-17.77***	-1.690***
	(1.820)	(1.329)	(2.327)	(0.459)
PPML, pooled with interaction effects	-5.237***	-5.238***	-13.74***	-1.559***
	(1.397)	(1.304)	(2.204)	(0.404)
OLS	-6.019**	-3.805**	-7.492*	-0.796
	(2.824)	(1.788)	(4.324)	(0.721)
OLS pooled with interaction effects	-6.577**	-3.217**	-9.424***	-0.932
	(2.743)	(1.523)	(2.839)	(0.771)

Note: dependent variable is the value of imports, by good, country and year (or the log of imports in the case of the OLS regressions). Estimates control for good*country and good*year fixed effects. PPML estimates computed using poi2hdfe. Robust standard errors clustered by country in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Finally, Table 10 shows the results of regressing the change in tariffs between 1931 and 1933 on the change in imports between 1928 and 1931. As can be seen, there is absolutely no correlation between these two variables.

Table 8: Robustness excercises: trade elasticities, narrow categories

Method	(1) Grain	(2) Animal	(3) Machinery	(4) Minerals	(5) Textiles	(6) Misc. inputs	(7) Misc. industry	(8) Food oils	(9) Color
PPML	-9.567**	-3.908***	-4.533**	-2.533***	-1.861	-4.905*	-7.995***	-23.47***	-1.468
	(4.829)	(1.489)	(1.951)	(0.779)	(3.350)	(2.787)	(2.509)	(3.098)	(0.53)
PPML, pooled with interaction effects	-7.669**	-4.456***	-1.672	-2.937***	-2.135*	0.712	-7.081**	-15.05***	-1.435
	(3.200)	(1.132)	(1.569)	(0.813)	(1.261)	(2.488)	(2.866)	(2.241)	(0.48)
OLS	-6.008	-6.289**	-1.896	-0.889	-3.986	-9.128**	-5.399	-7.136	-2.400
	(6.095)	(2.584)	(2.213)	(0.804)	(3.889)	(3.869)	(3.383)	(4.582)	(1.18)
OLS pooled with interaction effects	-5.286	-7.324***	0.491	-2.055*	-3.610*	-7.312**	-5.368*	-9.790***	-1.62
	(4.761)	(2.504)	(2.281)	(1.073)	(1.850)	(3.099)	(3.093)	(3.322)	(1.28)

Note: dependent variable is the value of imports, by good, country and year (or the log of imports in the case of the OLS regressions). Estimates control for good*country and good*year fixed effects. PPML estimates computed using poi2hdfe. Robust standard errors clustered by country in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Percentage of shift towards Empire, 1930-33, explained by trade policy shift, using different trade elasticity estimates

Econometric method	PPML	PPML with interactions	OLS	OLS with interactions
Broad categories	70.0	69.8	64.9	68.8
Narrow categories	72.2	75.3	65.3	67.8

Table 10: Relationship between import changes, 1928-31 and tariff changes, 1931-3

Broad category	(1) All goods	(2) Agriculture	(3) Manufacturing	(4) Raw materials	(5) Colonial goods
Log change in imports, 1928-31	0.00783	-0.00538	-0.00179	0.00228	0.0132
	(0.00524)	(0.00357)	(0.00240)	(0.00243)	(0.0346)
Constant	0.0841***	0.0608***	0.153***	0.0345***	-0.133***
	(0.00492)	(0.00570)	(0.00273)	(0.00321)	(0.0429)
Observations	1,225	147	611	357	110
R-squared	0.004	0.013	0.001	0.003	0.002

Note: dependent variable is the log change in tariffs, 1931-33