

## The First Great Liberalization

Stéphane Becuwe

University of Bordeaux

Bertrand Blancheton

University of Bordeaux

Christopher M. Meissner

University of California, Davis & NBER

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### Summary

In this paper considering an original disaggregated dataset for France's foreign trade recorded annually between 1836 and 1938 we document the evolution of French exports composition, concentration and specialization by using conventional indexes (CR4, CR10, Herfindahl, Lafay). We measure intra-industry trade at different level of aggregation by different indexes (Aquino, Grubel and Lloyd) and explain the phenomena testing Linder hypothesis and tariffs influences. Very originally we consider the evolution of quality positioning in response to tariff and ITT during first globalization.

How did an advanced industrial country react face a great liberalization?

How did this country adapt itself to global markets in the face of rapidly rising foreign productivity and falling trade costs.

How an early starter adapt it insertion strategy in international trade in long run perspective?

In economic theory, three ways are possible in response to trade costs decreasing.

In Ricardian model comparative advantages are founded on differences in relative productivity. Trade liberalization promoted specialisation, each country exports few products in large quantities, exports concentration should be high.

In factor-endowments approach inter-industry trade, mainly between the labor scarce and resource abundant New World and the labor abundant and land scarce Old World, is associated with products homogeneity and weak exports diversification too. According to O'Rourke and Williamson (1999) international trade promoted in long term convergence in real wages.

In new international trade theories exports diversification appears as a response. Incorporating increasing returns and love of variety Krugman model (1979) predicts that rich countries would have produced and exported a wide range of goods. Exports diversification and intra-industry trade increase. In Lancaster model (1980) IIT grows in response to demand diversification. In Falvey's (1981) approach, remains faithful to the classical hypothesis (perfect competition, absence of economies of scale...), quality is an increasing function of capital intensity. Capital abundant countries would have comparative advantage in higher-quality varieties while labour abundant countries have comparative advantage in lower quality varieties.

In the middle of XIXth century France was the second world's largest exporter and offers a significant example to study a national dynamic of adaptation face globalization. During globalization new countries improved local technology and emerged as new workshops to the world. They increased the number of export products, and contested old countries trade power. It is true for small countries as Belgium, Netherland, Denmark and Switzerland. It is true also for new big countries, new leaders in international trade, US and Germany or more later new emerging countries as Sweden in the 1890's, Japan or Italy at the beginning of twentieth century.

There is a large volume of research in the economic and historical literature on France's foreign trade between the 1830s and WWII: Tyszynski 1951, Yates 1959, Maizels 1963, Weiller 1971, Bairoch 1977, Levy-Leboyer and Bourguignon 1990, Verley 1997, Crouzet 2003, Broder 2006, Dormois 2009.... However this research is fragmented and unable to offer a complete and clear view of long-run tendencies and trends. Once all various assessments are put together, the diagnosis of decreasing competitiveness of French exports owing to industrial failure after 1870 becomes the predominant theme of the literature. The empirical basis for such a conclusion, however, is very slim (trade openness stagnation and national market share decreasing). Previous work has not been able to reach this conclusion on the basis of the universe of trade data given the difficulty of processing the necessarily large datasets involved.

In this paper considering an original disaggregated database for France's foreign trade recorded annually between 1836 and 1938 we document for the first time the evolution of French exports composition, concentration and specialization by using conventional indexes (CR4, CR10, Herfindahl, Lafay). We measure intra-industry trade at different level of aggregation by different indexes (Aquino, Grubel and Lloyd) and explain the phenomena testing Linder hypothesis and tariffs influences. Very originally we consider the evolution of quality positioning in response to tariff and ITT during first globalization.

The article is structured as follows. First section presents the original database, discusses nomenclatures, shows keys data and computes conventional indexes about French International trade. Section 2 focus on intra-industry trade measurement and determinant at different levels of disaggregation. Considering ITT 1860 appears as a shock. Section 3 analyses the country reaction: products diversification, innovations and productivity, exports quality positioning by

computing unit values and running regression. Last section discusses the main results and gives some explanation and line of research in link with recent literature on international economics.

## .1. Toward a global view of France's international trade 1836-1938

To analyse French international trade composition and concentration our strategy has consisted in building an original disaggregated database for France's foreign trade recorded annually between 1836<sup>1</sup> and 1938.

Our data set covers 107 headings for imports and about 135 for exports (corresponding to SITC rev.3 classifications). Concerning the definition of trade, we track "*commerce spécial*" and not "*commerce général*". Data from "*commerce spécial*" includes the value of goods imported for national consumption and the value of national production exported. Since "*commerce général*" includes goods in transit these data are less useful for our purposes. Our data set does not include traffic from tourism which can be significant as in the case of garments, underwear, trinkets, perfumes etc. Another common problem of nineteenth century trade statistics concerns valuations of goods and the use of official prices. After 1847 the *French Tableau* provides only '*valeurs annuelles*' using conventional prices defined by a committee and not '*valeurs officielles*' founded on traders statements (see Dormois, 2009, chapter 4). The '*valeurs annuelles*' were averages of market-based prices but some judgment and discretion may have been involved in deciding the exact values.

Appendix 1 give details of products included in exports and imports (with original French items) and how many years are they included in our work. Each year source documents products flows ranking in descending order of traffic. An item "others goods" include the remainder of the trade (items with very small traffics which represente between 5 and 10% of total exports and imports), it introduces difficulties to analyse the evolution of the number of heading (for example to capture variety of trade), it can't be classify.

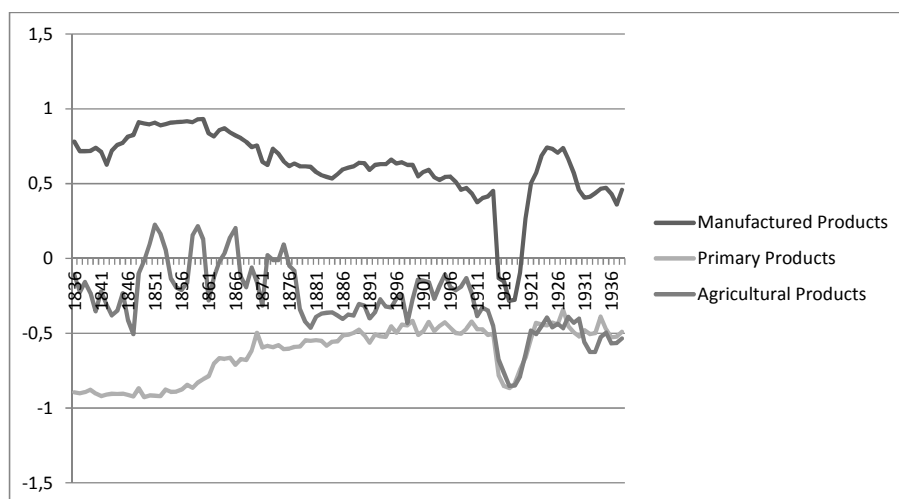
To present data firstly we classify exported and imported products into 3 main categories: agricultural products, primary products and manufactured products (see appendix 1 for details).

We present in Figure the evolution of net exports of manufactured, primary and agricultural products. Before 1860 the net export ratio is high for manufactured products and low for primary products fully in line with the international labor division of an advanced country. Between 1860 and the start of the 1880s the net export ratio manufactured products decreases very quickly. The rate of decrease rises dramatically prior to WWI. In the same time, as in mirror, net exports for primary products increase at the same pace. The convergence of these net exports ratios suggest an emergence of a kind of IIT and also a relative long run degradation of France's insertion in international trade.

<sup>1</sup> Because a lack of annual summary by products we do not include the period 1827-1835.

Commenté [CMM1]: De-industrialization ?

**Figure Evolution of net export ratios for primary, agricultural and manufactured products (1836-1938)**



Source and notes: Tableau général du commerce de la France avec ses colonies étrangères (1836-1896); Tableau général du commerce et de la navigation (1897-1938); own calculations. Net exports for product  $i$  at time  $t$  are defined by the following formula  $(X_{i,t} - M_{i,t}) / (X_{i,t} + M_{i,t})$ .  $X$  denotes exports and  $M$  denotes imports.

In order to highlight the export's dynamic and diversification, it could be interesting to observe the evolution of top exports share's. Appendix 2 presents, for exports and imports, how many years one item is in the top 10 between 1836 and 1938 and purposes an average ranking. For example, in exports, silk fabric witch appeared as the first French specialisation on the period is 103 ways in top 10 and have the best average ranking (1,9). Founded on Appendix 2 Figure proposes for exports the evolution of common concentration ratios CR4, CR10 and of the respective share of top 4 exports (Silk, Woolen and Cotton fabric and Wine) in the total of exports values between 1836 and 1938.

Between the 1830s and the end of the 1850s, export concentration remained very high. At the beginning of the period, France appears to have adhered tightly to the predictions of a Ricardian model of trade exporting a few products in large quantities. France was largely specialized in finished textiles (silk, woolen and cotton fabrics, and wine). From the end of 1850s C10 and C4 decreases rapidly until the shock of WWI. During the interwar period, concentration ratios stay stable at a relative low level.

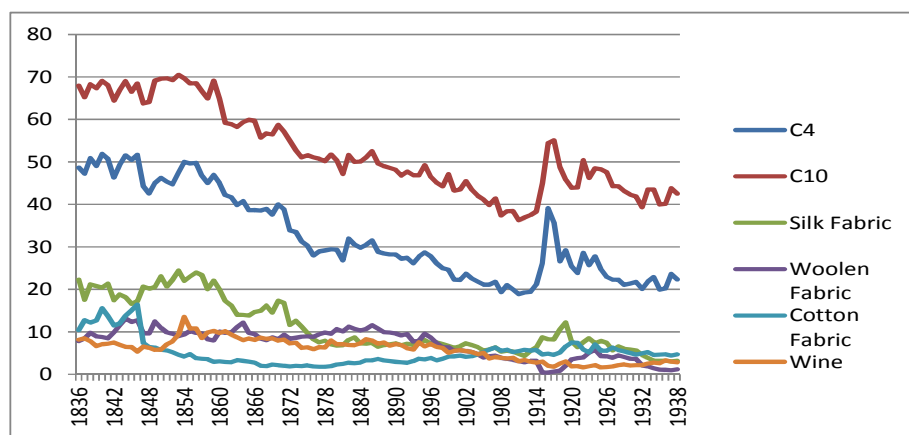
Scrutinizing year-to-year changes in the CR4 index over the 1836-1913 period, allows to trace trade specialization more closely. It is noticeable that the list of France's major foreign exchange earners did not differ markedly from one end of the period to the other. This consisted of a dozen of products including finished textiles (silk, woolen and cotton fabrics), wine, fancy

goods and trinkets<sup>2</sup>). In 1913, France's main exporting industries were still those, which had made their fame under the Second Empire, only their share in total trade had been dwindling. During Belle Epoque France was not able to renew and start up modern large specializations as 'machines and mechanicals' in Germany or 'chemical products' in Switzerland. More largely the decreasing of the ratios suggests an increasing in exports diversification.

After WWI CR10 and CR4 ratios go up to 48% and 27% in 1926 and decrease slowly until 1938 (42% and 23%). In the 1920's Silk fabric stays the first specialization but new products appear in CR4 illustrated a kind of French backwardness (iron, melting, steel, first in the 1930's, chemical products, machines and mechanicals)

**Figure. Evolution of relative share of top 4 exports, C4 and C10**

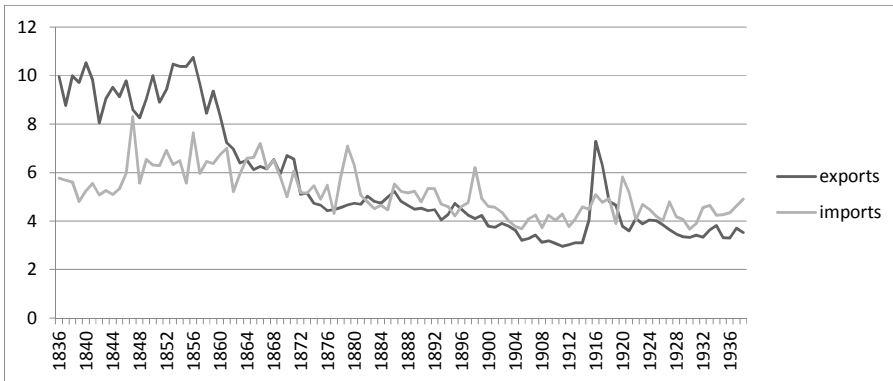
Commenté [CMM2]: Change from colors to dashes etc.



In order to gain a more comprehensive view of French international trade concentration we compute Herfindahl indexes for *all* exports and imports (Figure 4). The Herfindahl index is given by the following formula:  $H = \sum_i X_i^2$  where  $X_i$  is the share of product  $i = 1, \dots, 135$  in total exports. The maximal value is 100 implying total specialization.

**Figure Evolution of the Herfindahl Indexes of exports and imports between 1836 and 1938**

<sup>2</sup> This product category, specific to the French nomenclature combined a number of luxury or decorative articles using precious wood, inlaid with bone, ivory, mother-of-pearl including chessboards, tobacco jars jewellery cases, toys and the like; the Board of Trade used the formula "Small fancy wares and toys."



Between the 1830s and the 1850s, export concentration remains high in line with a Ricardian positioning. During this period, France was highly specialized in a small range of goods. From the mid-1850s, France's trade costs fell dramatically due to advances in international transportation and communications, the signing of the Cobden Chevalier treaty, and subsequent MFN treaties with other major trade partners. The Herfindahl index declined sharply between 1855 and 1865. A momentary deceleration is evident until 1869. From 1870 there is one further strong decline followed by a slower secular decline all the way down to World War I.

This decline would seem to be in opposition to a basic Ricardian trade model suggesting specialization along the lines of comparative advantage. This decline seemingly rules out the idea that productivity growth was concentrated in a few leading sectors or that relative productivity in one or two goods mattered. On the other hand, it is well known that the Ricardian model of Dornbusch et. Al 1977. would predict a negative impact of trade liberalization on export concentration. A rise in the share of many goods not previously exported in significant quantities or values should occur. To the extent that trade cost declines heightened international competition, a Ricardian model would also predict that some goods previously produced locally would lose out to international competition. This would be consistent with a lower import concentration ratio which is also visible in Figure.

**Commenté [CMM3]:** Should look carefully at the extensive margin and regress growth of trade on initial level – perhaps the LFI regressions are similar.

**Commenté [CMM4]:** Need to look more carefully at this.

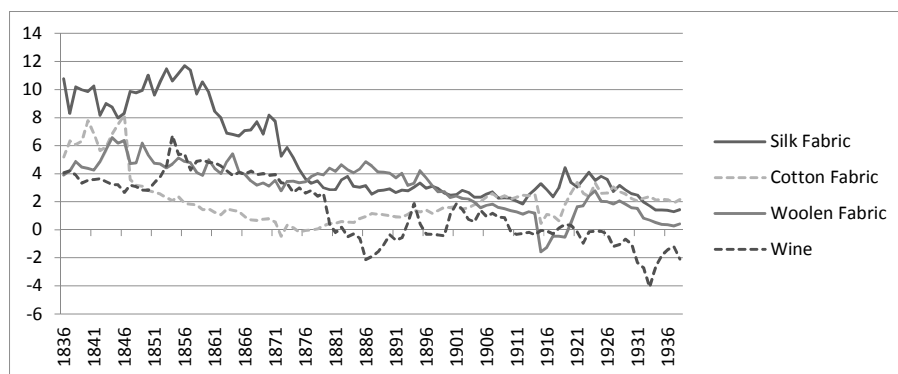
During the interwar period, the  $H$  index stays stable at a low level. In contrast the index for imports appears relatively stable over the long run. The shock of World War I shows increased concentration, in a context of an export collapse and closed international markets. This is a temporary and exceptional change and it is based on exports of armaments, munitions, and cotton fabric mainly toward military allies like Russia and Italy.

In order to analyse France's specializations we compute the Lafay Index for items at the 3-digit SITC classification. For any given product  $i$  the Lafay Index (LFI) is defined as :

$$LFI_i = 100 \times \left[ \left( \frac{x_i - m_i}{x_i + m_i} \right) - \frac{\sum_{i=1}^N (x_i - m_i)}{\sum_{i=1}^N (x_i + m_i)} \right] \times \frac{x_i + m_i}{\sum_{i=1}^N (x_i + m_i)}$$

where  $x_i$  and  $m_i$  are exports and imports of product  $i$  and  $N$  is the number of products. Thus, a positive value indicates the existence of a comparative advantage in a given item (a specialization in the  $i$ th good). On the contrary, negative values points to de-specialization. All indexes summed over  $i$  sum up to zero. For each particular good, the part in parentheses measures net exports normalized to average net exports. The weights, which sum to one, scale these deviations by how important each good is in overall trade.

**Figure. Lafay Index of specialization for Top 4 exports between 1836 and 1938**



Source : Tableau général du commerce de la France avec ses colonies étrangères (1836-1896) ; Tableau général du commerce et de la navigation (1897-1938) ; own calculations.

We compute the LFI index, year by year, for each product. Figure shows results for France's top 4 exports. At the start of the period, France was very highly specialized in, and a net exporter of, finished textiles which are included in the top 4 exports (silk, woolen and cotton fabrics). All series show a decline all the way to World War I but there is variance in the outcomes by product. For silk fabric the LFI index reached a level higher than 10 in the 1850s, although it decreased from the start of the 1860s down to the late 1870s. From then on, France clearly maintained its status as a net exporter of silk textiles until WWII, likely founded on a reputation for quality.<sup>3</sup> The LFI index was high for cotton fabric (with a peak at 8 in 1846). The LFI for cotton decreased quickly near the end of the 1840s, and became briefly negative in 1872 after Alsace and Lorraine were ceded to Germany. Its value rose from the 1880s all the way to World War I and stayed stable above 2 during the interwar. For woolen fabric, there are fewer sharp changes. Woolens were able maintain a value of around 4 from the 1860s through the 1890s. Woolens tend to decrease from the late 1890s and this trend continued until the end of the period when France very nearly loses its comparative advantage in this product.

**Commenté [CMM5]:** What happens to wine is especially surprising. What is going on here ?

<sup>3</sup> This industry concentrated in the area of Lyon which was responsible for around 2/3 of all exports until 1860. The principal destination was the USA until the end of the 1850s with Great Britain becoming the number one destination later (Verley, 1997).

Regarding export diversification decreasing and long run de-specialization, a crucial question remains: how exactly did France adapt itself to global markets in the face of falling trade costs and rapidly rising foreign productivity.

## 2. Intra-industry trade development as a consequence of trade liberalization

In order to give on other lighting on specialisations dynamics and competitiveness we purpose to measure intra-industry trade at different levels of desegregation.

Firstly we compute IIT at a global level by using Aquino and corrected Grubel and Lloyd index.<sup>4</sup> The Aquino index (AI) is defined as :

$$AI = 1 - \frac{1}{2} \sum_i^N \left| \frac{xi}{\sum_i^N xi} - \frac{mi}{\sum_i^N mi} \right|$$

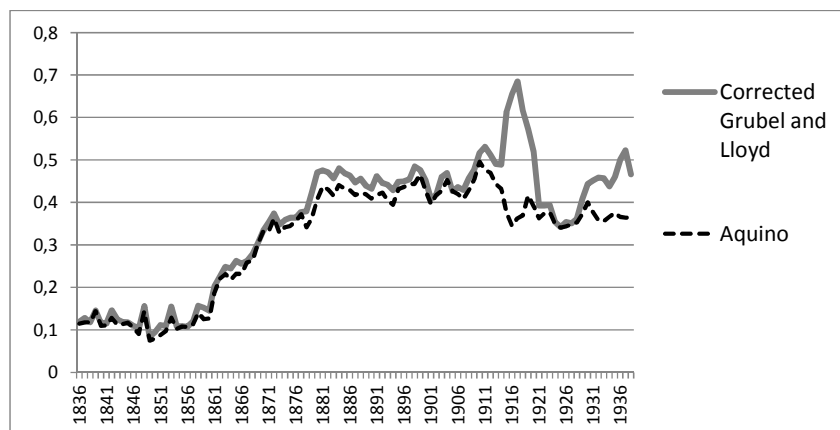
Where xi and mi are export and import of product i and N the number of products.

The corrected Grubel and Lloyd is defined as :

$$CGLI = \frac{\sum_i^N (xi - mi) - \sum_i^N |xi - mi|}{\sum_i^N (xi - mi) - |\sum_i^N xi - \sum_i^N mi|}$$

Where xi and mi are export and import of product i and N the number of products.

**Figure Global intra-industry trade index between 1836 and 1938**



<sup>4</sup> This index controls for distortions from an overall net deficit.



Global Aquino and CGLI are correlated excepted during WWI<sup>5</sup> and the 1930's. On the whole, the relative importance of intra-industry trade in the total trade rises from 12-14% in 1859-60 to 44-47% in 1880-81. Between 1880's and 1913, during a new trade regime in Europe (gradual return to protectionism), intra-industry trade stays stable around 45%. CGL go up during WWI, drops during the 1920's and increases at the end of the period (considering Grubel & Lloyd index). It is clear 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 between 1880 and WWII. Our contribution establishes a rapid development of this phenomenon from 1860 to 1880 during trade liberalization in Europe.

This fact confirms that France gives up its "Ricardian country" position that characterizes the beginning of the period, and has entered into an intra-industry specialization by keeping the same products.

At a macroeconomic level in order to understand IIT development we compute a regression of IIT at time  $t$  on the average tariff ( $T$ ) at time  $t$  and the spread between GDP per capita in France and GDP per capita of trade partners at time  $t$  testing Linder hypothesis. Linder (1961) firstly conjectured that the congruence of production and consumption patterns leads countries with similar income per capita to trade more with one another.

We run regressions of the following form:

$$IIT_t = b_0 + b_1(year) + b_2(T_t) + b_3[GGapt] + \eta_{i,t}$$

$IIT_t$  is the Aquino index by year.

GGapt is value of the difference between French GDP per capita and the GDP per capita of trade partners. GDP per capita of trade partners is weighted by exports share in French exports. Considering Maddison Project Database we include 12 partners represented 75.88% of French exports (UK, Belgium, Germany, US, Switzerland, Italy, Spain, Netherlands, Greece, Denmark, Sweden, Norway).

$$IIT_t = \frac{17.27}{(2.89)} + \frac{0.42}{(5.07)}(year) - \frac{0.93}{(-4.96)}(T_t) - \frac{0.016}{(-2.55)}[GGapt]$$

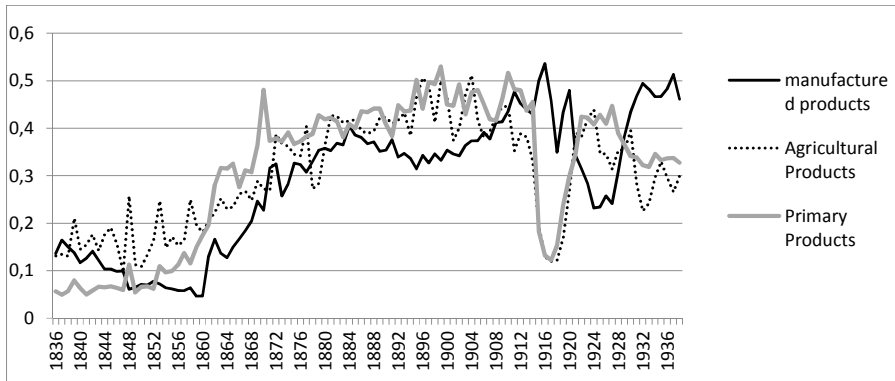
$$R^2 = 0.89, F = 168.03, n = 64$$

A significant negative relation between IIT and tariffs is established. Linder hypothesis appears valid by the way of the significant negative relation between IIT and GGapt. Considering the coefficient values the impact of tariffs appears more crucial.

Commenté [CMM6]: Can we do IIT at the bilateral level ?

## Figure Grubel and Lloyd index by categories and global between 1836 and 1938

<sup>5</sup> During WWI the gap between two indexes can be explain by the integration of the trade inbalance in CGL index. For example in 1917 the global coverage ratio is 22%.



As Figure shows intra-industry trade concerns all sectors but GL curves are not perfectly correlated. GL increases early for primary products from 1850's and go up very quickly between 1859 and 1862 probably in response to very large tariffs decreasing. After a peak in 1870 it increases slowly until the end of the 1890's, it stays stable until WWI and appears unstable after. For agricultural and manufactured products AI indexes increases really at the start of the 1860's with a pick respectively in 1886 (53%) and in 1889 (65%). AI index is after relatively stable in mid-term for agricultural products until WWI. However AI index decreases during the 1900's for manufactured products and go up during interwar particularly in the 1930's.

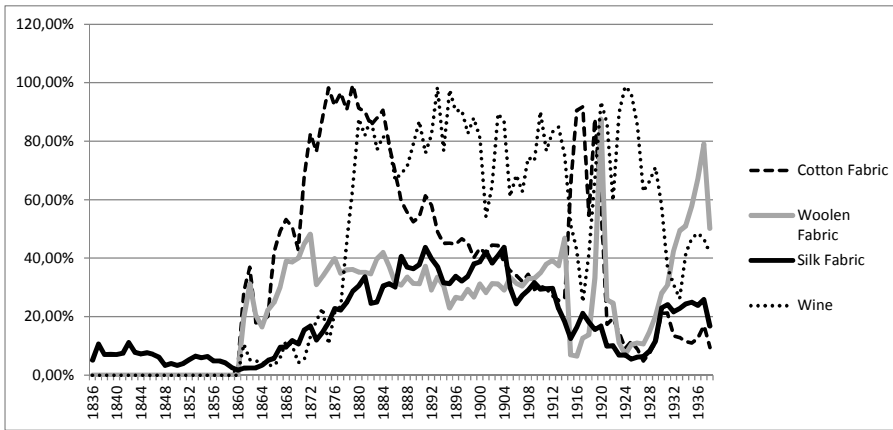
We compute IIT at a desegregated level by computing the respective share of intra-industry trade for Top 12 exports.

For each product and each year, a Grubel and Lloyd Index have been calculated:

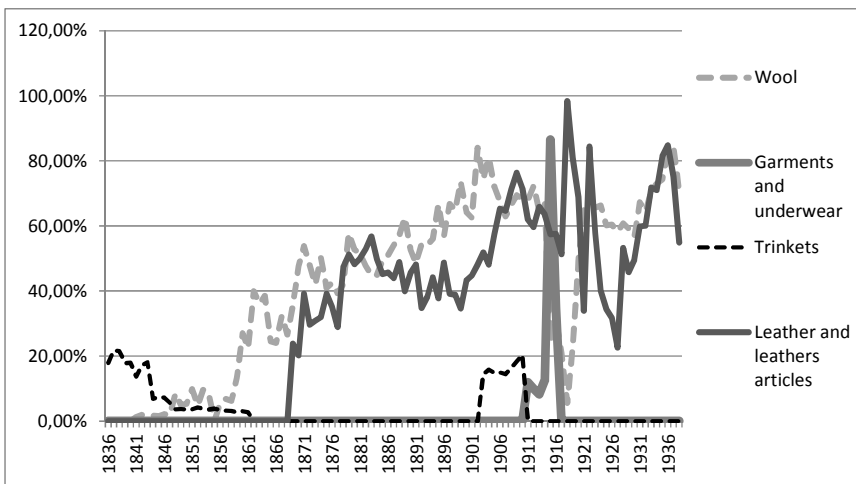
$$GL_i = 1 - \frac{|X_i - M_i|}{X_i + M_i} \quad (\text{with } i: \text{the product}).$$

Where  $X_i$  and  $M_i$  are export and import of product  $i$ .

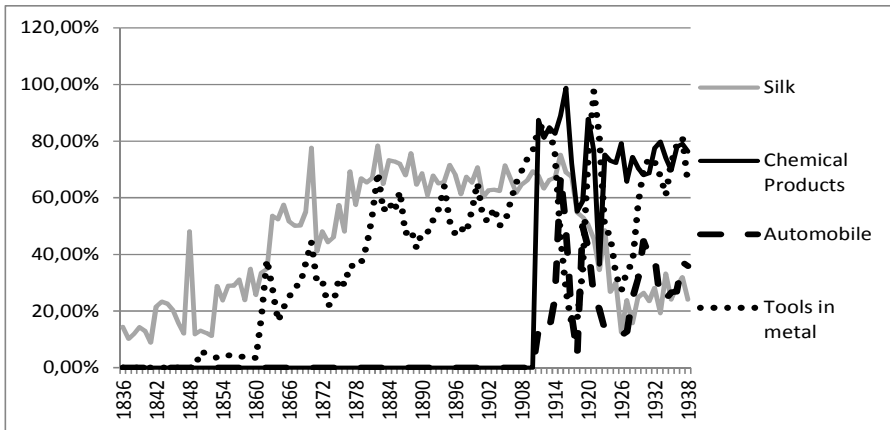
**Figure Evolution of the respective share of intra-industry trade of top 4 exports in the total of exports value between 1836 and 1938.**



Figures Evolution of the respective share of intra-industry trade of top 5-8 exports in the total of exports value between 1836 and 1938.



Figures Evolution of the respective share of intra-industry trade of top 9-12 exports in the total of exports value between 1836 and 1938.



At a desegregated level intra-industry trade seems correlated with trade policies. For textile 1860 appears as a turn point. Most of cotton and woollen fabrics, which were banned prior to the 1860 treaty, were immediately imported in large quantities from Britain after the treaty. It establishes for cotton, woollen and linen fabrics a moderate 15% tariff on imports (10% from October 1864). For silk fabric treaty reduces tariff to 3-4% for ribbon and introduces duty-free for pure silk fabric. More largely in the 1860's by increasing imports trade liberalization explains intra-industry trade on manufactured products (it is true for tool in metal and prepared hide). During the 1880's and the 1890's in a new strategic and negotiated trade regime high intra-industry trade intensity characterizes manufacturing sectors. It decreases curiously in the 1900's.

**Commenté [CMM7]:** How does this correspond to the value of tariff revenue/imports ? curious to know. Also is it strictly ad valorem ?

**Commenté [CMM8]:** Which sector ?

Garments and underwear and also trinkets are not concerning by intra-industry trade excepting during shorts moments (for example WWI for Garments & underwear), for these products French imports were weak in long run. For chemical products and automobile intra-industry trade appear of course later and was very significant for chemical product during interwar (between 60 and 80%).

From 1860's restrictions on primary and agricultural products were reduced in Europe. For raw silk and raw wool, after trade liberalization France's exports increases in opposition with old international division of labor. Wine case is very specific. At the beginning of the 1860's, a devastating plague of phylloxera occurs in France and destroys the major part of the vineyards. French wine sectors then face a period of underproduction. As a result, wine imports from Italy and Spain have significantly increased during the years 1875-1885. To keep foreign markets France re-exports part of with flows (see Becuwe and Blancheton, 2014). After the recovery, vineyards offer unexpected results around 1899-1900, thus leading to overproduction in 1905. In the time Algerian vineyards is developed and exports towards France.

**Commenté [CMM9]:** Algerian is counted as imports here ? this explains the high GL index in wine I guess.

Discussion

At a desegregated level in order to understand IIT development we compute a regression of IIT of sector I, at time t on the average tariff (T) of sector i at time t-1. We run regressions of the following form:

$$IIT_{i,t} = b_0 + b_1 years + b_2(T_i, t - 1) + \eta_{i,t}$$

### **.3. Increasing Quality Positioning, flight to quality**

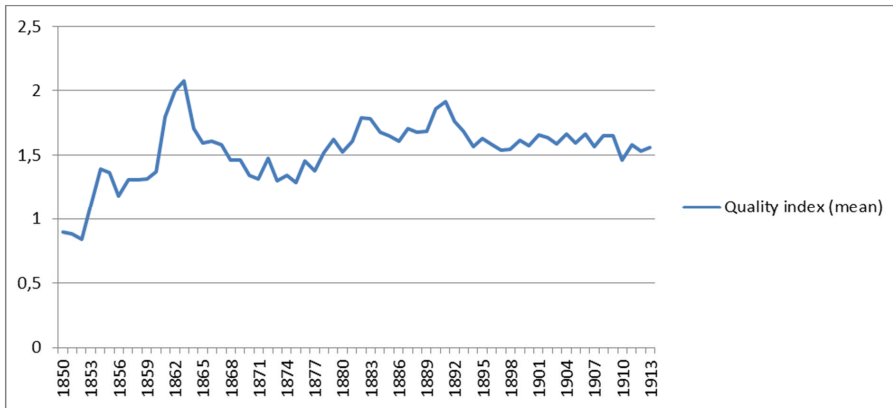
According to Levy-Leboyer and Bourguignon (1990) or Verley (1997), from 1820's French exporters had a strategy founded on high quality positioning which complement British leadership in global system. They export luxury and semi luxury products particularly in textile (silk trade from Lyon, combed wool from Roubaix-Tourcoing) but also in wine and spirits, trinkets.... They have a good or prestigious brand image. They are able to create fashion effects (in textile), impose their supplies and are copied with late and imperfection by Swiss or German competitors. In the middle of the nineteenth century France exports quality products towards a great number of countries, not only in Europe but also in long distance areas (Latin America, Turkey...). In new industrialised countries as in USA and in Zollverein industrial imports from France complete products range and French products were not in pure competition with domestic products. This strategy permits to offset lower productivity. The size of French unit production was relatively small (Levy-Leboyer and Bourguignon 1990), in the condition it is more difficult to exploit large economy of scale.

Analysing in detail French wool sector decline against British and German industry Daumas 2004 points out size of French companies, difficulties to dissociate wool thread and woollen fabric activities in these small companies and a default of adaptation to foreign demand because a lack of information.

Regarding quality tradition, export diversification, de-specialization and intra-industry trade emergence we try to analyse the evolution of quality positioning between 1850 and 1913. We build a quality index equal to unit value to exports on unit value to imports. We restrict analysis to 9 of the top 10 specializations (see Appendix II for a complete list of products and their ranks). We exclude trinkets ('articles de Paris' ...) because we have no imports for these specific goods. Figure below shows the evolution of the mean of quality indexes of the 9 specializations.

Considering Figure France have clearly a quality positioning, exports unit value is upper than imports unit value. It true for all products (with an exception for cotton fabric). By average, beyond volatility, quality index is largely upper to 1 between 1850 and 1870 and go up to 1.5 until WWI. Just after european trade liberalization we measure an increasing of quality index (particularly for tools in metal, wool, silk).

Figure . Quality index (mean)



We purpose to test the correlation between IIT and tariffs for top exports. We compute a regression of GL at time t on the average tariff (CT) at time t-1. In a second time we test the relation between quality index and IIT.

We consider a simultaneous regression.

Firstly we test  $GL_t = b_0 + b_1 \text{year} + b_2 CT_{t-1}$

Secondly we compute the estimated GL value founded on the results of the first equation  $GL_t^* = b_0^* + b_1^* \text{year} + b_2^* CT_{t-1}$

Thirdly we run a regression of Quality at time t on GL estimated at time t  
 $QIt = a_0 + a_1 \text{year} + a_2 GL_t^*$

The results of the regression are :

$$GL_t = 21.67 + 0.65 \text{year} - 0.74 CT_{t-1}$$

(9.23) (16.23) (-4.90)

$$R^2 = 0.87, F = 204.03$$

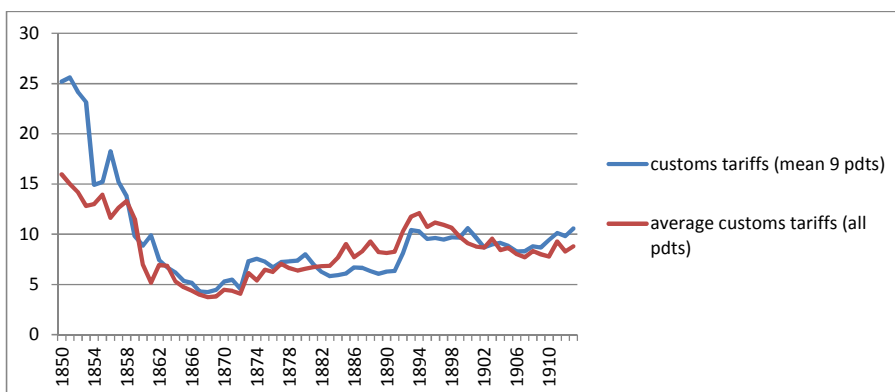
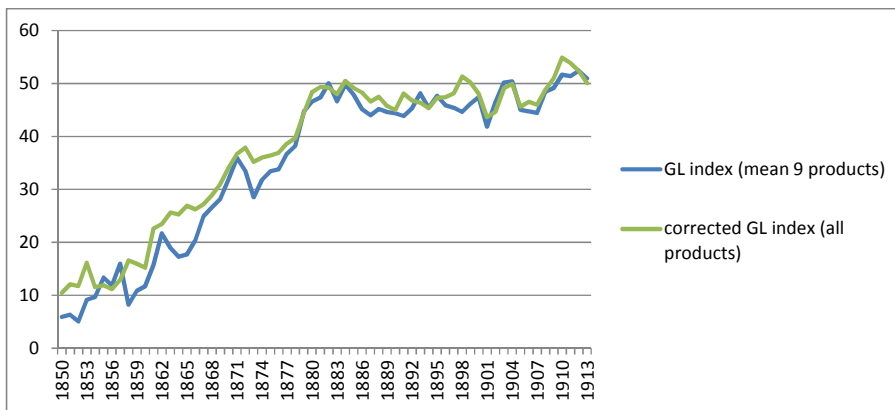
$$QIt = 0.97 - 0.018 \text{year} + 0.032 GL_t^*$$

(10.74) (-3.74) (4.99)

$$R^2 = 0.43, F = 22.84$$

We confirm the negative and significant relation between IIT and tariff (lagged here). We observe a positive and significant relation between Quality index and IIT.

Transaction costs decreasing push imports for all products, the nature of trade move and becoming intra-industry trade. The increasing of the degree of competition drive exporters to increase quality.



We run now a random-effects regression for all products pooled together for 1850-1913 and include year dummies.

$$IQ_{i,t} = b_0 + b_1(IIT_{i,t-1}) + b_2CT_{t-1} + \eta_{i,t}$$

The results of this regression are in annexe.

The results of the regression are:

### **Conclusion/discussion**

Establishing exports diversification decreasing and long run de-specialization particularly during first globalization we show how did France adapt its strategy. In response to falling trade costs and rapidly rising foreign productivity, intra-industry trade increase rapidly in the 1860s-1870s. More largely our regression establish a significant negative relation between IIT and tariffs between 1850 and 1913. Linder hypothesis appears valid by the way of the significant negative relation between IIT and GGapt. But considering the coefficient values the impact of tariffs appears more crucial. Our regressions show a significant positive relation between quality indexes and IIT. Increasing quality appears as a solution face more hard competition.

After trade liberalization between 1860 and the start of 1880s, the degree of specialization decreases and IIT emerge rapidly. France can't avoid a recoil on traditional specialization and is not able to start-up modern specialization. Exporters react by increasing quality in these traditional sectors. After, until WWI, a new trade regime took hold which is more strategic and discriminatory. Successive French governments acted to protect industries in which France had a traditional specialization (silk, cotton and woolen fabrics, leather or leather articles, metal tools). This defensive protection strategy can partly explain the stabilization of the specialization structure, IIT share and quality indexes between the middle of the 1880s and World War I.

This increasing of quality indexes is correlated to a re-orientation of French exports. French response face trade costs decline have been the development of intra-industry trade and high quality with close rich markets such as Belgium, Switzerland and Germany. By opposition a retraction in Latin America and Asia-Pacific can be observe. These geographical areas with low GDP per capita are more likely to be sensitive to price competitiveness. French suppliers would be positioned in the high-end segments of the market. One might assume that high-quality products do not find a significant solvent demand in low-income countries between 1880 and 1913. This patten appears in line with recent papers on second globalization. Hallak (2006) shows that rich countries tend to import relatively more from countries that produce high quality goods. Feenstra and Romalis (2014) find a greater preference for quality in richer countries. According to Hummels and Klenow (2005) rich countries consume and export more high quality products than emerging countries.



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| Appendix 1 Products included in exports and imports between 1836 and 1938 |   |  |            |            |            |            |            |            |
|---|---|--|------------|------------|------------|------------|------------|------------|
| Code  | Exports                                       | Imports  | Periods    |            |            |            |            |            |
|   |   |  | Exports    |            |            | Imports    |            |            |
|   |   |  | 1st period | 2nd period | 3rd period | 1st period | 2nd period | 3rd period |
| 1   | primary product                               |  |            |            |            |            |            |            |
| 2   | agricultural products                         |  |            |            |            |            |            |            |
| 3   | manufactured product                          |  |            |            |            |            |            |            |
| 3   | Acide stearique, cire, bougies                |  | 1857-1904  |            |            |            |            |            |
| 2   |   | Arachides et noix de touloucouna   | 1844-1849  |            |            |            |            |            |
| 3   | Armes poudres et munitions                    | Armes, poudres et munitions  | 1841-1904  | 1914-1938  |            | 1838-1861  | 1911-1922  |            |
| 3   | Automobiles                                   | Automobiles  |            | 1905-1938  |            |            | 1911-1939  |            |
| 2   | Bestiaux                                      | Bestiaux   |            | 1914-1938  |            | 1836-1939  |            |            |
| 1   | Bois communs                                  | Bois communs   | 1835-1938  |            |            | 1836-1939  |            |            |
| 1   |   | Bois Exotiques   |            |            |            | 1836-1939  |            |            |
| 2   |   | Cacao  |            |            |            | 1836-1939  |            |            |
| 2   |   | Café   |            |            |            | 1836-1939  |            |            |
| 3   | Caoutchouc et gutta-percha bruts              | Caoutchouc et gutta percha bruts   |            | 1905-1919  |            |            | 1904-1939  |            |
| 3   | Carrosserie                                   | Carrosserie (non compris les automobiles)  |            | 1905-1938  |            |            | 1906-1916  |            |
| 1   |   | Cendres et regrets d'orfevres  |            |            |            | 1836-1868  |            |            |
| 2   | Céréales                                      | Céréales (y compris le malt)   | 1835-1938  |            |            | 1836-1939  |            |            |
| 3   | Chandelles                                    |  | 1841-1860  |            |            |            |            |            |
| 3   | Chapeaux                                      | Chapeaux de paille, d'écorce et de sparte, etc                                   | 1857-1886  |            |            | 1836-1905  |            |            |
| 1   | Chardons cardières                            |  | 1841-1849  |            |            |            |            |            |
| 2   | Chevaux, mules et muets                       | Chevaux  | 1835-1938  |            |            | 1846-1905  | 1911-1916  |            |
| 1   |   | Cochenille   |            |            |            | 1836-1862  |            |            |
| 3   | Colle de poisson                              |  |            | 1914-1919  |            |            |            |            |
| 1   | Coton en laine                                | Coton en laine   | 1859-1938  |            |            | 1838-1939  |            |            |
| 3   | Couleurs crayons encres                       |  | 1835-1938  |            |            |            |            |            |
| 3   | Coutellerie                                   |  | 1836-1868  |            |            |            |            |            |
| 1   | Cuivre  | Cuivre   | 1857-1938  |            |            | 1836-1939  |            |            |
| 1   |   | Déchets de laine   |            |            |            | 1903-1916  |            |            |
| 1   | Drilles                                       |  | 1869-1939  |            |            |            |            |            |
| 2   | Eaux de vie, esprits et liqueurs              | Eaux de vie et esprits de toute sorte  | 1835-1939  |            |            | 1861-1905  | 1917-1939  |            |
| 2   |   | Écorce de quinquina  |            |            |            | 1836-1861  |            |            |
| 3   |   | Embarcations   |            |            |            |            | 1917-1939  |            |
| 3   | Espèces médicales                             | Espèces médicinales  | 1904-1938  |            |            | 1903-1916  |            |            |
| 1   |   | Étain  |            |            |            | 1836-1939  |            |            |
| 3   | Extraits de bois de teinture                  |  | 1841-1860  |            |            |            | 1911-1916  |            |
| 3   |   | Fils   |            |            |            |            |            |            |
| 3   | Fils de coton et de laine                     | Fils de coton et de laine  | 1841-1938  |            |            | 1838-1905  |            |            |
| 3   | Fils de lin, de chanvre                       | Fils de lin et de chanvre  | 1835-1913  | 1920-1938  |            | 1836-1905  |            |            |
| 3   |   | Fils de poil de chevre   |            |            |            | 1838-1861  |            |            |
| 3   | Fils de soie et boume de soie                 |  |            | 1905-1919  | 1926-1938  |            |            |            |
| 1   | Fonte, fer et acier                           | Fonte, fer et acier  | 1841-1938  |            |            | 1836-1905  | 1911-1938  |            |
| 2   | Fourrages                                     |  |            | 1905-1913  | 1920-1938  |            |            |            |
| 2   | Fromages et beurres                           | Fromages et beurre   | 1835-1939  |            |            | 1836-1939  |            |            |
| 2   | Fruits de table                               | Fruits de table  | 1835-1938  |            |            | 1836-1939  |            |            |
| 2   | Garance                                       |  | 1835-1880  |            |            |            |            |            |
| 2   | Garancine                                     |  | 1857-1880  |            |            |            |            |            |
| 2   | Gemmes, résines indigènes...                  |  |            | 1905-1938  |            |            |            |            |
| 2   |   | Girofle  |            |            |            | 1836-1849  |            |            |
| 1   |   | Gummes exotiques   |            |            |            | 1836-1861  |            |            |
| 2   | Graines et fruits à enssemencer               | Graines et fruits à enssemencer  | 1836-1938  |            |            | 1836-1938  | 1838-1905  |            |
| 2   | Graines et fruits oléagineux                  | Graines et fruits oléagineux   | 1835-1904  |            |            | 1836-1938  |            |            |
| 2   |   | Graisse de poisson   |            |            |            | 1836-1849  |            |            |
| 2   | Graisses de toute sorte                       | Graisses de toute sorte (y compris la margarine)                                 | 1857-1898  | 1905-1913  | 1914-1938  | 1869-1939  |            |            |
| 3   |   | Guano et autres engrais (y compris les engrais chimiques et les superphosphates) |            |            |            | 1861-1905  |            |            |
| 3   | Horlogerie                                    | Horlogerie   | 1835-1938  |            |            | 1838-1910  |            |            |
| 2   |   | Houblon  |            |            |            | 1863-1904  |            |            |
| 1   | Houille crue, carbonisée et agglomérée        | Houille crue, carbonisée et agglomérée   | 1869-1938  |            |            | 1836-1939  |            |            |
| 2   | Huile d'olive                                 | Huile d'olive  | 1835-1849  |            |            | 1836-1870  | 1881-1916  |            |
| 1   |   | Huile lourde et résidus de pétrole   |            |            |            | 1917-1938  |            |            |
| 2   |   | Huiles de graines grasses et de fruits oléagineux (non compris l'huile d'olive)  |            |            |            | 1861-1870  | 1881-1910  | 1917-1939  |
| 1   |   | Huiles d'olive, de graines grasses et de fruits oléagineux                       |            |            |            | 1869-1880  |            |            |
| 1   |   | Huiles et essences de pétrole et de schiste                                      |            |            |            | 1869-1939  |            |            |
| 2   | Huiles fixes pures autres que l'huile d'olive | Huiles fixes pures d'olive   | 1893-1938  |            |            |            | 1917-1939  |            |
| 2   | Huiles volatiles et essences                  | Huiles volatiles et essences végétales   | 1835-1849  | 1905-1938  |            |            | 1906-1939  |            |
| 1   | Indigo  | Indigo   | 1857-1904  |            |            | 1838-1905  |            |            |
| 3   |   | Instruments aratoires  |            |            |            | 1836-1861  |            |            |
| 3   | Instruments de musique                        |  | 1857-1904  | 1914-1938  |            |            |            |            |
| 1   |   | Jute en brins ou teillé  |            |            |            | 1863-1938  |            |            |
| 1   | Laines en masse, peignées, teintes et déchets | Laines en masse  | 1841-1938  |            |            | 1836-1939  |            |            |
| 2   | Légumes frais, salés ou conservés             |  |            | 1905-1938  |            |            |            |            |
| 1   | Lin et Chanvre                                | Lin et chanvre   | 1835-1856  | 1869-1939  |            | 1836-1938  |            |            |
| 3   | Lingerie et Vêtements                         | Lingerie, vêtements et articles confectionnés                                    | 1836-1939  |            |            |            | 1911-1916  |            |
| 3   | Machines et mécaniques                        | Machines et mécaniques   | 1835-1938  |            |            | 1836-1939  |            |            |
| 1   | Matériaux                                     | Matériaux  | 1857-1938  |            |            | 1917-1939  |            |            |
| 3   | Médicaments composés                          |  | 1835-1938  |            |            |            |            |            |
| 2   | Mélasse                                       |  | 1836-1840  |            |            |            |            |            |
| 1   | Minéral de fer                                | Minerais de toute sorte  |            | 1914-1938  |            | 1863-1939  |            |            |
| 3   | Modes et fleurs artificielles                 |  | 1836-1938  |            |            |            |            |            |
| 1   |   | Nacres de perles   |            |            |            |            | 1903-1916  |            |
| 1   |   | Natte ou tresses de paille, d'écorce ou de sparte                                |            |            |            | 1836-1849  | 1863-1910  |            |
| 1   |   | Nitrate de soude et nitrate de potasse   |            |            |            |            | 1838-1939  |            |

| Code | Exports  | Imports  | Periods      |            |            | Imports      |            |            |
|------|--|--|--------------|------------|------------|--------------|------------|------------|
|      |  |  | Exports      |            |            |              |            |            |
| 1    | primary product  |  | first period | 2nd period | 3rd period | first period | 2nd period | 3rd period |
| 2    | agricultural products  |  |              |            |            |              |            |            |
| 3    | manufactured product   |  |              |            |            |              |            |            |
| 3    |  | Objets de collection hors de commerce                                    |              |            |            |              | 1900-1916  |            |
| 2    |  | Œufs de vers à soie  |              |            |            | 1863-1880    |            |            |
| 2    | Œufs   | Œufs de volaille et de gibier  | 1835-1904    |            |            |              | 1903-1916  | 1923-1939  |
| 1    | Or battu tiré laminé ou filé   |  | 1835-1849    |            |            |              | 1869-1916  |            |
| 3    | Orfèvrerie et bijouterie   | Orfèvrerie, bijouterie, ouvrages dorés ou argentés et bijouterie         | 1835-1938    |            |            |              | 1869-1916  |            |
| 2    |  | Os, sabots et cornes de métaux   |              |            |            |              | 1906-1910  |            |
| 3    | Outils et ouvrages en métaux   | Outils et ouvrages en métaux   | 1835-1938    | 1905-1919  |            | 1850-1939    |            |            |
| 3    | Ouvrages de sparterie, de corderie de vann.                                |  |              | 1905-1938  |            |              | 1903-1939  |            |
| 3    | Ouvrages en caoutchouc   | Ouvrages en caoutchouc   |              |            |            |              |            |            |
| 3    | Ouvrages en peau ou en cuir  | Ouvrages en peaux ou en cuir   | 1875-1938    |            |            | 1869-1916    |            |            |
| 3    | Papiers et ses applications  | Papiers et ses applications  | 1835-1938    |            |            | 1869-1939    |            |            |
| 3    | Parfumeries et Savons  |  | 1835-1938    |            |            |              |            |            |
| 1    |  | Pâtes de cellulose   |              |            |            |              | 1903-1939  |            |
| 1    | Peaux et pelleteries brutes  | Peaux et pelleteries brutes  | 1841-1938    |            |            | 1835-1939    |            |            |
| 3    | Peaux tannées  | Peaux préparées  | 1835-1938    |            |            | 1869-1939    |            |            |
| 3    | Pelleteries préparées ouvrées ou confectionnées                            | Pelleteries préparées, ouvrées ou confectionnées                         | 1835-1849    | 1905-1938  |            | 1836-1861    | 1903-1939  |            |
| 1    | Perles fines   | Perles fines   |              | 1920-1938  |            |              | 1917-1939  |            |
| 1    |  | Phomonium tenax, abaca, ect  |              |            |            |              | 1917-1939  |            |
| 3    |  | Pièces détachées et organes de machines                                  |              |            |            |              | 1917-1939  |            |
| 1    | Pierres gemmes   | Pierres, gemmes de toute sorte, brutes ou taillées                       |              | 1920-1938  |            |              | 1917-1939  |            |
| 1    |  | Pierres, terres servant aux arts et métiers                              |              |            |            |              | 1903-1939  |            |
| 1    | Plaques  |  | 1835-1849    |            |            |              |            |            |
| 1    |  | Platine brut en masse  |              |            |            |              | 1903-1916  |            |
| 1    |  | Plomb  |              |            |            | 1836-1916    |            | 1923-1939  |
| 2    | Plumes de panure   | Plumes de panure   | 1905-1939    |            |            |              | 1903-1916  |            |
| 2    | Pois propres à la filature ou à la chap                                    | Pois de toute sorte  | 1841-1849    |            |            | 1836-1862    |            |            |
| 2    | Poissons frais, secs, salés...   | Poissons de mer frais, secs, salés ou conservés                          | 1841-1938    |            |            | 1836-1939    |            |            |
| 2    |  | Poivre et piment   |              |            |            |              | 1836-1870  |            |
| 2    | Pommes de terre, légumes secs et leurs farines                             | Pommes de terre, légumes secs et leurs farines                           | 1869-1938    |            |            | 1863-1939    |            |            |
| 1    |  | Potasse  |              |            |            | 1836-1860    | 1901-1905  |            |
| 3    | Poteries, verres et cristaux   | Poteries, verres et cristaux   | 1835-1938    |            |            | 1861-1870    | 1904-1939  |            |
| 2    | Préparations sucrées   | Préparations sucrées (sirop, bonbons, fruits, biscuits, confitures, ect) |              | 1920-1938  |            |              | 1917-1922  |            |
| 3    | Produits chimiques   | Produits Chimiques   | 1857-1938    |            |            |              | 1911-1939  |            |
| 2    | Riz  | Riz  |              | 1920-1938  |            | 1836-1939    |            |            |
| 2    |  | Rogues de morue et maquereau   |              |            |            | 1836-1861    |            |            |
| 2    |  | Safran   |              |            |            | 1863-1905    |            |            |
| 2    | Sei de marais ou de saline   |  | 1835-1849    |            |            |              |            |            |
| 1    | Soies  | Soies et bourre de soie  | 1835-1938    |            |            | 1836-1939    |            |            |
| 1    |  | Soufre   |              |            |            | 1836-1910    | 1917-1939  |            |
| 2    | Sucres bruts   | Sucres   | 1863-1913    |            |            | 1836-1939    |            |            |
| 2    | Sucres raffinés et vergeoises  | Sucre raffiné  | 1835-1938    |            |            | 1917-1939    |            |            |
| 2    |  | Sulf brut et saindoux  |              |            |            | 1836-1872    |            |            |
| 2    |  | Tabac en feuilles ou en côtes  |              |            |            | 1836-1939    |            |            |
| 2    |  | Tabac fabriqué   |              |            |            | 1869-1905    | 1928-1939  |            |
| 3    | Tabletterie, bimbeloterie, broserie... et articles de l'industrie parisien | Tabletterie, bimbeloterie, broserie, éventails et boutons                | 1835-1938    |            |            | 1836-1861    | 1903-1910  |            |
| 3    | Teintures préparées  |  |              | 1905-1938  |            |              |            |            |
| 2    |  | Thé  |              |            |            | 1836-1861    |            |            |
| 3    | Tissus de coton  | Tissus de coton  | 1837-1938    |            |            | 1861-1939    |            |            |
| 3    | Tissus de jute   | Tissus de jute, de phomonium tenax, etc                                  |              | 1920-1938  |            |              | 1917-1939  |            |
| 3    | Tissus de laine  | Tissus de laine  | 1835-1938    |            |            | 1861-1939    |            |            |
| 3    | Tissus de lin et/ou de chanvre   | Tissus de lin et/ou de chanvre   | 1839-1904    | 1914-1919  |            | 1836-1905    |            |            |
| 3    | Tissus de poil   |  | 1841-1849    |            |            |              |            |            |
| 3    | Tissus de soie et de bourre de soie  | Tissus de soie et bourre de soie   | 1835-1938    |            |            | 1836-1939    |            |            |
| 2    | Tourteaux de graines grasses...  | Tourteaux de graines oléagineuses  | 1841-1913    |            |            |              | 1903-1910  |            |
| 2    | Tourteaux et drèches   |  |              | 1926-1938  |            |              |            |            |
| 2    | Vianes fraîches, salées...   | Vianes fraîches, salées ou autrement conservés (non compris              | 1842-1919    |            |            | 1863-1939    |            |            |
| 2    | Vins   | Vins   | 1835-1938    |            |            | 1861-1939    |            |            |
| 1    | Zinc   | Zinc   |              | 1905-1913  |            | 1836-1916    | 1923-1938  |            |
|      | Colis postaux  | Colis postaux  |              | 1914-1938  |            |              | 1903-1939  |            |
|      | Autres marchandises  | Autres marchandises (autres articles)                                    | 1835-1938    |            |            | 1835-1938    |            |            |

**Appendix 2 For exports and imports, number of ways in top 10 between 1836 and 1938 and average ranking.**

| <i>Exports</i>                       |                          |                 | <i>Imports</i>                        |                          |                 |
|--------------------------------------|--------------------------|-----------------|---------------------------------------|--------------------------|-----------------|
| <b>Products</b>                      | Number of ways in top 10 | Average ranking | <b>Products</b>                       | Number of ways in top 10 | Average ranking |
| <b>Silk Fabric</b>                   | 103                      | 1,90            | <b>Raw Cotton</b>                     | 103                      | 3,43            |
| <b>Woolen Fabric</b>                 | 91                       | 2,95            | <b>Raw Wool</b>                       | 98                       | 3,19            |
| <b>Cotton Fabric</b>                 | 88                       | 4,48            | <b>Raw Coal</b>                       | 94                       | 4,46            |
| <b>Wine</b>                          | 87                       | 3,72            | <b>Corn</b>                           | 85                       | 3,85            |
| <b>Trinkets</b>                      | 81                       | 5,35            | <b>Plain timber</b>                   | 79                       | 6,08            |
| <b>Garments and Underwear</b>        | 68                       | 6,78            | <b>Raw Silk</b>                       | 75                       | 3,20            |
| <b>Leather or leather articles</b>   | 68                       | 7,72            | <b>Leather unrefined</b>              | 75                       | 7,69            |
| <b>Wool</b>                          | 57                       | 5,37            | <b>Coffee</b>                         | 51                       | 8,94            |
| <b>Silk</b>                          | 55                       | 6,19            | <b>Oleaginous grain</b>               | 50                       | 7,12            |
| <b>Tools in metal</b>                | 28                       | 7,64            | <b>Wine</b>                           | 49                       | 4,80            |
| <b>Chemical products</b>             | 26                       | 5,31            | <b>Cattles</b>                        | 30                       | 7,67            |
| <b>Automobile</b>                    | 26                       | 8,31            | <b>Colonial suggar</b>                | 29                       | 5,17            |
| <b>Spirits</b>                       | 25                       | 8,24            | <b>Seed</b>                           | 21                       | 5,45            |
| <b>Corn</b>                          | 23                       | 6,00            | <b>Oil</b>                            | 18                       | 6,56            |
| <b>Papers and these applications</b> | 23                       | 8,04            | <b>Machines and Mechanicals</b>       | 18                       | 8,17            |
| <b>Refined Sugar</b>                 | 22                       | 8,64            | <b>Engine</b>                         | 15                       | 7,20            |
| <b>Works in Hide</b>                 | 21                       | 6,48            | <b>Linen</b>                          | 15                       | 8,73            |
| <b>Iron, Melting, Steel</b>          | 19                       | 2,95            | <b>Copper</b>                         | 11                       | 9,09            |
| <b>Taned Hides</b>                   | 17                       | 9,12            | <b>Olive Oil</b>                      | 11                       | 7,09            |
| <b>Machines and Mechanicals</b>      | 14                       | 5,43            | <b>fruits</b>                         | 10                       | 8,70            |
| <b>Hides unrefined</b>               | 12                       | 8,92            | <b>Linen and Hemp thread</b>          | 8                        | 8,00            |
| <b>Linen and Hemp fabric</b>         | 11                       | 5,92            | <b>Tabacco</b>                        | 8                        | 8,88            |
| <b>Pottery, glass, crystal</b>       | 11                       | 9,00            | <b>Foreign suggar</b>                 | 7                        | 9,71            |
| <b>Cheese and butter</b>             | 10                       | 8,88            | <b>Oleaginous fruit</b>               | 6                        | 7,17            |
| <b>Fashions and flowers</b>          | 7                        | 8,57            | <b>Woolen fabric</b>                  | 5                        | 6,60            |
| <b>Fine Pearls</b>                   | 5                        | 6,20            | <b>Iron, Melting, Steel</b>           | 5                        | 4,40            |
| <b>Arms, powder, munitions</b>       | 4                        | 3,25            | <b>Rubber</b>                         | 5                        | 8,20            |
| <b>Works in rubber</b>               | 4                        | 9,75            | <b>Meat</b>                           | 4                        | 6,5             |
| <b>Iron ore</b>                      | 3                        | 8,67            | <b>Indigo</b>                         | 4                        | 9,50            |
| <b>Prepared 'pelleteries »</b>       | 2                        | 6,50            | <b>'Cendres et regrets d'orfevre'</b> | 4                        | 8,00            |
| <b>Cotton</b>                        | 2                        | 8               | <b>Gem</b>                            | 4                        | 8,00            |
| <b>Gem</b>                           | 2                        | 8,5             | <b>Fine pearls</b>                    | 3                        | 8,67            |
| <b>Unrefined suggar</b>              | 2                        | 9,5             | <b>Arms, powder, munitions</b>        | 3                        | 4,33            |
| <b>Wool thread</b>                   | 2                        | 10,00           | <b>Tools in metal</b>                 | 3                        | 8,00            |
| <b>Horses, mules, cattles</b>        | 2                        | 10,00           | <b>Cotton Fabric</b>                  | 3                        | 8,67            |
| <b>Coal</b>                          | 1                        | 3,00            | <b>Linen and Hemp fabric</b>          | 3                        | 7,00            |
| <b>Rubber</b>                        | 1                        | 5,00            | <b>Thread</b>                         | 2                        | 6,50            |
| <b>'Garance'</b>                     | 1                        | 9,00            | <b>Refined suggar</b>                 | 1                        | 7,00            |
|                                      |                          |                 | <b>Cellulose</b>                      | 1                        | 10,00           |

