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Stéphane Becuwe, Bertrand Blancheton, and Christopher M. Meissner  
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**ABSTRACT**

France and Great Britain signed the Cobden Chevalier treaty in 1860 eliminating import prohibitions and lowering tariffs with Britain. This policy change was unexpected by French industry and entirely free from lobbying efforts. A series of commercial treaties with other nations followed in the 1860s lowering tariffs with France's largest trade partners. We study the dynamics of French trade patterns using product level exports and imports for France with all partners and at the bilateral level before and after these tectonic trade policy shocks. We find a significant rise in intra-industry trade in leading manufactured products. Cotton, woolen and silk cloth "held their ground," rising imports being met with rising exports. Rather than shifting or destabilizing French patterns of specialization, liberalization allowed for an expansion of exports in differentiated products. The findings are consistent with the "smooth adjustment" hypothesis. The return to discussion of higher tariffs from 1878 should not be regarded as a backlash to international competition, but rather the outcome of anti-competitive protectionist lobbying.

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## 1. Introduction

How do industries react and survive in the wake of extreme trade liberalization? Over the last thirty years the global economy has rapidly and substantially reduced tariffs and scaled back sundry trade barriers. China's integration into the WTO and establishment of most-favored nation status with the US after 2001 is alleged to have caused great dislocation in American labor markets (Autor et. al., 2013; Feenstra and Sasahara, 2017). Besides this massive shock, globalization and integration has greatly intensified since the 1970s. Naturally, studies of these trade shocks and the adjustment process in terms of patterns of specialization, labor markets and political economy have proliferated.

What can we learn from history and the first wave of globalization? In 1860 France and Great Britain unexpectedly signed the revolutionary Cobden-Chevalier treaty dramatically decreasing tariffs in both countries on a large set of important products. British tariffs on French wine and many other key manufactured goods were lowered. Numerous French prohibitions for key industries such as cotton and woolen cloth and cotton thread were substituted for lower tariffs. After signing the treaty of 1860, France signed over a half dozen other bilateral commercial treaties in the 1860s, all of them featuring a Most Favored Nation (MFN) clause.

Recent research by Markus Lampe (2009) has convincingly demonstrated that these trade treaties promoted trade in the targeted products and in proportion to the way in which liberalization unfolded.<sup>1</sup> Undoubtedly international competition stiffened. In terms of adjustment, less is known. There is a significant economic history literature about the "grain invasions" and the subsequent "tariff backlash" (e.g., Gourevitch, 1977 and O'Rourke, 1997). This work argues that inexpensive grain imports from New World producers, and lower overall trade costs raised international competition. In France, and in Germany too, farmers and industrial interests formed politically powerful coalitions demanding higher tariffs from 1879 (Germany) or from 1878 (France).<sup>2</sup> The long delay between Cobden Chevalier and the rise in French tariffs in 1892 raises the question of whether these tariffs

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<sup>1</sup> Flandreau and Accominotti (2008), studying aggregate trade in the period, found little effect of trade treaties. Aggregation bias may be responsible for the difference between their findings and Lampe's.

<sup>2</sup> Not all countries raised tariffs after the 1870s. Great Britain, the Netherlands, Denmark, and Belgium stayed staunchly in favor of low trade barriers. See Henriksen et. al (2012) on Denmark and Huberman (2008) on Belgium. France resisted higher tariff proposals throughout the 1870s and 1880s waiting instead until 1892 to make drastic changes to the liberal policies of the 1860s (Smith, 1980).

were a response to the 1860s or not. We believe they were not. Two potential answers for the absence of a more immediate reaction are: the liberalization was not very significant; or the adjustment costs of the shock were politically and economically tolerable.

As we discuss below, for France, the liberalization clearly was significant. 1860 was a major watershed in the history of trade policy for many other countries as well. Moreover, the economies involved were not small. In the middle of 19th century, France was the world's second largest exporter, Great Britain being the largest and most advanced exporter. If any trade agreement in the entire history of the global economy were to be of consequence, then the Cobden Chevalier treaty of 1860 would be one of them. Moreover, there were large incentives for a host of smaller countries to join the network of commercial treaties due to fears of trade diversion and loss of market share. Over half a dozen other treaties were signed by France in short succession with the leading nations of Europe. Similar treaties proliferated on the European continent between other countries too (Lampe, 2009).

In light of this, we hypothesize that adjustment costs may not have been that high and that the benefits of free(er) trade were greater than the costs. We demonstrate that France diversified its export base but it also simply differentiated its products throughout the 1860s and in response to the Cobden Chevalier treaty. Head-to-head, intra-industry competition was the hallmark of the 1860s and 1870s. This dynamic is the key for understanding why the liberalization was not met with more resistance. Rather than imposing a massive sectoral reallocation of resources French producers seem to have met international competition with a strategy of differentiation and niche competition.

Since the 1990s the hypothesis has been put forward that increases in intra-industry trade involve a very different (and less costly) adjustment process than those associated with increased inter-industry trade and shifts in specialization (Greenaway et. al., 1994 and Hamilton and Kneist, 1991). Brühlhart and Elliott (2002) discuss the “smooth adjustment hypothesis” which states that liberalization might be less disruptive and adjustment dynamics less costly when trade expansion is intra-industry. Inter-industry trade would imply that large sectoral re-allocations would have to take place implying short-run unemployment of specific factors. Even if French producers were to survive, greater competition in homogeneous goods in direct competition would require costly investments and technological upgrading to stay competitive. Our data are consistent with the idea that France was able to avoid moving factors of production (i.e., labor or capital) between sectors where rigidities might have made the transition more difficult. Our evidence shows significant support for “smooth adjustment” in France for the 1860s and 1870s.

As we show, the development of intra-industry trade was rapid after 1860 especially in the leading industries of cotton, wool and silk cloth. Instead of losing market share to Great Britain and moving towards net import status, France was able to sustain global sales even as imports surged. This result may seem anachronistic since intra-industry trade (IIT) was “discovered” by Verdoorn in 1960. However, a path breaking study on Germany due to Brown (1995) highlighted that IIT was important in the realm of textile trade circa 1913. In contrast to Brown (1995) we study a broader range of products as well as focusing on the case of France rather than Germany. It should also be emphasized that IIT ostensibly has a documented history even in France (Becuwe and Messerlin, 1986). Rather than simply document its existence, our study emphasizes that IIT was heavily driven by the liberalization of French foreign trade in the period. Moreover, although Gourevitch (1977, p.294) assumed that textiles as well as highly capitalized sectors in industry were “vulnerable” after liberalization, he also noted the paradox of the long delay in tariff backlash in France. Rather than ascribing the delay to political economy factors as did Gourevitch, we believe that the impact on these sectors was not immediately as negative as thought and that these sectors were less “vulnerable” than supposed.

We proceed by analyzing a new dataset of dis-aggregated French exports and imports. We begin with an analysis of the 104 broad products listed in French official trade statistics. We decompose changes in imports and exports into intra-industry movements, increased specialization and loss of previous specializations using a technique due to Bastos and Cabral (2007). This decomposition establishes that increased intra-industry trade was paramount in the wake of liberalization.

We then turn to an analysis of the top nine largest exports in the broad product classification scheme. For each of these broad products we have data on between four and 48 sub-products.<sup>3</sup> These top nine exports, including textiles (cotton, silk and wool) were allegedly some of the most vulnerable and interest groups historically opposed international liberalization.<sup>4</sup> At this highly disaggregated level, once again, we see a significant degree of

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<sup>3</sup> Specifically we have: 4 for clothing, 5 for raw wool, 48 for tools, 24 for leather, 16 for raw silk, 24 for cotton cloth, 20 for wool cloth, 44 for silk cloth, and 4 for wine. Most French imports in the late 1840s through the 1850s were raw materials. The top 10 imports using import values averaged over 1856 to 1859 were: raw silk (15%), wool/cotton fibers (10%), grains (8%), raw wool (8%), raw sugar (7%), wood (6%), coal (5%), leather and skins (4%), animals (3%) and coffee (3%).

<sup>4</sup> We focus on nine products instead of say 10 because the 10<sup>th</sup> is a classification called “Articles of Paris”. These included luxury items and handicrafts but which had little international competition by definition.

intra-industry competition. A third test examines the bilateral exports and imports of these top nine products for the universe of France's trade partners. Intra-industry trade at the bilateral level is higher post-liberalization, after a period of transition, especially in key products that had rabidly resisted liberalization prior to 1860 such as cotton, silk and wool cloth. While representatives of these key industries had argued French production would be eliminated by removing prohibitions their claims seem to have been greatly exaggerated. A better explanation for their protestations is simply rent-seeking, in effect an attempt to retain monopoly power via special policy and privilege.

Our bottom line is that France experienced gains from international trade via trade in differentiated goods. Rather than massively disrupting the economy and leading to between sector transitional challenges as is emphasized in specific-factors trade theories with market rigidities, France managed its transition at tolerable economic cost. While comprehensive employment and output data for France are not available in this period, our story is consistent with the idea that, at the very least, French producers and workers were able to compete through within-industry product differentiation in order to maintain market share. There is little doubt that the economic environment became more competitive post-liberalization, but the competition is more consistent with models of differentiated goods rather than homogenous goods.<sup>5</sup> We discuss below the process and reaction to liberalization, about which much has been written, but at this point we believe it is no overstatement to say that 1860 was a watershed in the history of modern international trade. Our study reveals that the first wave of globalization involved significant intra-industry trade and not simply specialization at the broad sectoral level.

## **2. Liberalization in the Second Empire**

### **2.1 Theoretical Considerations**

How might a country at the early stages of industrialization adapt to intensified international trade after a sharp break towards a more liberal trade policy regime? The most basic models of international trade posit three potential routes. In a Ricardian model of homogeneous comparative advantage, trade is based on differences in relative

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These items were however subject to British tariffs and an object of discussion in the 1859 treaty negotiations between France and Britain (Dunham, 1930)

<sup>5</sup> We do not make an explicit distinction between horizontal and vertically differentiated products in this paper, but quality upgrading could be part of the story and consistent with our findings.

productivity. Trade liberalization promotes specialization. In the two-country setup of Dornbusch et. al. (1977) each country expands its range of exports while a number of goods previously domestically produced are now sourced from abroad. Marginal sectors will be eliminated by international competition.<sup>6</sup> These marginal sectors afforded protection and sustained by trade policy would be expected to be in decline after liberalization.

In a factor-endowments approach, inter-industry trade, mainly between the labor scarce, resource abundant New World and the labor-abundant, land-scarce Old World, is associated with homogeneous products and weak export diversification. According to O'Rourke and Williamson (1999) international trade promoted long term convergence in real wages consistent with inter-sectoral specialization. Trade liberalization would be associated with an increase in specialization in products in which France had a comparative advantage. Net exports of products which were artificially promoted by a previously restrictive trade regime would be expected to decline.

“New” international trade theories feature intra-sectoral competition. Incorporating monopolistic competition and a love of variety, the Krugman (1979) model predicts that industrialized countries would have produced and exported a wide range of goods. Liberalization would lead to export diversification and an increase in intra-industry trade.<sup>7</sup>

## **2.2. Historical Background on the Great Liberalization of the 1860s**

The prologue to our study starts in 1848, the end of ‘Monarchie de Juillet’ and the start of Second Republic (February, 1848). In December 1848, Louis Napoleon Bonaparte was elected President of the Second French Republic. Throughout the 1840s, France remained deeply attached to protectionism. Todd (2008) analyzes the formation of the protectionist culture which triumphed over French opinion throughout the 1840s and 1850s.

Prior to this, various pressure groups, with intellectual support from J-B Say, campaigned in the 1830s for the removal and reduction of formal trade barriers. Almost immediately, these free trade ideas faced a powerful nationalist pushback. According to Todd, the period 1834 to 1844 was marked by a nationalist discourse closely related in spirit to the “national system” of political economy promoted by List. For many industrialists and economists, economic nationalism was desirable as a means to subdue the social tensions wrought by industrialization along the lines of the “English model”. According to Demier

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<sup>6</sup> Similar logic would apply in the more general Ricardian framework of Eaton et. al (2001).

<sup>7</sup> In Lancaster (1980) intra-industry trade grows in response to diversification on the demand side. Becuwe et al. (2018) discuss the diversification of France’s exports in this period.

(2009, p. 147) “most of the products that France can do without, in particular, manufactured goods, were prohibited”. Demier counts 58 prohibitions for imports and 12 for exports in the 1840s. These prohibitions would ultimately be thought to be the force sustaining French production of cotton cloth and textiles as well as other manufactured goods. It was widely believed that Great Britain, and soon other upstart industrializers, would eliminate domestic production and the associated jobs if the trade regime were to have become more liberal. Dunham (1930) notes that this view was most strongly held by cotton industrialists but that several economists believed that limited competition prevented modernization of French metallurgical and cotton industries.

Despite some lonely voices, free trade ideas had few fans in France in the two decades prior to 1860 as manufacturers vigorously promoted the idea that international competition would lead to national ruin. In February 1846, the ‘association pour la liberté des échanges’ was created at a gathering of French economists. Frédéric Bastiat was the leader. The movement in favor of free trade foundered, torn and riven by internal tensions and political divisions. Arguments remained doctrinaire and un-rooted in any real empirical examination of the issues.

In September 1846, in response to the free-trade movement, industrial leaders created the “association de défense du travail national”. The goal of this society was to maintain active commercial policy based on patriotism and the unique economic identity of France. Without protection from international competition, British competition in particular, national industry would suffer. The protectionist campaign was a success, conquering popular opinion by adopting an Anglophobe discourse. The democratic and Socialist left joined the protectionist camp and such sentiment could be declared politically dominant by 1848. Adolphe Thiers’ protectionist views prevailed. Political liberalism distanced itself from free trade. The movement to relax trade restrictions did not totally die out, however.

Indeed Louis Napoleon Bonaparte himself harbored aspirations for more liberal policies. Because of his exile in Great Britain, he was familiar with and became himself a proponent of free trade ideas. Dunham (1930) suggests that Napoleon viewed free trade as a means to national economic development and improved welfare. Dunham (1930, ftnt. 5 p.84) cites evidence that Napoleon III had a grand vision for liberalization and reform of the French economy including adjustment loans to industry post-liberalization, improved infrastructure, further trade treaties and a progressive reduction in first tariffs on inputs and then on final goods.

Nevertheless, throughout the 1850s, his Government was not strong enough to promote a comprehensive reform. Some progress was made however by means of executive power. Between 1853 to 1855, in accordance with the Act of December 17, 1814, tariffs on raw materials (coal, iron, wool, and several other raw materials) were reduced by executive decree. Figure 4 shows that the average tariff on different types of raw wool declined in this period while those on raw silk were low throughout. These reductions in tariffs might be seen as aiming France in the direction of liberalization but they also represented a higher effective rate of protection for manufactured products given that these changes applied to key industrial inputs.

In 1856 the Government attempted to abolish existing prohibitions on manufactured goods and replace them by tariffs. Parliament resoundingly defeated these proposals, and the government committed to leaving prohibition in place until at least 1861. France appeared overwhelmingly opposed to a unilateral reduction of the long-standing policies to protect its manufacturing sector.

Political allies of Napoleon III (e.g., Chevalier, Persigny and others) concluded however that it might be possible to drive a customs reform through by executive power alone. It was suggested that by using the power conferred by the *Senatus-Consulte* of December 25 1852 to the Emperor, the executive could achieve reform via treaty and without parliamentary consent. Throughout the 1850s, Chevalier, amongst other free trade sympathizers, worked political back channels at home and in Britain to lay the ground work for such a treaty. In late 1859 the emperor signaled his approval to commence secret negotiations for such a treaty.

From the fall of 1859, negotiations for a new, bilateral treaty of commerce were opened with Great Britain. Policy makers carefully aimed to be free of political lobbying from particular industries and instead aimed for a wholesale liberalization. Negotiations for the French-British treaty were “conducted in the greatest secrecy” (Arnauné, 1911, p.253). Every precaution was taken to prevent political adversaries from discovering the negotiations. In France, apart from the Emperor, only five people were privy to the negotiations (Ministers Rouher, Baroche and Fould, Chevalier and the Ambassador to London Persigny). Under the patronage of Gladstone, Cobden negotiated first alone, then with Lord Cawley. This process culminated with the signing of a treaty of commerce on January 23, 1860, referred to as a “*coup d'état douanier*” (Dunham, 1930).

The so-called Cobden-Chevalier treaty of 1860 was revolutionary in the realm of manufactured products. Article 1 of the treaty provided a list of 44 British products, previously prohibited, which could be imported from late 1861 (5 years after the 1856 compromise) with a tariff not exceeding 30% in ad valorem terms. Outright prohibitions on nearly all woolen fabrics, cotton fabrics (with the notable exceptions of “dentelles”, nankin cloth, “tulle” with lacework, silk fabrics--only “tulle”, cotton and woolen threads, garments and underwear, prepared hides, refined sugar, tools in metal, pottery and glass, garancine, soap, chemical products, medicament, and trinkets) still existed through the end of the 1850s. By eliminating these prohibitions, the treaty of 1860 was nothing short of revolutionary. Although tariffs remained in the high-to-moderate level, they would certainly not be prohibitive in most categories. Dunham (1930) noted however that the treaty tariffs for some products in iron and metal remained prohibitive into the 1860s.

Article 16 stated that that French ad valorem tariffs would be progressively lowered after 1860 from 30% and these were limited to a maximum of 25% from October 1, 1864. Article 5 declared that British tariffs on 41 products (silk fabrics, perfume, tools in metal, and of course French wines) would be either totally eliminated or reduced drastically. It should be remembered that Great Britain maintained significant levels of protection in the 1850s even after repeal of the Corn Laws. In fact, reducing British tariffs on French-style wines, silk products, and French luxury goods were key components of the negotiation for the Cobden Chevalier treaty. Success for French wine producers was achieved since article 6 introduced special benefits by way of progressively lower tariffs on French wines.<sup>8</sup> Article 5 abolished British tariffs on silk cloth and over 38 other manufactured and semi-manufactured products including iron and steel, machinery, several types of woolen articles (blankets gloves and non-wool fabrics), and specialized clothing (gloves, stockings etc.). Article 19 introduced the most favored nation (MFN) clause.

The spirit of the new policies echoed Napoléon III's statement during his first meeting with Cobden (in October 1859) “We don't do reforms in France, we make revolutions.”<sup>9</sup> The treaty was to last 10 years until a renewal option could be exercised. The treaty reduced the average rate of all duties in France from 11.8% in 1859 to 5.3% in 1861. Figure 3 shows the import-weighted average tariff rate on the top 9 exports as of the late 1850s. Figure 3

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<sup>8</sup> Cognac exports rose rapidly after 1860 from 150,000 hectoliters in 1860 to 421,000 in 1866. According to Jouannet (1983) in the Cognac region the treaty brought prosperity to the region. Local authorities even named a street after Richard Cobden which still exists in Cognac.

<sup>9</sup> “Nous ne faisons pas des réformes en France, nous ne faisons que des révolutions “ (Dunham, 1930, p.124).

shows the average tariff on the manufactured goods within the top 9 which were significantly higher than those prevailing for raw materials (raw wool and silk) the tariffs on which had been reduced to near zero in the mid-1850s (Figure 4).<sup>10</sup>

According to Bairoch (1989), Irwin (1993), O'Rourke and Williamson (1999) and Lampe (2009) the Cobden-Chevalier treaty was decisive at a global level in reducing tariff protection by incentivizing bilateral agreements including the Most Favored Nation clause. A literature in political science seeks to analyze the determinants and domestic origins of these treaties. Pahre et. al. (2008) emphasize domestic compensation, while Lazer (1999) emphasizes the interaction between domestic economic interests and international relations. Most previous work is of the opinion that the treaty of 1860 and the ensuing development of the Cobden network was a significant break point in international trade relations.

What is less well understood is how the French economy reacted and adjusted in the wake of this period of liberalization. Did French producers of industries shielded by former policies suffer an onslaught of imports and a slump in exports? In other words did net exports in the most "vulnerable" industries, those in which Great Britain presumably had a comparative advantage fall requiring industries to shed labor and contract? Did the liberalization episode lead to displacement in the labor market and prolonged adjustment as workers and resources were re-assigned to industries in which France had a comparative advantage? Little work has been done to study the question since detailed data on production and labor are not available at a high frequency in this period. One feature of the era is remarkable. Napoleon was not ostensibly politically punished for signing a series of commercial treaties. Nor did the nation's workers rise up in protest. Furthermore, treaties were renewed in the 1870s. Little evidence of a massive backlash is evident in the two and a half decades following 1860s. It is only from the early late 1870s that a strong political appetite for a return to protectionism appears.

But a recent literature questions the revolutionary status of 1860. Perhaps it is not really true that Cobden-Chevalier was a turning point. If so, this could explain the lack of an immediate backlash. Some authors emphasize continuity in trade liberalization between the end of the 1840s through the 1860s. Federico (2009) and Sharp (2010) emphasize that liberalization following the abolition of the Corn Laws was not exclusive to Great Britain. Moreover, lower tariff duties in the agricultural sector had of course started before 1846.

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<sup>10</sup> It should be remembered that actual policy was much more prohibitive on most of these goods due to prohibitions with the data in Figures 3 and 4 are based only on the limited number of goods admitted prior to 1860.

Measuring trade liberalization with average tariff rates, Accominotti and Flandreau (2008) allege that there was more progress before 1860 than after. Tena, Lampe and Fernandez (2012) show a significant tariff liberalization in manufactures around the world before Cobden-Chevalier. They observe tariff reductions from the end of 1840s to the end of the 1850s in poor and rich continental Europe.

For France this does not seem to be the case where in effective protection for manufactured cloth likely actually rose in the 1850s due to the fall in the tariff of raw materials. For France, 1860 is clearly the break point when taking into account the abolition of many significant prohibitions and the structure of tariff policy. This point has recently been somewhat obscured by the work of Tena, Lampe and Fernandez (2012) who use data on tariffs faced by British exporters to track the evolution of tariffs between 1846 and 1880. Tena et. al argue that there was a gradual liberalization in process globally prior to 1860 although they do note that “rich Europe” was an exception with tariffs in the 1850s stable but falling dramatically in the 1860s (see their Figure 1, p. 725). Our data for France are consistent with this observation.

Tena et. al. also bias their measure of changes in protection downwards by assigning a tariff rate of twice the post-prohibition level when possible. They rely on the tariffs published in British sources which often cover only a portion of trade, mainly high value, specific goods that are un-prohibited. By assigning a numeric value in terms of an ad valorem equivalent without regard to the prohibitions, Tena et al (2012) erroneously give the impression of a much more gradual decrease of protection in the manufactured sector. In Table A3 of Tena et. al (2012) the level of average tariffs for manufacturing products for France is given as 83% in 1853, 69% in 1859, and 23% in 1863 (manufactured goods, weighted by British export shares).

We use French data for six manufactured products amongst the top 9 exports for France (silk, woolen, and cotton cloth, tools, clothing, leather products) to verify these claims. We add up total customs revenue and total imports for all sub-products listed in the *Tableau* dividing the former by the latter. With this average tariff rate, Figure 5 shows a somewhat different pattern than that suggested by the French figures given by Tena et. al. Although there is a small decrease of two percentage points (roughly 13 percent) between 1848-51 and 1856-59, a much larger decrease, equivalent to a 45 percent decline, is evident between 1856-59 and 1869-1872. Our bottom line is that the liberalization in France after 1860 was indeed large and economically significant.

Figure 5 also plots the average tariffs for two raw materials (raw silk and wool) and three intermediates (cotton, wool, and linen thread). Some liberalization in raw materials was evident in the mid-1850s, as discussed in the literature. However it is only after 1860 when tariffs fell for key manufactured goods and manufactured intermediates like thread. Overall Figure 5 suggests a gradualist approach to liberalization whereby liberalization proceeded up the value-added chain. First raw materials tariffs decreased in the 1850s. Key intermediates tariffs were lowered from 1861. Prohibitions were eliminated beginning in 1861, with tariffs on final goods (e.g., wool, silk, and cotton cloth) allowed a maximum of 30% in ad valorem terms. These maximum tariffs were reduced to 25% from 1864. In addition in the years after 1860 a number of new treaties further lowered overall tariff rates.

Nevertheless, the liberalization shock of 1860 was not wholly unexpected in the 1850s and in the years immediately preceding 1860. There were earlier discussions in 1856, for example, about lowering the tariff. The Cobden Chevalier negotiations were however largely free from direct lobbying by industrial interest groups since they were conducted in secret with not open debate. Moreover, the precise timing did come as a shock given the secrecy surrounding negotiations.

In terms of adjustment, it should also be noted that the government granted and distributed 40 million francs in adjustment loans in the early 1860s. Companies were required to apply for such loans justifying their proposals with plans for technical upgrades to meet increased international competition. These loans were distributed amongst the leading industries in metallurgy and cotton as well as others and surely helped ease some of the strains though the amounts given do not appear to be decisive at the aggregate level.

Dunham (1930) details the fortunes of several key industries (iron and steel, cotton spinning and weaving, silk, woolens, wine etc.). While systematic census data is unavailable, Dunham suggests that heightened competition incentivized upgrades to machinery, techniques, processes and products and liberalization generally promoted salutary growth. Dunham (1930) argues, for example, that advanced mechanization in cotton spinning and weaving, one of the industries expected to be hit hardest by liberalization because of British competition, proceeded more quickly after 1860 than prior to 1860.

In addition particular industries faced various exogenous shocks in the 1860s unrelated to trade policy. Notably the cotton industry (in France and abroad) suffered from the cotton-famine induced by the American civil war. Hearings by the French government in 1870 suggested that the cotton industry suffered from the tariff, but Dunham attributes

their difficulties to these other shocks. Moreover, there is and was no quantitative evidence at the time that British cotton had eliminated or reduced French exports and production (Dunham, 1930).

The iron and steel industry benefitted from a demand shock associated with the construction boom in railway building in the 1850s and 1860s. In the 1860s, woolens benefitted from a large increase in the supply of high quality raw wool from Australia and Argentina. It is important to note that these shocks would have affected France’s major trading partners to a similar degree and that they were largely determined by forces unrelated to internal economic dynamics in the French economy and could not have been foreseeable in the late 1850s.

### 3. Data

To study the impact of liberalization, we assemble four different datasets for French trade between 1848 and 1877.<sup>11</sup> Each data set covers a slightly different range of products or has a different level of disaggregation. Our main data source is the *Tableau général du commerce de la France avec ses colonies et les puissances étrangères* (*Tableau général du commerce et de la navigation* after 1896). We use “commerce special” (i.e., specific trade)” and not “commerce general” (general trade). Data from specific trade includes the value of goods imported for national consumption and the value of national production exported. Ostensibly “specific trade” excludes goods in transit. Trade is based on calendar years.

Our first data set covers 104 products for total imports and exports. For these data, we have total values of exports and imports in current French francs. Products are classified (by the authors) into four broad sectors: tropical/exotic, primary, semi-manufactured and manufactured. The second data set covers the top nine exports for France as of the 1850s. These broad products include silk, woolen and cotton cloth, wine, leather, clothing, tools, raw silk and raw wool. The share of these top nine exports on French total exports is very significant: 53.1 % in 1848, 56.1 in 1860, and 50.4% in 1870.

This “top nine” data set will provide a foundation for studying the impact on the industries/products with potentially the most to lose (in terms of net exports) from liberalization since competition with Great Britain would likely have been very intense and was expected to be so. For each of these products, we have the total value of exports,

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<sup>11</sup> We provide further details in the data appendix. Data are based on calendar years.

imports and tariff revenue collected in current French francs. Tariff revenue for these nine products is available and we can calculate the average tariff for each of the nine products and for all of these products together. A third data set covers bilateral exports and imports of these nine products for over 151 different countries and territories. Quantities, values and unit values are available.

For our fourth dataset, we disaggregate further within the top nine specializations. For the period 1848-1877, we digitized all sub-products at the highest level of disaggregation possible in French trade statistics within each of the nine products. For this period, the dis-aggregated nomenclature is relatively homogeneous and stable. Specifically we have the following sub-product counts: 4 for clothing, 5 for raw wool, 48 for tools, 24 for leather, 16 for raw silk, 24 for cotton cloth, 20 for wool cloth, 44 for silk cloth, and 4 for wine.<sup>12</sup>

For each product we have export and import values, quantities and by extension unit values. For each of these products, data is available on total customs duties collected. This makes it possible to calculate the ad valorem equivalent of customs duty rates by sub-product product.

## 4. Trade policy and Intra-Industry Trade

### 4.1 Measuring the Level and Changes in Intra-Industry Trade

Figure 1 shows that France became increasingly open to trade in the mid-19<sup>th</sup> century in the wake of the generalized decline in trade costs associated with the first wave of globalization (Jacks, Meissner and Novy, 2010). In addition the trade balance declined somewhat especially from the late 1870s. This decline in the trade balance was noted by contemporaries and as has been suggested elsewhere (Levy-Leboyer and Bourguignon, 1985 and 1990).<sup>13</sup>

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<sup>12</sup> In the original data there are several more categories for certain products. The French data distinguish between Bordeaux wine in barrels and wine in barrels for instance. Since imports of the former are impossible by definition we aggregate the former with the latter. Another issues arises for raw wool. Only certain types of sub-products are broken down for imports but not exports in certain years. We also aggregate these together for consistency.

<sup>13</sup> Levy-Leboyer (1985) also notes declines in net exports of 40% to 60% on certain products. “A partir de 1876-1879, des baisses souvent très brutales, de l’ordre de 40 à 60%, parfois davantage, se sont produites en effet sur la vente de produits...”

In order to shed light on the transformation of international competition we study the evolution and determinants of intra-industry trade (IIT) measures in our different data sets. First we compute at the Aquino and corrected Grubel and Lloyd indexes for the 104 products. The Aquino index (AI) is defined as:

$$\text{Aquino Index} = 1 - \frac{1}{2} \sum_i^N \left| \frac{X_i}{\sum_1^N X_i} - \frac{M_i}{\sum_1^N M_i} \right|$$

where  $X_i$  and  $M_i$  are exports and imports of product  $i$  and  $N$  is the number of products.

The corrected Grubel and Lloyd is defined as:

$$\text{Corrected Grubel Lloyd Index} = \frac{\sum_i^N (X_i - M_i) - \sum_i^N |X_i - M_i|}{\sum_i^N (X_i - M_i) - |\sum_i^N X_i - \sum_i^N M_i|}$$

The Grubel Lloyd Index is defined as

$$\text{Grubel Lloyd Index} = 1 - \frac{\sum_i^N |X_i - M_i|}{\sum_i^N (X_i + M_i)}$$

Figure 7 shows the evolution of these indicators of IIT. The Aquino and Grubel-Lloyd indexes are highly correlated. Intra-industry trade as a share of total trade rises from 12-14 percent in 1859-60 to 38 percent in 1872. A notable acceleration is evident in the 1860s coincident with liberalization. The indicators plateau between the 1880s and 1913 during the return to protectionism in France and on the rest of the European continent. From Figure 7 we can see that even if the intra-industry trade was “discovered” by Verdoorn in 1960, it constitutes one of the main contributing factors of the French foreign trade since the 1850s. Our data establishes a rapid development of IIT from about 1860 through the 1870s.

Using the methodology developed by Bastos and Cabral (2007) we are also able to decompose changes in trade into the fraction accounted for by intra-industry trade. Such a decomposition allows us to have an index of how much the changes in trade were accounted for by modern, Intra-Industry trade as opposed to growth in products where there is specialization (as measured by net exports).

Bastos and Cabral (2007) “decompose the trade change into three different components: ‘marginal intra-industry trade’, inter-industry trade growth that contributes to an *increase* in a country’s previous specialization, and inter-industry trade growth that contributes to a *decrease* in a country’s previous specialization”. For the first, define *MIIT* from Brühlhart (1994) as

$$MIIT_{it} = 1 - INTER_{it} = 1 - \frac{\Delta X_{it} - \Delta M_{it}}{|\Delta X_{it}| + |\Delta M_{it}|}$$

Bastos and Cabral (2007) note that the portion of trade not allocated to intra-industry trade can be classified in two ways as follows:

$$INTER_{it} = \begin{cases} \mathbf{IPS}_{it} & \text{if sign } \Delta X_{it} - \Delta M_{it} = \text{sign } (X_{i0} - M_{i0}) \\ \mathbf{SS}_{it} & \text{if sign } \Delta X_{it} - \Delta M_{it} \neq \text{sign } (X_{i0} - M_{i0}) \end{cases}$$

In these expressions,  $\Delta X_{it}$  and  $\Delta M_{it}$  are respectively the change in exports and imports between period  $t$  and a base period for product  $i$ . *MIIT* measures the share of the *growth* in exports that is matched by a rise in imports. Like the Grubel-Lloyd index, *MIIT* varies from 0 to 1. If *MIIT* equals 1, trade expansion is entirely “matched” and is intra-industry, if *MIIT* = 0, the entirety of the growth in trade is of the inter-industry type. The *MIIT* index can be calculated at the aggregate level as well as by trade partner and by product. The base year for differences is also obviously flexible.

For inter-industry trade  $X_{i0}$  and  $M_{i0}$  are respectively the exports and imports in a product in an initial period. *IPS* represents movements in trade that contribute to an *increase in a previous specialization*. A product in which France was a net exporter in the initial period and for which exports grew faster than imports would have assign *INTER* to *IPS*; similarly, if in a product France was a net importer and imports rose faster than imports then we assign *INTER* as *IPS*.

*SS* represents inter-industrial movements that involve *shifts in specialization*. Movements here contribute to a weakening of a previous specialization through lower net exports in industries where net exports were positive or through lower net imports when net exports were previously negative. To understand changes in *SS* consider a particular

product where imports are limited by the trade policy regime of the 1850s. Net exports are *higher* (or no lower) than they would be under the lower tariff policy of the 1860s (*ceteris paribus*). Liberalization, causing a decrease in the net exports of such a product, would be associated with higher values of *SS*. Presumably under free-trade, international competition forces new imports and limits exports especially in products near the cutoff range for importing in the Dornbusch et. al. model.

The data used to calculate this decomposition cover up to 104 broad products. We calculate the weighted average from each product's decomposition using initial trade values as weights. We also smooth the trade data over four year periods to minimize the impact of short-run shocks. Our initial reference period is 1848-1851. We track the evolution of *MIIT*, *SS* and *IPS* for 1848-1851 to 1885-1888.

The evolution of *MIIT*, *IPS*, and *SS* are presented in Table 1 and in graphic form in Figures 8 and 9 for all products (104 in total) and for the top nine specializations of France. Again, these figures represent weighted averages of the product-by-product indexes.

Both Figure 8 and Figure 9 illustrate the sharp increase in the share of trade growth accounted for by intra-industry trade in the wake of the trade liberalization of 1860. At the same time, increased international competition is associated with a deceleration in the overall degree of specialization as seen by the declining share of trade growth accounted for by *IPS*. The share and trends in *SS* are less pronounced. For all products, prior to liberalization, *SS*, accounted for 15% (1852-55) or 8% (1856-59) of trade growth. In the 1870s these values vary between 10% and 12%. Because the differences are with respect to a common base period, this implies very little of the growth in trade came from products that were "artificially" promoted prior to liberalization.

On the face of it, these trends are not in agreement with the predictions of the Heckscher-Ohlin model for which trade liberalization is expected to induce an increase in a country's net exports in the industries that are intensive in a country's abundant factor endowments. By contrast, when countries have similar factor endowments, intra-industry trade expansion is expected to dominate.

Although the rise of intra-industry trade seems to come from the shock of 1860, this phenomenon persists and even increases somewhat over time. This is likely due to the fact that liberalization continued as a number of new trade treaties were signed with European partners and the technologies propelling the first globalization diffused.

Up until 1873-76, changes for the nine top specializations are similar to those of all French products. The share of intra-industry trade is accelerating gradually and at roughly the same rate in all sectors. Significant differences appear from 1877-1880 up to 1885-1888. For the nine main specializations, there is a similar evolution of intra-industry trade which is roughly stable.

On the other hand there are differences in the evolution of *IPS* and *SS* when comparing all goods to the top nine products. The share of trade growth accounted for by previous specializations (*IPS*) for the top 9 products drops by 10 percentage points (1877-1880 to 1885-1888) while “revealed comparative advantage” products weakens. That is, there is a rise of 10 percentage points in *SS* implying shifts in specialization. For the larger set of products, there was little change in the evolution of *IPS* and *SS*. These changes reflect a slight reversal or slowdown of the trend of towards IIT and/or greater specialization in the years immediately after the 1860s. These developments were accompanied by the appearance in 1878 of a gaping trade deficit (see Figure 1). This deficit solidified the position of those calling for enhanced protectionism throughout the 1880s.

## 4.2 Intra-Industry Trade and Specific Industries

Figures 7, 8, and 9 show more evidence that IIT accelerated in the wake of liberalization. Here we attempt to see which products were most affected by the liberalization of the early 1860s. French protectionists siding with various key industrial interests promoted the idea that their interests would be harmed by allowing British products to penetrate the French market. If so, then in the wake of the Cobden Chevalier treaty manufactured goods and leading industries (especially cotton and woolen cloth, clothing and metal tools) should have seen net exports decline implying a slowdown in previous specializations or rise in shifts in specialization (a decline in *IPS* or a rise in *SS*) compared to industries less affected by the new tariff regime and the competition that it implied. If, on the other hand, lower trade barriers promoted two-way trade in differentiated goods in the most contested industries, then *MIIT* should have increased post-liberalization relatively strongly in the products most affected by the decline in trade barriers and international competition.

Unfortunately there is no way, given the data at hand, to assign each product or broad product class a well-defined quantitative treatment level. Instead we allow for a set of flexible specifications for various categories of products which have been indicated in the

literature as potentially the most affected. By and large we allow the data to speak for themselves through flexible specifications.

We first run a cross-sectional regression with a constant for the immediate post-liberalization period comparing the evolution of *MIIT*, *IPS*, and *SS* across different categories of products. We calculate *MIIT*, *IPS* and *SS* using differences in the smoothed levels of trade data for the post-liberalization period of 1861-1864. All indicators use the base period of 1848-51 as the reference.

We use two different “treatment” groups: manufactured goods and the top nine products. The control groups are either un-manufactured products or all products outside of the top 9. Trade data is for the 104 products in the French trade data. Our first dependent variable is *MIIT*. The second dependent variable is the difference between *IPS* and *SS* (*IPS-SS*) following Bastos and Cabral (2007). This variable is larger when the specialization in revealed comparative advantage goods increases. Since *MIIT*, *IPS* and *SS* are defined as differences between a base period and a later period we do not include product or category fixed effects. The constant allows for a common shock in the post-liberalization period. With this specification we can interpret the coefficients as a difference-in-differences with two periods of interest (1848-51 and 1861-64). Specifications take the following form for the period 1861-1864:

$$MIIT_i = \kappa + \beta(\text{manufactured}_i) + \varepsilon_i$$

with  $i$  indexing a product in the set of 104 products in our dataset.

Results for these regressions are presented in Table 2. For manufactured goods in general, there is no solid evidence of a relatively large *MIIT* share in the years immediately following Cobden Chevalier. The column labelled *IPS-SS* shows there is also no evidence of a loss in competitiveness in manufactured goods in the years immediately following Cobden Chevalier. In other words, there is no evidence that there was a statistically significantly large loss in specialization for manufactured goods relative to other products.

On the other hand, the constant in column 1 reveals a significant fraction of the overall rise in trade was intra-industry for all products. This average share was on the order of 12 percent for non-manufactured products. In the sample, the overall average is 15

percent. The data also reveal a positive skewness in the empirical distribution equal to 1.65 suggesting some products were much more affected than others by liberalization.

For the top nine specializations, column 3 shows that *MIIT* was a statistically and economically significant 23 percentage points larger for these products in the immediate wake of the Cobden Chevalier treaty. Column 4 shows that there is no evidence of a loss in previous specializations for the top nine products. Our conclusion is that while competition intensified, on average it did not do so at the cost of exports. Instead, it appears that both imports and exports increased together as new trade theories of differentiated goods would predict. Leading sectors seemingly had little to worry about from liberalization after the fact.

A word of caution is in order when thinking about changes in the level of the Grubel Lloyd index as compared to *MIIT*. *MIIT* and the GL index are conceptually distinct. The former is about trade on the margin whereas the GL index is a variable in levels, and it also scales by the level of trade. In fact the correlation between *MIIT* and changes in the GL index is only about 0.24 in the entire sample and 0.14 in the 1861-64 period.

In Table 3 we explore the evolution of the level of Grubel Lloyd Index and a measure of the level of intra-industry trade due to Greenaway et al. This variable is calculated as

$$IIT_i = [(X_{it} + M_{it}) - |X_{it} - M_{it}|]$$

and measures the value of gross trade not accounted for by inter-industry trade. This measure gives more importance to industries or products that have a larger share in trade and thus can give insight into the magnitude of the adjustment process. The correlation between changes in the GL index and  $\Delta IIT$  is also low at 0.15.

Table 3 uses the level of the GL ratio, *IIT* and a logarithmic version of IIT as the dependent variables.<sup>14</sup> The data cover 83 of the 104 broad products in the 1856-59 and 1861-64 periods. Due to products that have zero trade in both periods we do not have all 104 products for this exercise. We run regressions of the following form here:

$$GL_{it} = \kappa + \beta(\text{manufactured}_i \times \text{post}_t) + \text{post}_t + \mu_i + \varepsilon_i$$

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<sup>14</sup> Specifically we use  $\ln \left[ \frac{(X_{it} + M_{it})}{|X_{it} - M_{it}|} \right]$ .

For these regressions in levels, we interact the manufactures indicator for product  $i$  (or the top 9 indicator) with the *post* indicator equal to one in the period 1861-64. Because of the use of product fixed effects,  $\mu_i$ , coefficients in our setup measure the relative changes in intra-industry trade ( $\Delta IIT$ ) or the Grubel Lloyd share post-liberalization relative to the comparison group as in a typical difference-in-differences setup.

We find that the top nine specializations had significantly higher values of intra-industry trade in the immediate post-1860 years (columns 4-6). This is not the case for the “manufactured” products where there is no statistically significant effect detected. We also explored a dynamic version of the regressions in columns 1 and 4 allowing for separate intercepts in all six three-year periods (1848-51,...,1869-72). Again, for manufactures, no statistically significant impact on the GL ratio is evident. For the top nine specializations all coefficients in the periods after 1860 are positive and significant rising from 0.08 (s.e., 0.04) in 1861-64 to 0.19 (s.e., 0.07, p-value 0.01) in 1869-72.<sup>15</sup>

### 4.3 Sub-Products

In a similar spirit to Table 2, Table 4 uses value data for sub-products for which we have data in the top nine broad product categories. In principle we have up to 216 separate products here, but since *MIIT*, *IPS* and *SS* are not defined when both imports and exports are zero in both periods we have only 156 sub-products for the years 1861-1864. We use the same dependent variables (*MIIT* and *IPS* – *SS*) as in Table 2 and the base period is also 1848-51. This time we calculate these indicators at the sub-product level. We show results for manufactured goods as a whole as well as coefficients for each broad product class. Each category is interacted with an indicator for the years 1861-1864. Regressions take the following form where an observation  $s$  indexes the 156 sub-products:

$$MIIT_s = \kappa + \beta(\text{manufactured}_s) + \varepsilon_i$$

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<sup>15</sup>Additionally we classified products into centiles in terms of share of exports in 1856-59 (below the median, the median to the 75<sup>th</sup> percentile, 75<sup>th</sup> percentile to the 90<sup>th</sup> percentile, and above the 90<sup>th</sup> percentile). We interacted these with each of the six period dummies. Nearly all categories see higher GL ratios post-1860s compared to the baseline period of 1856-59 and no significantly different GL ratio levels compared to the baseline period prior to the 1860s.

The manufactured goods comprise all the sub-products in the broad categories of wool cloth, silk cloth, cotton cloth, clothing, leather, and tools. Non manufactured goods are raw wool and raw silk. Because of the special nature of wine, and its heavy reliance on climate, geography, soil quality, and the agricultural commodity of wine grapes, we leave wine out of the manufactured category for now. We omit the constant in columns 2, 3, 5 and 6 so that coefficients simply represent the average of the dependent variable by category in the 1861-1864 period. A positive coefficient implies that within a product class the dependent variable was significantly different from zero in the immediate post-liberalization period.

Column 1 shows that within the top nine products, the manufactured goods had a smaller *MIIT* in 1861-1864 than other products. In fact, the data reveal a large share of the increase in trade within the top 9 exports was IIT for raw wool and silk (as columns 2 and 3 show). Columns 2 and 3 show that in both weighted and un-weighted regressions, tools silk cloth, and raw wool and silk had *MIIT* indicators positive and statistically different from zero.<sup>16</sup> Using un-weighted regressions (column 2) reveals that the *MIIT* for nearly all broad product categories *MIIT* was statistically significantly different from zero and positive which is consistent with results in Table 2.

Results in columns 4, 5, and 6 show that manufactured products had no significant loss of specialization. In the specific product categories, clothing has a relatively large increase in specialization while tools, cotton cloth, and silk cloth have statistically and economic significant declines in specialization. For these latter categories then, those which were well represented in the anti-liberalization camp in the 1850s, the evidence on liberalization is mixed. Cotton cloth and silk cloth for example were highly protected by prohibitions prior to Cobden Chevalier and it is interesting that many of the products within these classifications faced extreme rises in imports so that apparent specialization decreased. In general part of the growth in trade for these broad products involved intra-industry trade while some sub-products faced outright loss of market share. The net conclusion has to be that the impact of liberalization was highly heterogeneous.

It is also interesting to study the dynamics of liberalization. To do so we revert to using the simple Grubel-Lloyd measure of intra-industry trade (in levels) for each sub-product,  $s$ , as the dependent variable. We interact each of the top nine broad product classes

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<sup>16</sup> We weight observations by average of total trade in both periods for each specific sub-product. We use both periods due to the fact that there are zero values for some products for imports and exports in the initial period.

with period indicators (1848-51,...,1873-76) and include broad product fixed effects and period fixed effects. We omit the period immediately prior to Cobden Chevalier (1856-1859) as the reference period. Coefficients now show the difference in the dependent variable for a product class,  $i$ , in a given period,  $t$ , relative to 1856-1859. Regressions take the following form:

$$GL_{st} = \sum_i \sum_t \beta_{it}(\text{Product}_s \times \delta_t) + \mu_i + \varepsilon_i$$

Figure 10 shows the point estimates for each broad product and each period. For four out of 9 categories, the level of intra-industry trade was higher after 1860 relative to the pre-liberalization period with no significant trends prior to liberalization. These include leather, wool cloth, silk cloth, and cotton cloth. The dynamics reveal that the process of liberalization that progressed between 1860 and the early 1870s led to significant rises in the share of trade accounted for by intra-industry trade especially in the politically sensitive categories of all types of cloth.

#### 4.4 Evidence from bilateral trade

In the years following 1860, France signed a number of other treaties of commerce with other leading European nations. The incentive to sign such treaties for third countries was large because in the absence of a treaty with an MFN clause demand could potentially be diverted from these countries without treaties towards Great Britain causing a loss of market share for countries without a treaty.

Treaties of commerce including the MFN clause and/or “tailor made’ reductions (in the terminology of Lampe, 2009) were signed between France and Belgium (1862), the Zollverein and the Hanseatic League (1863), Italy (1864), Switzerland (1865), the Netherlands, Spain, Sweden and Norway (1866), and Portugal (1867). The difference in timing allows us to explore the impact of trade treaties on intra-industry trade in a large sample of bilateral French trade data with a set of control group countries and territories which did not sign treaties of commerce with France. Specifically we explore regressions of the following form

$$GL_{cit} = \omega_c + \mu_i + \delta_t + \sum_{\tau=0}^m \beta_{-\tau} Treaty_{c,t-\tau} + \sum_{\tau=1}^q \beta_{+\tau} Treaty_{c,t+\tau} + \varepsilon_{cit}$$

where the dependent variable  $GL$  is the level of the Grubel-Lloyd index for product  $i$  in trade with country  $c$ , in year  $t$ ,  $\omega_c$  is a set of country fixed effects,  $\mu_i$  is a set of product fixed effects, and  $\delta_t$  is a set of year fixed effects. Product fixed effects control for (time-invariant) product-specific demand and supply features. Country dummies control for time-invariant determinants of supply and demand for all products. Time dummies control for both global shocks covering all trade partners as well as French year-specific demand and supply shocks affecting all products. We also allow for greater flexibility by allowing for linear country and product time trends which might control for income convergence between France and trade partners as well as other partner-specific trends. The variable  $Treaty$  equals 1 if France ever had a treaty of commerce in effect with country  $i$ . We allow for  $q = 3$  leads captured by  $(\beta_{+1}, \beta_{+2}, \beta_{+3})$  and the year of signing and 5 lags  $(\beta_{-0}, \beta_{-1}, \dots, \beta_{-5})$ . In a seventh coefficient we allow for the impact of treaties six years and beyond. The sample covers the years 1850 to 1870, 74 trade partners, and the top nine exported products.

Results in Table 5 strongly support the idea that French trade treaties were associated with a higher Grubel Lloyd index at the bilateral level. On average, the GL index was roughly three percentage points higher for trade partners with a treaty. The point estimate is somewhat higher when country and product trends are excluded (7 percentage points). In column (4) we interact the treaty dummy with the partner country indicators to show the evolution of intra-industry trade at the bilateral level. For the major industrialized and industrializing trading partners, coefficients are positive and statistically significant (p-value = 0.0107 for Great Britain). The magnitude of these coefficients are 0.13 for Belgium, 0.18 for the Zollverein, and 0.13 for Switzerland. Coefficients for Great Britain and the Netherlands are 0.06 and 0.05 respectively but are estimated relatively imprecisely.

Information on leads and lags is presented in columns 5 and 6. Leads (columns 5 and 6) are insignificant. Lags show that the impact of a treaty takes some time to appear. The share of trade accounted for by IIT rises by about three percentage points in the three years immediately following a treaty. Beyond the six year horizon, the GL index is estimated to be a statistically and economically significant 12 to 13 percentage points higher. Results for the dynamics for each of the nine products are show in in Figure 11. We also explored similar specifications using Greenaway et. al.'s (1994) measure of IIT as the dependent variable and the logarithmic version of that measure. Results are exactly in line and largely qualitatively similar in levels with those above using aggregate data and whether or not we use the logarithmic version of  $IIT$  or not. Our results using bilateral trade are largely in line

with Brown (1995) who found that in 1913 lower tariffs were associated with higher intra-industry textile trade. We confirm these patterns in a dynamic setting covering a wider range of products.

## 5. Conclusion

The Treaty of commerce signed on January 23, 1860 was one of the most significant events for international trade up to that point in time. Fortunately, for modern researchers wishing to study the impact of liberalization on adjustment it can be considered largely exogenous to the demands of specific industries. Being unexpected and motivated by broader ideas and concerns about economic development allows us to use the 1860s as a natural experiment to study adjustment in France amongst a set of leading industries. We are able to do so indirectly by examining changes in the nature of net and gross trade flows.

In line with new international trade theories, we show evidence consistent with the idea that that France had a relatively smooth adjustment. This occurred as France differentiated its products and competed intra-industry. Rather than imposing massive inter-sectoral changes in French specialization, the nation was often able to continue exporting its own unique brand in each specific product line. Intra-industry trade is often considered to be a 20<sup>th</sup> century feature of the data, but it appears to constitute the basis of a large share of trade in late 19<sup>th</sup> century France. Some evidence shows that the more highly protected products are less likely to be engaged in intra-industry trade suggesting that protectionism slows down the adaptation process and leads to greater levels of specialization. Whether such specialization was consistent with comparative advantage is obviously an open question.

We also contribute to a recent debate in economic history about the size of the shock in trade liberalization in the 1860s. This issue, driven by research by Accominotti & Flandreau (2008) Sharp (2010) and Tena et. al. (2012) shows that the status of prohibitions appears crucial. The vast majority of woolen and cotton fabrics were prohibited in France prior to 1860 (with only a few exceptions in sub-products for cotton and woolen fabrics). The shock is much larger than these authors have suggested in these sectors in our opinion. Notwithstanding the fact that this was a massive re-orientation in trade policy, French industry and trade seems to have remained buoyant rising to the demands of international competition, increasing sales. French consumers are also likely to have gained through a higher variety of products available and at lower cost. On the supply side we emphasize the

importance, implicitly, of product quality and differentiation even at early stages of development and in 19<sup>th</sup> century history which is often under-emphasized in quantitative literature. We have left the study of vertical/quality differentiation and liberalization in the 19<sup>th</sup> century to further research, but we believe that this could be promising area for helping us to achieve greater understanding of the nature of international competition in the first wave of globalization.

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## Data Appendix 1

This appendix lists the sub-products for each of the top nine exports used in this study.

### SILK FABRICS

foulards écrus, foulards imprimés, étoffes unies autres, étoffes façonnées, étoffes brochées de soie étoffes brochées d'or ou d'argent fin, étoffes brochées d'or ou d'argent faux, étoffes mêlées de fil sans mélange, étoffes mêlées de fil et d'or ou d'argent fin, étoffes mêlées de fil et d'or ou d'argent faux, étoffes mêlées d'autres matières, tapis même mêlés de fil, Couvertures, gaze de soie pure, gaze de soie pure mêlée d'or ou d'argent, gaze de soie mêlée d'or ou d'argent faux, Crêpes, crêpes unis, crêpes brodés ou façonnés, Tulle, dentelles de soie dites blondes, dentelles d'or ou d'argent fin, dentelles 'd'or ou argent faux, Bonneterie, passementerie or ou argent fin, passementerie or ou argent faux, passementerie de soie pure, passementerie de soie mêlée or ou d'argent fin, passementerie de soie mêlée d'or ou d'argent faux, passementerie de soie mêlée d'autres matières, rubans même de velours, rubans de soie pure velours, rubans de soie pure autres, rubans de soie mélangée velours, rubans de soie mélangée autres, tissus de bourre de soie étoffes pures, tissus de bourre de soie couvertures, tissus de bourre de soie bonneterie, tissus de bourre de soie tapis mêlés de fil, tissus de bourre de soie passementerie et rubans, tissus de bourre de soie étoffes mélangées, tissus de soie et de bourre de soie, rubans de bourre de soie pure ou mélangée, tissus façon cachemire

### WOOLEN FABRICS

Couvertures, tapis, tapis de pied simples, tapis de pied simples, à chaîne de fil de lin ou de chanvre, moquettes--autres, tapis de pied simples—autres, tapis de pied à nœuds, à chaîne de fil de lin ou de chanvre simples—autres, tapis de pied à nœuds, à chaîne, autres que de fil de lin ou de chanvre a nœuds (a chaînes et autres), tapis de toute espèce, Tapisseries, casimirs et tissus croisés, foulés et drapés, Mérinos, Draps, draps—casimirs, burail et crépon de Zurich, toile a blutoir sans couture, chaussons de lisière, étoffes diverses (serge, cacot, panne), châles brochés et façonnés, Dentelles, Bonneterie, passementerie et rubanerie, passementerie et rubanerie de pure laine, passementerie et rubanerie de pure laine blanche, passementerie et rubanerie de pure laine teinte, passementerie et rubanerie de pure laine mélangée d'autres matières, étoffes mélangées velours pour ameublement, étoffes mélangées autres, lisières de draps, étoffes mélangées, tissus d'alpaga

### WINE

vins ordinaires en futailles (combined with vins ordinaires en futailles d'ailleurs and with vins ordinaires en futailles de la Gironde), vins ordinaires en bouteilles (combined with vins ordinaires en bouteilles d'ailleurs and with vins ordinaires en bouteilles de la Gironde), vins de liqueur en futailles, vins de liqueur en bouteilles

## **COTTON FABRICS**

toiles, percales et calicots écrus et blancs, toiles, percales et calicots teints, toiles, percales et calicots imprimés, toiles cirées et goudronnées, toiles cirées et goudronnées pour emballage, toiles cirées et goudronnées pour ameublement, tentures et autres usages, linge de table en pièces, châles et mouchoirs, Mousseline, mousselines écrues ou blanches unies, mousselines écrues ou blanches--brodées ou brochées, mousselines imprimées, draps et velours, velours façon soie. Velvets, velours autres, Cords, moleskins, etc., étoffes croisées, basins, piqués et autres, étoffes dites printanières, Couvertures, broderies à la main, dentelles fabriquées à la main et aux fuseaux, tulle avec application d'ouvrages en dentelle de fil, tulle, autres, gaze, Bonneterie, passementerie et rubanerie, Nankin, étoffes mélangées, guinées et autres toiles à carreau des Indes, chapeaux de coton, tissus autres, tissus d'écorce en fibres de palmier, cotonnette

## **CLOTHING**

pièces de lingerie cousues, habillements neufs, confectionnés et autres effets à l'usage des voyageurs, habillements neufs, autres, habillements vieux

## **SILK**

soies en cocons, soies écrues gréges, soies écrues moulinées, soies écrues douppions, soies teintées pour tapisserie, soies teintées à coudre, soies teintées toutes autres, bourre en masse écrue, bourre en masse teinte, bourre cardée – frisons-peignés soies-bourre cardée toute autre, soie-bourre peignée de toute sorte, soie-bourre filée--écrue et teinte, soies-bourre filée écrue, soies-bourre filée teinte, fils de bourette ou de déchets de soie

## **TOOLS AND ARTICLES IN METAL**

instruments aratoires faux, instruments aratoires faucilles, instruments aratoires autres, limes et rapés à grosses tailles, limes et rapés à polir dites fines, limes et rapés à poli (fines >17), limes et rapés à polir (fines <17cm), scies circulaires de plus de 20 cm de diamètre, scies circulaires de 20 cm et au-dessous, scies autres que circulaires, ayant comme longueur 146cm ou plus , scies autres que circulaires -- ayant comme longueur moins de 146cm, scies autres -- ayant de longueur plus de 146cm, scies autres -- ayant de longueur moins de 146cm et jusqu'à 50cm, scies autres-- ayant de longueur de 50cm et au-dessous, serrans peignes à pointes d'acier, outils de pur fer, outils de fer rechargé d'acier, outils de pur acier, outils autres de cuivre ou de laiton, ouvrages en métaux dorés ou argentés, ouvrages en fonte , ouvrages en fonte non polis, ouvrages en fonte polis, ouvrages en fonte étamés émaillés vermis, ouvrages en fonte et fer non polis, ouvrages en fonte et fer polis émaillés, ouvrages en fer, ouvrages en fer tubes de tous diamètres, ouvrages en fer ferronnerie, ouvrages en fer serrurerie, ouvrages en fer clous forgés -- vis à bois--boulons et écrous, ouvrages en fer articles de ménage et autres ouvrages non dénommés en fer ou en tôle, ouvrages en tôle et fer blanc, ouvrages en fer blanc et cuivre, ouvrages en acier, ouvrages en cuivre pur ou allié communs, ouvrages en cuivre ou allié tournés fins, ouvrages en cuivre pur ou allié dorés, ouvrages en cuivre pur ou allié argentés, ouvrages en cuivre pur ou allié autres, ouvrages en plomb, ouvrages en étain poterie commune, ouvrages en étain poterie fine, poteries et autres ouvrages en étain pur ou allié, ouvrages en étain autres, ouvrages en nickel allié au zinc et au cuivre, ouvrages en zinc, ouvrages en métaux non dénommés

## **PREPARED SKINS AND ARTICLES OF SKIN OR LEATHER**

peaux préparées d'agneau et de chevreau, peaux préparées parchemin et vélin bruts, parchemin et vélin achevés, peaux préparées cuir de veau odorant--dit de Russie, peaux préparées au tan de chèvre, peaux préparées au tan-- simplement tannées autres que de porc—grandes, peaux préparées au tan--simplement tannées autres que de porc--petites , peaux préparées pour la ganterie, peaux préparées au tan corroyées pour tiges, peaux préparées au tan corroyées autres que pour tiges de bottes, peaux préparées à l'alun hongroyées, peaux préparées à l'alun – mégissées, peaux préparées teintées de mouton, peaux préparées teintées autres, peaux préparées autres, Gants, buvards, étuis, porte-cigares, portefeuilles et porte-monnaie, sellerie grossière, outres vides, sellerie autre que les bâts non garnis de cuir, Sellerie, Chaussures, ouvrages en peau ou en cuir autres, pelleteries ouvrées

## **WOOL**

laines en masse -- (combined with: laines en masse dégraissées et épurées, laines en masse en suint ou lavées, laines en masse en suint communes , laines en masses en suint fines, laines en masse lavées communes, Laines en masse lavées fines), alpaga, laines peignées, laines teintées de toute sorte, déchets de laine, déchets de bourre entière, déchets de bourre lanice et tontisse

## Appendix 2: Hidden Trade and Smuggling

Very probably part of exports in transit does in fact include special trade. Agents might have done this in order to reduce administrative formalities. Another common problem of old trade statistics is smuggling. Considering the nature of smuggling (easy to transport, low price elasticity, a large gap in taxation levels between countries) and the example of a publication by the British government covering data on products seized, Dormois gives the conclusion “we can presume that smuggling traffic represents probably about 5% of total trade” (Dormois, 2009: p.134).

These data do not include trade from tourism. From the establishment of the Second Empire, and with railway development, European tourism (from UK, Germany, Russia etc.) became important in France particularly in the Atlantic and Mediterranean coasts as well as in Paris (Larique, 2006). Trade from tourism and associated purchases by foreign residents may be significant during the first globalization but likely only for some headings. Specifically these would be the “articles de Paris, garments, underwear and silk fabrics”.

Another common issue in 19th century trade statistics concerns the use of official prices. After 1848 the official French data show “annualised values” using standard prices defined by the Customs Value Commission (Created in December 1848). These prices supplanted the “official values” which were based on fixed values defined in 1827 and heavily criticised up to 1847 as unrealistic.

To establish the “annualized values” during the first months of year the committee defined the standard price used to value the quantity on each heading of the general tariff nomenclature. Between 1848 and 1863 the French *Tableau* offers both series (annualised and official values). After 1863 “official values” were removed (as in the official British data after 1854). We use “annualized values” throughout.

Regarding imports, according to Dormois (2009), traders might be incentivized to under value the units prices in order to reduce ad valorem taxation. By computing the

“mirror flows” between Belgium and France, Dormois (2009) evaluated the gap at a maximum of roughly 3.02 % (Dormois, 2009: p.133). He concludes that the possible bias is unlikely to exceed 5%. Unit values defined by the French and Belgian commissions can be different even for a relatively homogeneous heading. These differences may reveal differences in product characteristics or demand features of each market.

### **Appendix 3 Product classification**

Product classification is a crucial issue in historical trade data. The definition of the nomenclature can influence dramatically any analysis of such data.

In the *Tableau Général du Commerce*, French contemporaries classified exported and imported products into three main categories: agricultural products, primary products and manufactured products.

It is possible to classify products imported and exported by using Standard Industrial Classification (rev.3). Here we can consider four broad categories : agriculture, hunting and forestry (A), fishing (B), mining and quarrying (C) and manufacturing (D), the other divisions are not relevant for international trade during the period.

Some differences can be emphasized. In the contemporary source agricultural products include manufactured and processed food products (butter, cheese, refined sugar, meat, grease...) and beverages (wines, spirits), manufactures of tobacco products. Oppositely, SIC includes these products in section D (15).

A broader definition of manufacturing products offers different vision of French trade than contemporary sources offered. The shares of manufactured products in imports and exports are higher. Net exports is higher for manufacturing, particularly between the end of the 1890s and WWI. In this period there is a large contribution food products and beverages to exports in a context of increasing protection of the agricultural sector.

Nevertheless, the trends are roughly the same: between 1860 and the start of the 1880s the net export ratio manufactured products decreased quickly. This ratio was stable during the rest of Belle Epoque. The net export ratio for agricultural products is always in large deficit.

Some good arguments justify the inclusion of processed food products into the manufactured sector: use of capital, the degree of transformation and so forth. For an economy with a diversified exports ISIC or contemporary nomenclatures can give roughly similar results, but for economies with highly concentrated exports, anomalous results can appear. In the nineteenth century, large wine exporters such as Spain and Algeria can appear as “industrialized” areas. For Spain in the 1880s wine’s share in total exports was more than 30% with a peak of 40% in the mid-1880s (Pinilla & Serrano, \*\*\*). Before WWI in Algeria the share of wine in total exports is greater than 40% (Meynié, 1981).

The following tables show how we classified each of the 104 products for purposes of our analysis into, exotic/tropical, primary/agricultural, semi-manufactured and manufactured. Semi-manufactured goods retain some similarities to commodities in that they are relatively homogenous. On the other hand, they are also processed using significant amounts of capital (e.g., mining and refining). The tropical/exotic goods are by and large those products not produced in metropolitan France. Different from contemporary classifications we include processed food and beverages in the manufactured rather than the agricultural sector.

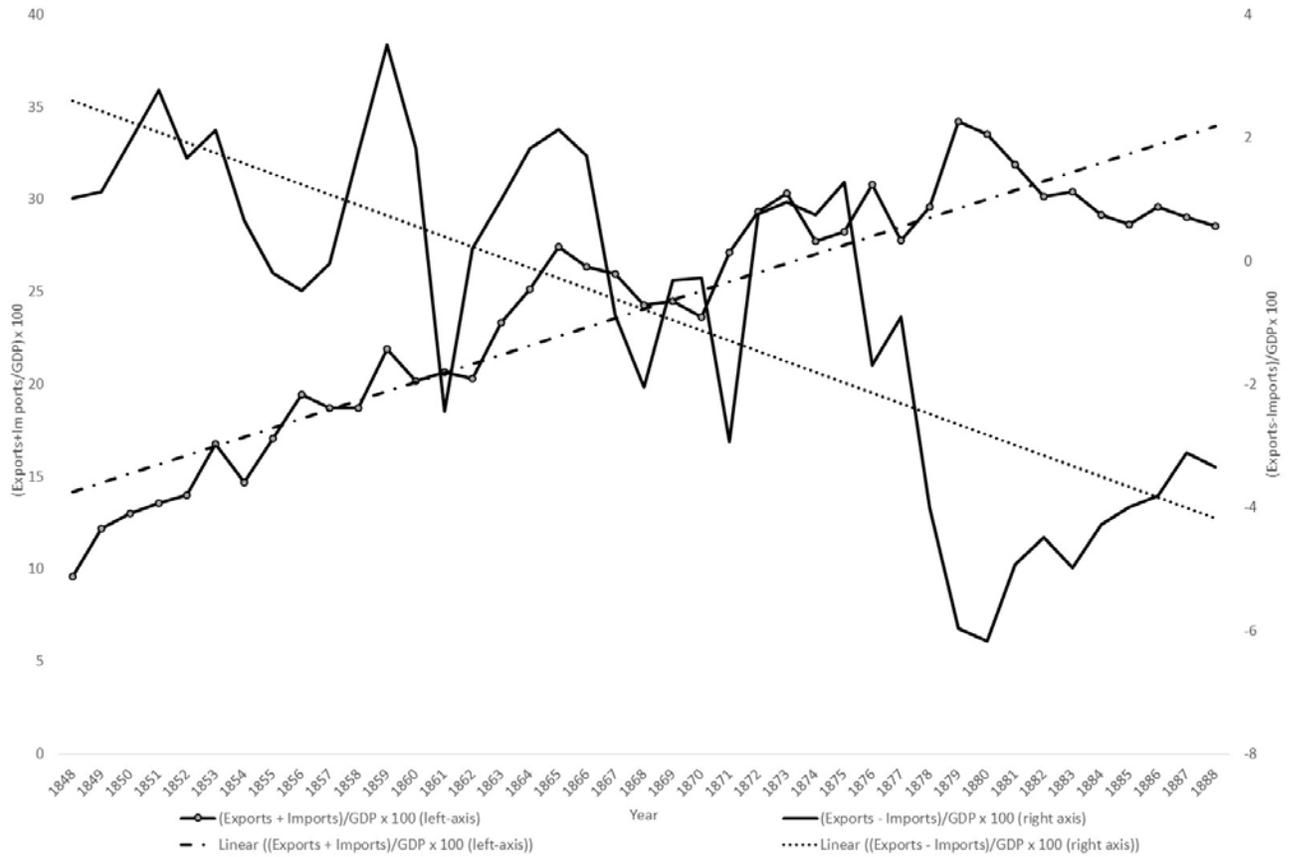
Appendix Table 3.1 Classification of 104 Products

SIC code	French Name	English Name	Type
0.01	Arachides et noix de touloucouna	ground nuts	Tropical/exotic
0.02	Bois Exotiques	Tropical wood	Tropical/exotic
0.0113	Cacao	Cocoa	Tropical/exotic
0.0113	Café	Coffee	Tropical/exotic
0.01	Cochénille	cochineal	Tropical/exotic
0.02	Ecorce de quinquina	Cinchona bark	Tropical/exotic
0.013	Girofle	cloves	Tropical/exotic
0.02	Gommes exotiques	tropical rubber	Tropical/exotic
24	Indigo	indigo	Tropical/exotic
0.01	Poivre et piment	peppers	Tropical/exotic
15.1	Thé	tea	Tropical/exotic
0.0121	Bestiaux	Animals	Primary/Ag.
0.02	Bois communs	Wood	Primary/Ag.
0.0111	Céréales	Grains	Primary/Ag.
17.1	Chardons cardières	cardoon thistles	Primary/Ag.
0.0121	Chevaux, mules et mulets	horses, donkeys, mules	Primary/Ag.
13.2	Étain	tin	Primary/Ag.
24	Extraits de bois de teinture	extracts of dyeing wood	Primary/Ag.
0.0111	Fruits de table	fruit	Primary/Ag.
24	Garance	dye: madder	Primary/Ag.
0.0113	Graines et fruits à ensemercer	seeds and fruits for planting	Primary/Ag.
0.0111	Graines et fruits oléagineux	oil seeds and oleaginous fruits	Primary/Ag.
15.1	Graisse de poisson	fish fat	Primary/Ag.
15.1	Graisses de toute sorte	fats and grease	Primary/Ag.
0.01	Houblon	hops	Primary/Ag.
10.1	Houille crue, carbonisée et agglomérée	coal: Raw, carbonized and agglomerated	Primary/Ag.
0.01	Jute en brins ou teillé	raw jute	Primary/Ag.
0.011	Lin et Chanvre	linen and hemp	Primary/Ag.
13.1	Minerai de fer	iron	Primary/Ag.
0.01	Œufs de vers à soie	silkworm eggs	Primary/Ag.
0.012	Oeufs	eggs	Primary/Ag.
0.01	Peaux et pelleteries brutes	leather and skins	Primary/Ag.
13.1	Plomb	lead	Primary/Ag.
0.01	Plumes de parure	ornamental feathers	Primary/Ag.
0.01	Poils propres à la filature ou à la chap	hairs for spinning, bristles	Primary/Ag.
0.05	Poissons frais, secs, salés...	fish	Primary/Ag.
0.01	Pommes de terre, légumes secs et leurs farines	potatoes, legumes	Primary/Ag.
14.21	Potasse	potassium	Primary/Ag.
0.01	Riz	rice	Primary/Ag.
0.05	Rogues de morue et maquereau	cod and mackerel roe	Primary/Ag.
0.01	Safran	saffron	Primary/Ag.
14.2	Sel de marais ou de saline	salt	Primary/Ag.
17.1	Soies	silk	Primary/Ag.
24	Soufre	sulphur	Primary/Ag.

SIC code	French Name	English Name	Type
0.01	Sucres bruts	raw sugar	Primary/Ag.
0.01	Tabac en feuilles ou en côtes	tobacco, raw	Primary/Ag.
15.1	Viandes fraîches, salées...	meat	Primary/Ag.
13.1	Zinc	zinc	Primary/Ag.
24	Acide stearique, cire, bougies	Stearic acid, wax, candles	Semi-manufactured
36.91	Cendres et regrets d'orfèvres	Cendres et regrets d'orfèvres	Semi-manufactured
13.2	Cuivre	copper	Semi-manufactured
14.21	Guano et autres engrais (y compris les engrais)	fertilizers (natural and synthetic)	Semi-manufactured
0.013	Laines en masse, peignées, teintées et déchets	raw wool, dyed wool	Semi-manufactured
20.2	Natte ou tresses de paille, d'écorce ou de spart	mats, braided straw	Semi-manufactured
33.3	Or battu tiré laminé ou filé	gold, laminated	Semi-manufactured
19	Peaux préparées (et peaux tannées)	prepared hides and skins	Semi-manufactured
15.3	Tourteaux de graines grasses...	oil seed cake	Semi-manufactured
29.27	Armes poudres et munitions	Weapons, gunpowder, ammunition	Manufactured
24	Chandelles	candles	Manufactured
19	Chapeaux	hats	Manufactured
17.1	Coton en laine	woolen cotton fibers	Manufactured
24	Couleurs crayons encres	ink	Manufactured
28.93	Coutellerie	knives	Manufactured
17.1	Drilles	rags	Manufactured
15.51	Eaux de vie, esprits et liqueurs	Eaux de vie, spirits, licors	Manufactured
17.11	Fils de coton et de laine	Cotton/wool thread	Manufactured
17.11	Fils de lin, de chanvre	linen thread	Manufactured
17.11	Fils de poil de chevre	goat hair thread	Manufactured
13.1	Fonte, fer et acier	cast iron and steel	Manufactured
15.2	Fromages et beurres	butter and cheese	Manufactured
24	Garancine	dye: garancine	Manufactured
33.3	Horlogerie	watches and clocks	Manufactured
15.1	Huile d'olive	olive oil	Manufactured
15.1	Huiles de graines grasses et de fruits oléagineux	vegetable oils, other	Manufactured
11.1	Huiles et essences de pétrole et de schiste	petroleum: oil and gas	Manufactured
11.1	Huiles volatiles et essences	oils (non-petroleum)	Manufactured
29	Instruments aratoires	farm implements	Manufactured
33	Instruments de musique	musical instruments	Manufactured
18.1	Lingerie et Vêtements	Clothing	Manufactured
29	Machines et mécaniques	machines	Manufactured
20	Matériaux	industrial materials	Manufactured
24.23	Médicaments composés	medicine, drugs	Manufactured
19	Modes et fleurs artificielles	artificial flowers	Manufactured
33.3	Orfèvrerie et bijouterie	jewelry	Manufactured
28	Outils et ouvrages en métaux	tools	Manufactured
19	Ouvrages en peau ou en cuir	leather products	Manufactured
21	Papiers et ses applications	paper	Manufactured

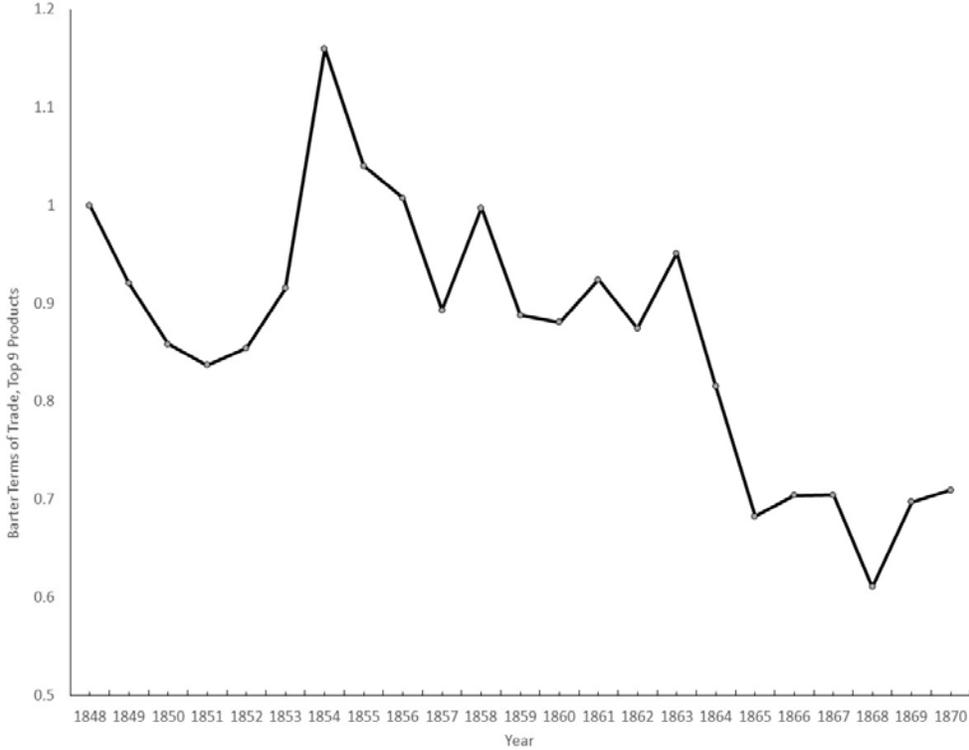
SIC code	French Name	English Name	Type
24.2	Parfumeries et Savons	perfume and soap	Manufactured
19	Pelleteries préparées ouvrées ou confectionnées: furs: prepared and confectionery	furs: prepared and confectionery	Manufactured
0.01	Plaqués	panels	Manufactured
26	Poteries, verres et cristaux	glass, pottery, crystal	Manufactured
15	Préparations sucrées	sugar confectionery, candy	Manufactured
24	Produits chimiques	chemical products	Manufactured
15.1	Sucres raffinés et vergeoises	refined sugar	Manufactured
24	Suif brut et saindoux	raw tallow and lard	Manufactured
16	Tabac fabriqué	tobacco products	Manufactured
19	Tabletterie, bimboloterie, broserie... et article	parisian products	Manufactured
17	Tissus de coton	cotton cloth	Manufactured
17	Tissus de jute	linen cloth	Manufactured
17	Tissus de laine	wool cloth	Manufactured
17	Tissus de lin et/ou de chanvre	linen or hemp cloth	Manufactured
17	Tissus de poil	cloth of animal hair	Manufactured
17	Tissus de soie et de bourre de soie	silk cloth	Manufactured
15.52	Vins	wine	Manufactured

Figure 1 Evolution of the Ratio of Total Trade (Exports + Imports) to GDP and the Ratio of the Trade Balance to GDP, 1848-1888



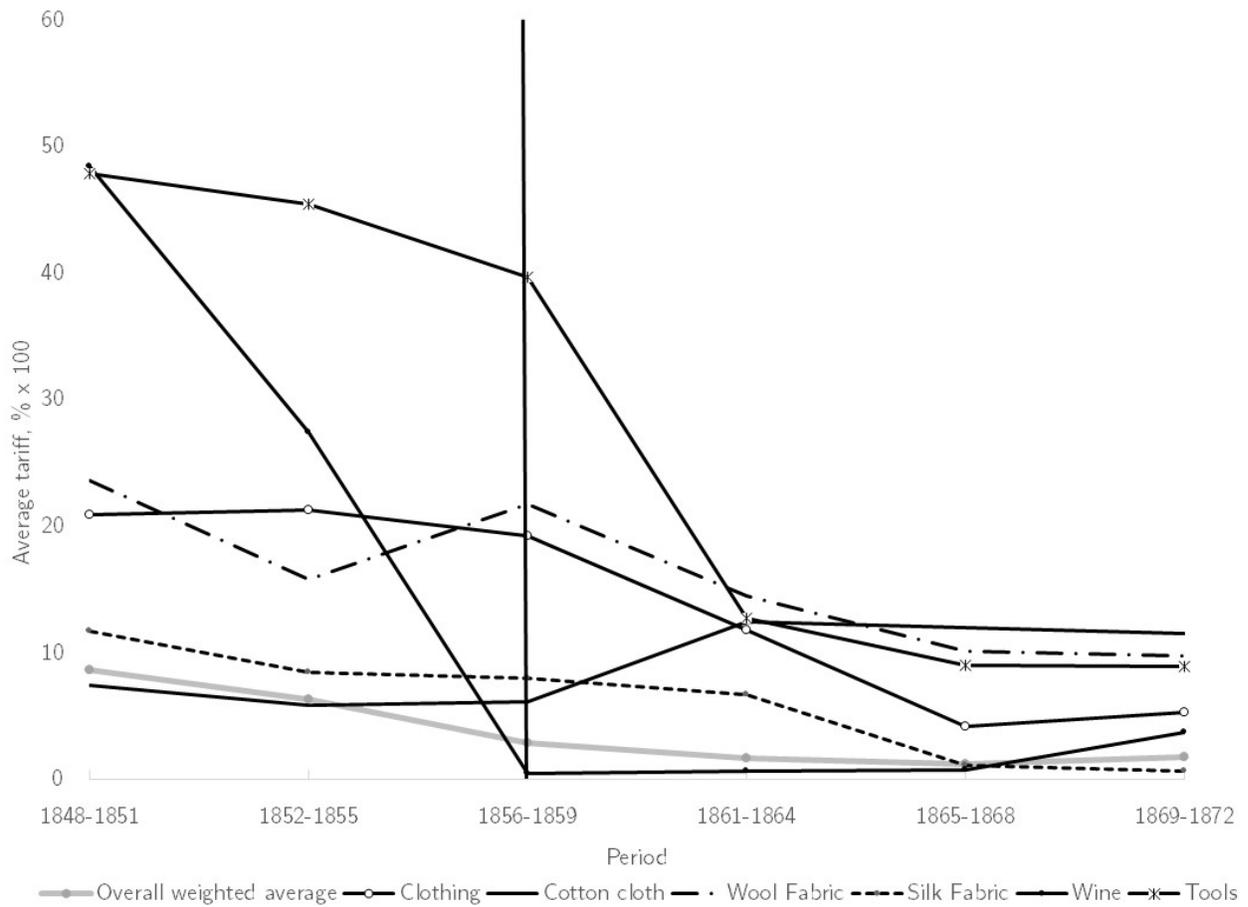
Notes: Trade data are from the *Tableau*. GDP data is from the Maddison project. Linear time trends are super-imposed.

Figure 2 Net Barter Terms of Trade for the Sub-Products Comprising the Top 9 French Exports Categories, 1848-1870 (1848 =1)



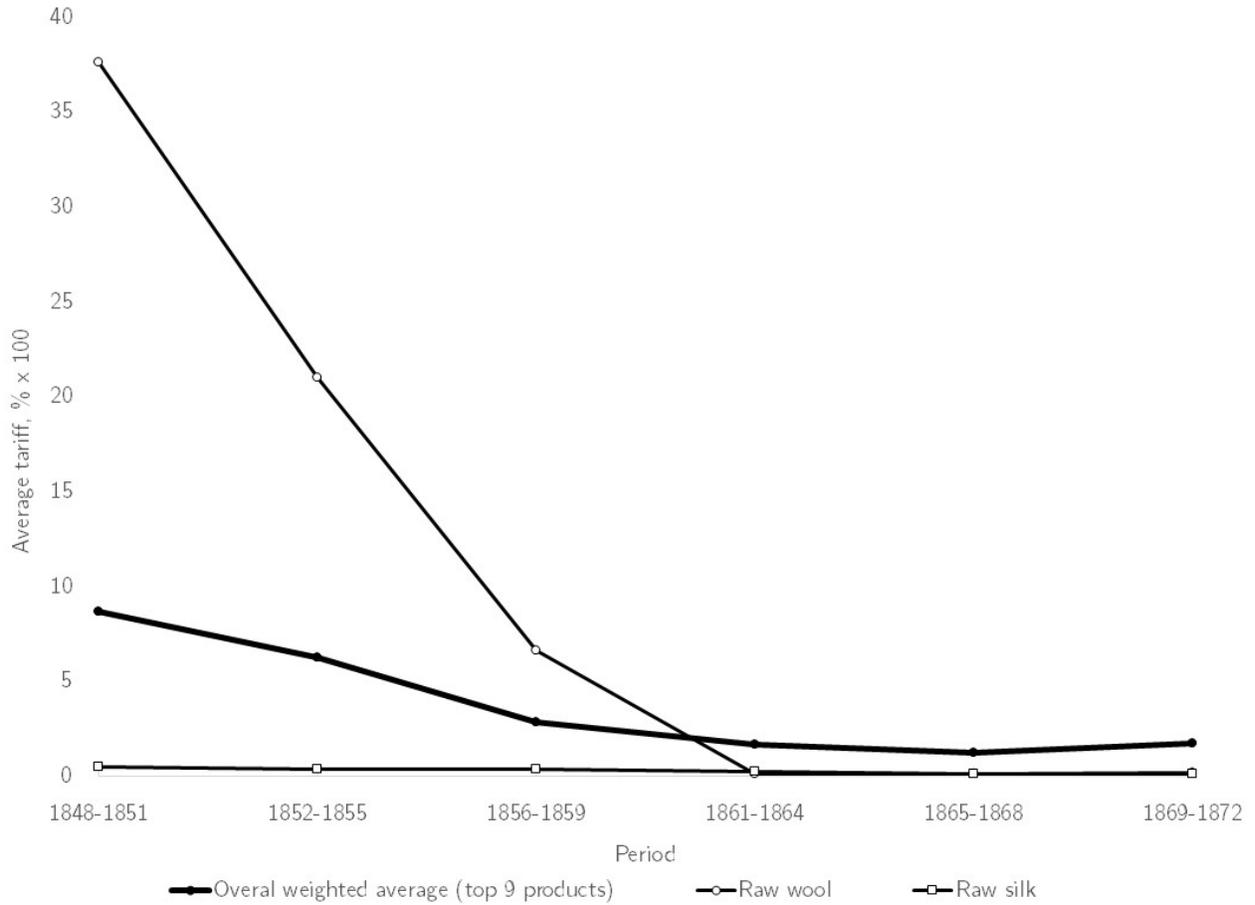
Notes: This figure shows the net barter terms of trade for products classified in the top 9 French exports. Data for unit values for imports and exports are available for the sub-products described in the text and in Appendix 1. These are combined to form Laspeyres indexes for exports and imports with the base year being 1848.

Figure 3 Average Tariffs for Manufactured Products and Across All Top 9 Products, 1848-51 to 1869-72



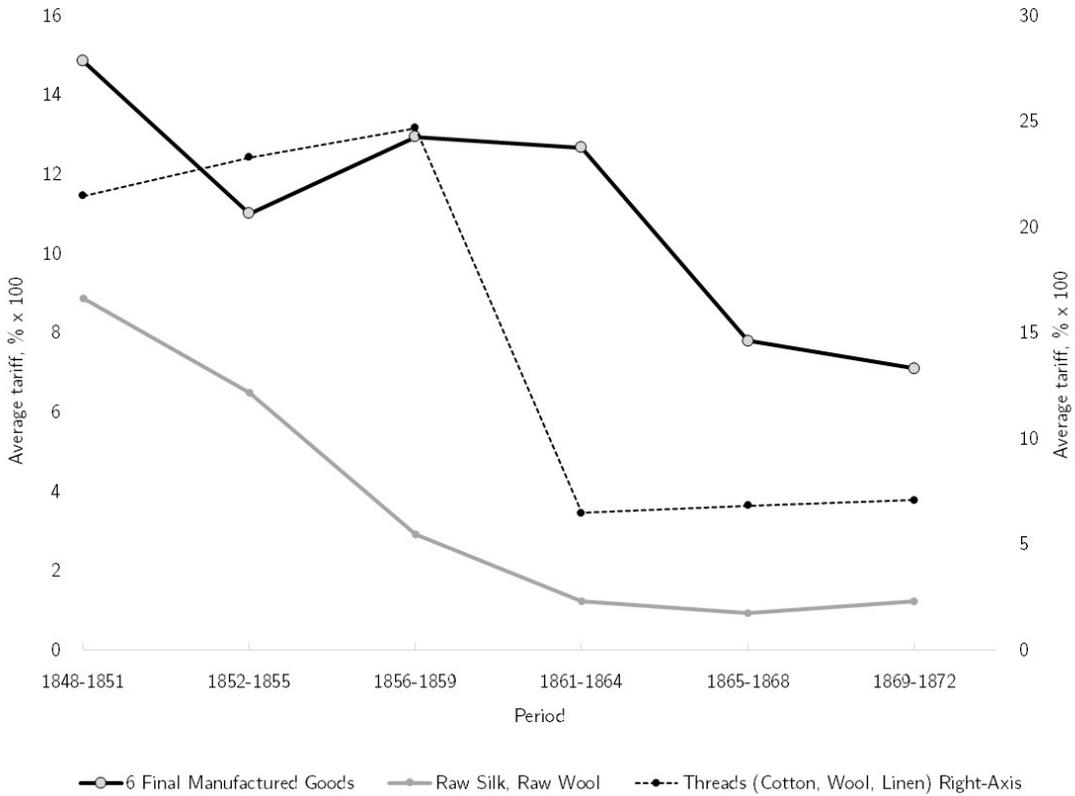
Notes: Lines show the average tariff for each product in the top nine that we classified as ‘manufactured’. The average tariff is calculated as the weighted average of the ratio of the tariff revenue to total imports for each sub-product within the broad class listed in the figure. Weights are equal to the share in imports of each sub-product within the broad product class. The overall weighted average tariff is the weighted average of these six products and two other products raw wool and raw silk. The weights are the ratio of the total imports of each broad product to total imports of the top nine products. Tariffs are calculated from annual data and then averaged within each three year period. The vertical line represents the last period prior to 1860 when the Cobden Chevalier treaty was signed.

Figure 4 Average Tariffs for Non-Manufactured Products and Across All Top 9 Products, 1848-51 to 1869-72



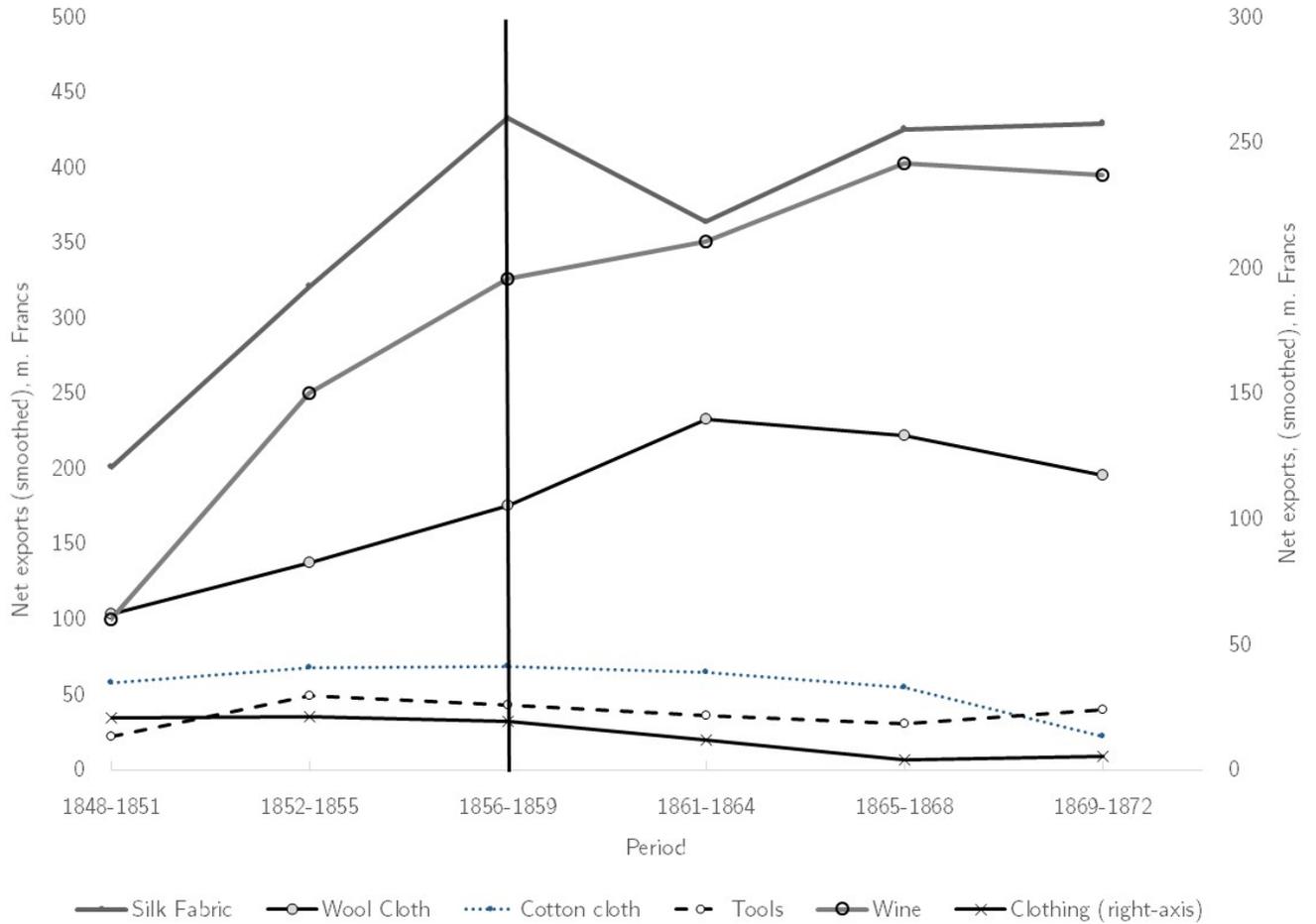
Notes: Lines show the average tariff for each product in the top 9 that we classified as ‘non-manufactured’. The average tariff is calculated as the weighted average of the ratio of the tariff revenue to total imports for each sub-product within the broad class listed in the figure. Weights are equal to the share in imports of each sub-product within the broad product class. The overall weighted average tariff is the weighted average of the same products in Figure 3. The weights are the ratio of the total imports of each broad product to total imports of the top 9 products. Tariffs are calculated from annual data and then averaged within each three year period.

Figure 5 Average Tariff Rates for Six Final Manufactured Products, Three Intermediates, and Two Raw Materials, 1848-51 to 1869-72



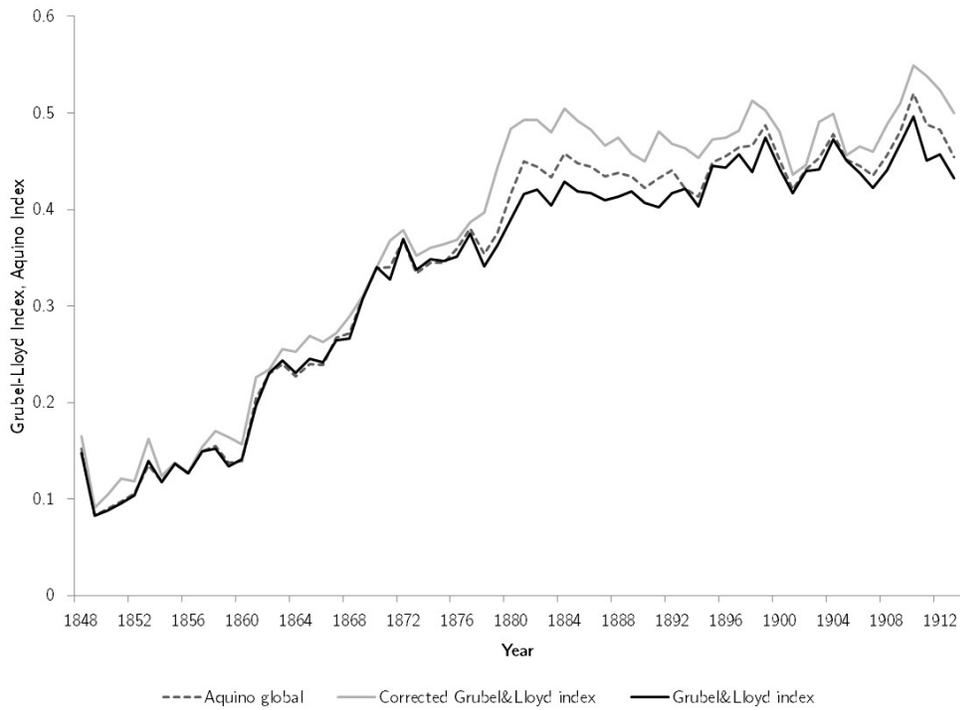
Notes: Figure shows the average tariff for six broad product ranges of manufactured goods (clothing, leather, tools, wool cloth, cotton cloth and silk cloth), raw silk and raw wool, and thread (cotton, wool, linen).

Figure 6 Net Exports for 6 Products, 1848-51 to 1869-72



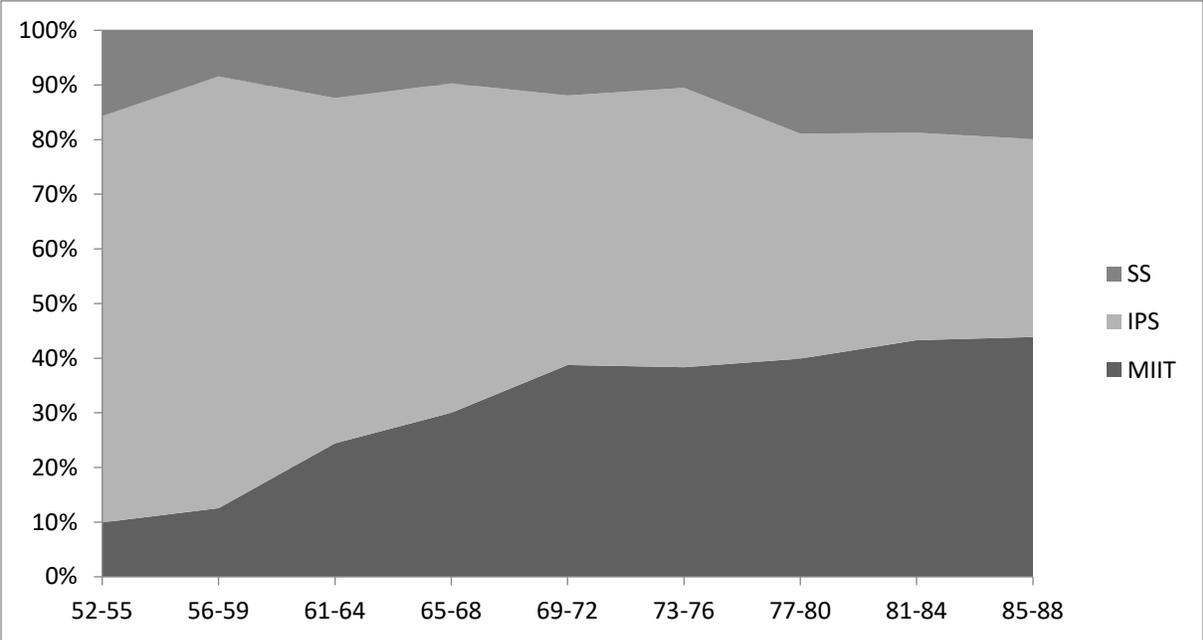
Notes: Figure shows the net exports of five of the six manufactured goods. Values are in millions of current French Francs and averaged within three year periods. Vertical line is in the last period before the Cobden Chevalier treaty of 1860. Source for data is the *Tableau* (see text).

Figure 7 Grubel-Lloyd and Aquino Indexes, 1848-1913



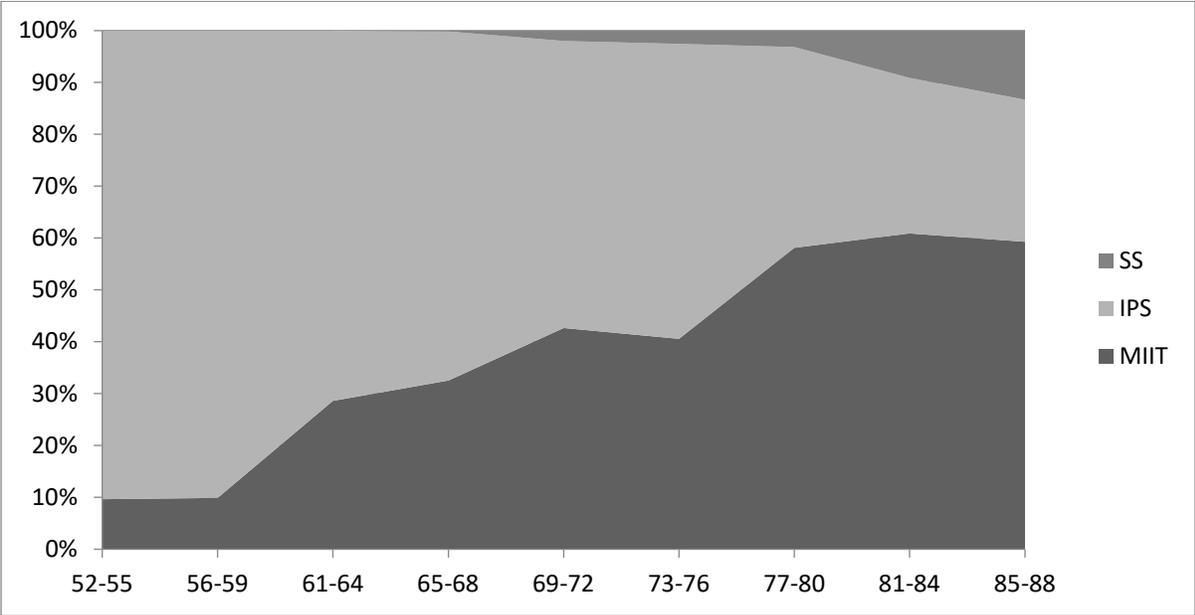
Notes: Figure shows the Grubel Lloyd, Corrected Grubel-Lloyd and Aquino indexes of intra-industry trade for 104 broad products.

Figure 8 Decomposition of Changes in Trade (*MIIT*, *IPS*, *SS*), 104 Products, 1848-51 to 1885-88



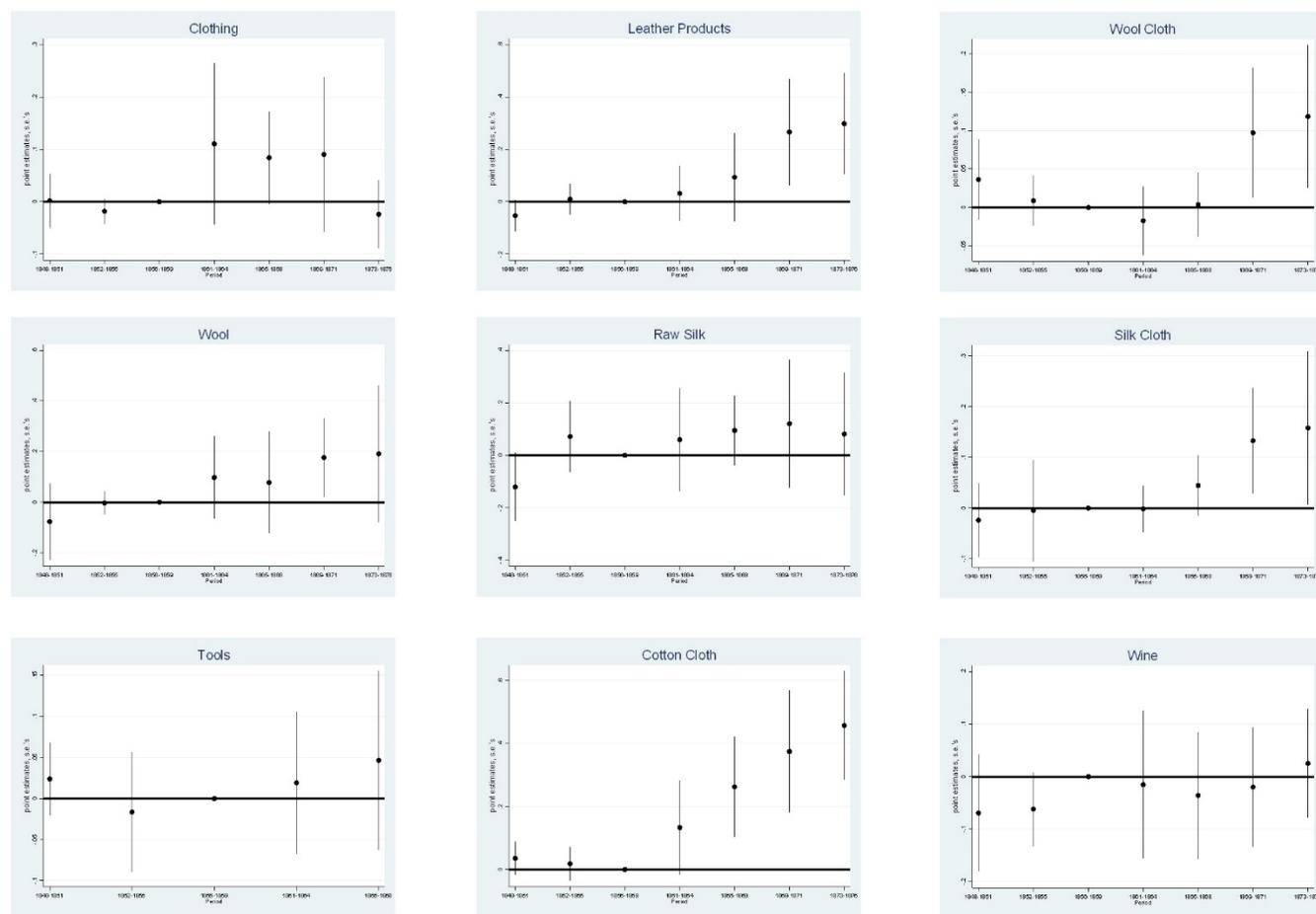
Notes: Data show the *MIIT*, *IPS* and *SS* indexes for the 104 broad products. Trade data are smoothed within periods. See text for formulae.

Figure 9 Decomposition of Growth in Trade for Top 9 Products (*MIIT*, *IPS*, *SS*), 1848-51 to 1885-88



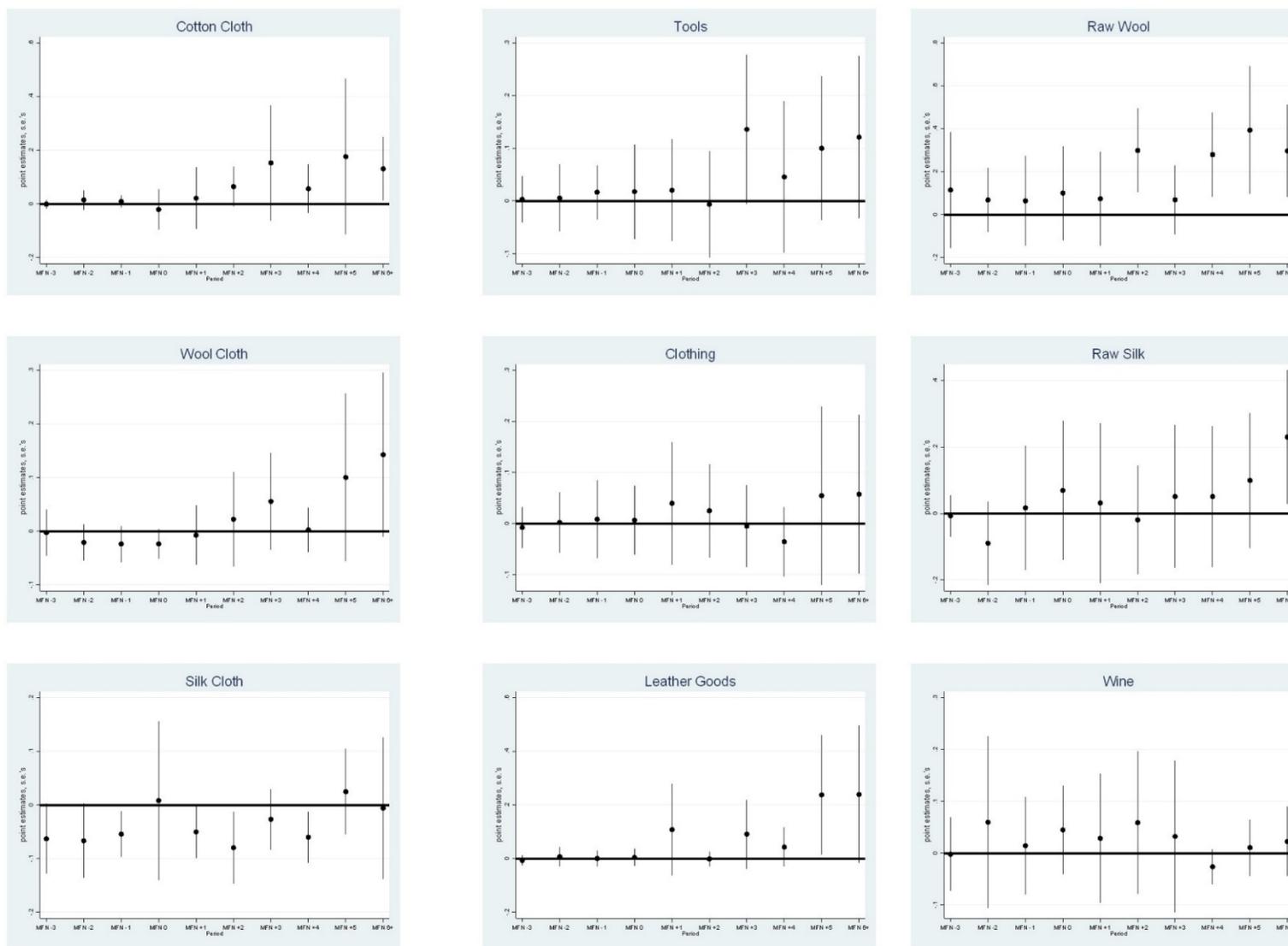
Notes: Data show the *MIIT*, *IPS* and *SS* indexes for the total values of trade within the nine top products. Trade data are smoothed within periods. See text for formulae and an explanation of the products included.

Figure 10 Estimated Evolution of Intra-Industry Trade for Nine Broad Product Categories, 1848-51 to 1873-76



Notes: Figures show the OLS estimates of the period averages in the Grubel Lloyd Index (dots) and 1.96 times the clustered standard errors (bars) for the top 9 French exports relative to the 1856-59 period. There are 7 four-year periods (1848-51,...,1873-76) except for tools for which data are un-available. Product fixed effects and time indicators are included in all specifications.

Figure 11 Estimated Association between Commercial Treaties with MFN Clauses and the bilateral Grubel-Lloyd Index of Intra-Industry Trade, in the Years Before, at the Time of and after Adoption.



Notes: Figures show the point estimates (dots) and 1.96 times the clustered standard errors (bars) for the MFN indicator in panel regressions of the bilateral GL index (i.e., GL is measured for a product, country, and year triplet) on time indicators,

product fixed effects, and country fixed effects. The MFN indicator has 3 leads, a contemporaneous value, 5 lags and a final indicator for an active MFN treaty 6 years and beyond. Data are for 74 countries between 1850 and 1870.

Table 1 Decomposition of Growth in Gross Trade, 1848-51 to 1885-88

<b>Top 9 Exports</b>	1852-55	1856-59	1861-64	1865-68	1869-72	1873-76	1877-80	1881-84	1885-88
<i>MIIT</i>	9.65	9.89	28.62	32.52	42.67	40.60	58.14	60.90	59.31
<i>IPS</i>	90.35	90.11	71.38	67.31	55.32	56.84	38.67	30.01	27.36
<i>SS</i>	---	---	---	0.17	2	2.56	3.19	9.09	13.33
Total sum of column	100	100	100	100	100	100	100	100	100
<b>104 Broad Products</b>									
MIIT	9.96	12.59	24.43	30.01	38.75	38.32	39.91	43.31	43.87
IPS	74.33	79.01	63.15	60.30	49.32	51.16	41.17	37.94	36.22
SS	15.71	8.41	12.42	9.69	11.93	10.51	18.92	18.75	19.90
Total sum of column	100	100	100	100	100	100	100	100	100

Notes: Table presents the values of the growth in trade accounted for by *MIIT* (intra-industry trade), *IPS* (increase in previous specialization) and *SS* (shifts in specialization) in percentage terms (x 100). Underlying trade data for 104 broad products and the top 9 exports, and are averaged within three year periods. The *MIIT*, *IPS* and *SS* are weighted averages across all products with weights based on share in total trade in the base period. The base period is 1848-1851.

Table 2 Determinants of Marginal Intra-Industry Trade, Increase in Previous Specialization and Specialization Shifts, 1856-59 to 1861-1864.

Category	MIIT (1)	IPS-SS (2)	Category	MIIT (3)	IPS-SS (4)
Manufactured	0.08 [0.06]	0.01 [0.19]	Top nine	0.23** [0.09]	-0.10 [0.25]
Constant	0.12*** [0.04]	0.03 [0.13]	Constant	0.12*** [0.03]	0.04 [0.10]
Observations	98	89		98	89
R <sup>2</sup>	0.02	0.00		0.06	0.00

Notes: Dependent variable is *MIIT* which is defined as a difference between two periods. See text for formulae. Data are smoothed within 1856-1859 and 1861-1864 to create two periods. Data comprise all main products (104) in official trade data. Estimation is by OLS. Robust standard errors are in brackets are clustered at the product level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3 Evolution of the Grubel-Lloyd and Intra-Industry Trade, 1856-59 Compared to 1861-1864, Broad Products

	<b>GL</b>	<b>IIT</b>	<b>ln (IIT)</b>		<b>GL</b>	<b>IIT</b>	<b>ln (IIT)</b>
Manufactured	(1)	(2)	(3)	Top nine	(4)	(5)	(6)
Manufactured x 1861-1864	0.03 [0.04]	4.44 [4.00]	0.07 [0.14]	Top nine x 1861-1864	0.09** [0.04]	20.58** [9.41]	0.10 [0.09]
1861-1864	0.03 [0.03]	3.80 [2.61]	0.03 [0.08]	1861-1864	0.03 [0.02]	3.30* [1.68]	0.05 [0.08]
Constant	0.15*** [0.01]	6.46*** [0.99]	0.32*** [0.03]	Constant	0.15*** [0.01]	6.46*** [0.93]	0.32*** [0.03]
Observations	166	166	166		166	166	166
R <sup>2</sup>	0.06	0.11	0.01		0.08	0.22	0.01

Notes: Dependent variable in columns 1 and 4 is the Grubel Lloyd Index. In columns 2 and 5 it is IIT a measure of intra-industry trade. Columns 3 and 6 use the ln (IIT) measure. See text for formulae. Data are smoothed within 1856-1859 and 1861-1864 to create two periods. Data comprise all main products (83 out of 104) in official trade data with balanced data available. Estimation is by OLS. Robust standard errors are in brackets are clustered at the product level. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4 Estimated Marginal Intra-Industry Trade and Specialization Shifts by Broad Product Classification, 156 Sub-Products in the Top 9 Broad Export Classes, 1856-59 to 1861-64

Category	MIIT			Category	IPS - SS		
	(1)	(2)	(3)		(4)	(5)	(6)
Manufactured	-0.13*			Manufactured	0.06		
	[0.07]				[0.19]		
Clothing		0.25*	0.08	Clothing		0.57**	0.91***
		[0.13]	[0.07]			[0.29]	[0.07]
Wool		0.27*	0.56***	Wool		-0.47	0.39***
		[0.16]	[0.03]			[0.30]	[0.06]
Tools		0.11***	0.06*	Tools		-0.36***	-0.38
		[0.04]	[0.03]			[0.13]	[0.34]
Leather		0.13**	0.04	Leather		0.17	-0.23
		[0.06]	[0.02]			[0.23]	[0.46]
Silk		0.27***	0.54***	Silk		-0.31	-0.25
		[0.09]	[0.17]			[0.21]	[0.27]
Cotton cloth		0.10**	0.14	Cotton cloth		-0.43**	-0.21
		[0.05]	[0.09]			[0.19]	[0.51]
Wool cloth		0.09*	0.22	Wool cloth		0.02	0.35
		[0.05]	[0.14]			[0.25]	[0.32]
Silk cloth		0.03**	0.07***	Silk cloth		-0.34**	0.22
		[0.01]	[0.02]			[0.16]	[0.47]
Wine		0.01	0.00	Wine		0.01	0.57
		[0.01]	[0.00]			[0.51]	[0.45]
Observations	156	156	156		156	156	156
R <sup>2</sup>	0.04	0.27	0.71		0.00	0.13	0.20

Notes: Dependent variable in columns 1,2, and 3 is *MIIT* which is defined as a difference between two periods. The baseline is 1848-51 and the end period is 1861-64. Dependent variable in columns 3, 4, and 5 is *IPS-SS* also defined as a difference between a given period and a baseline period. See text for formulae. Annual data are smoothed within the 1861-1864 period by a simple arithmetic average. Regressions are un-weighted in columns 1,2, 4, and 5.

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Columns 3 and 6 use the export values in 1848-51 to weight observations. Data comprise 156 sub-products for the top 9 categories of exports. Estimation is by OLS. Robust standard errors are in brackets and clustered at the broad product level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 5 Association between MFN-Treaties of Commerce and Bilateral Intra-Industry Trade, 1850-1870

	(1)	(2)	(3)	(4)		(5)	(6)
MFN	0.07*** [0.02]	0.03*** [0.01]	0.03*** [0.01]				
MFN GB				0.06 [0.04]*	MFN(-3)	-0.01 [0.01]	-0.01 [0.02]
MFN Belgium				0.13*** [0.04]	MFN(-2)	-0.00 [0.02]	-0.01 [0.03]
MFN Turkey				-0.01 [0.01]	MFN(-1)	-0.00 [0.02]	-0.01 [0.03]
MFN Hanseatic				0.18*** [0.04]	MFN(0)	0.02 [0.02]	0.01 [0.04]
MFN Italy				0.03 [0.02]	MFN(+1)	0.03 [0.02]	0.02 [0.04]
MFN Switzerland				0.13*** [0.04]	MFN(+2)	0.04 [0.03]	0.03 [0.04]
MFN Sweden				-0.01 [0.01]	MFN(+3)	0.06** [0.03]	0.05* [0.03]
MFN Norway				-0.01 [0.01]	MFN(+4)	0.04 [0.04]	0.02 [0.04]
MFN Netherlands				0.05 [0.03]	MFN(+5)	0.12** [0.05]	0.11*** [0.04]
MFN Spain				0.02 [0.02]	MFN (+6 or more)	0.13*** [0.05]	0.12*** [0.04]
MFN Portugal				0.05 [0.04]			
Observations	7,489	7,489	7,489	7,489		7,489	7,489
R <sup>2</sup>	0.18	0.19	0.20	0.19		0.21	0.21
Country Fixed Effects	yes	yes	yes	yes		yes	yes
Year Fixed Effects	yes	yes	yes	yes		yes	yes
Product Fixed Effects	yes	yes	yes	yes		yes	yes
Country Fixed Effects x Trend	no	yes	yes	no		no	yes
Product Fixed Effects x Trend	no	no	yes	no		no	yes

Notes: Dependent variable is the Grubel-Lloyd index of intra-industry trade at the bilateral, product level. See text for formula. MFN = 1 when a treaty of commerce and navigation is in effect. Data comprise the top 9 broad categories of exports and cover 74 trade partners. Standard errors clustered at the trade partner and product level are in brackets. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1