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# Uruguay and the First Globalization. On the accuracy of export performance, 1870-1913

*Nicolás Bonino-Gayoso, Antonio Tena-Junguito and Henry Willebald*

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**Keywords:** bilateral trade, accuracy indices, exports, Uruguay, First Globalization.

**JEL Classification:** F14, N76

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## **Uruguay and the First Globalization.**

### **On the accuracy of export performance, 1870-1913<sup>1</sup>**

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#### **Abstract**

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## 1. Introduction

In 1870 Uruguay was a small economy, with an area of 176,215 km<sup>2</sup> —half of the territory corresponding to present Germany, almost 75 per cent of United Kingdom, 32 per cent of France and 35 per cent of Spain— and just 343,000 inhabitants (Argentina recorded a population five times higher in the same year). In spite of these very small dimensions, Uruguay was part of the richest economies of the world, received abundant productive factors from abroad (labour and capital) and constituted one of the ‘promised lands’ of the first wave of the commercial and financial globalization.

In the eve of the First World War (WWI), Uruguay was the second Latin American country in the ranking of foreign investment per capita (302 US dollars), only overcome by Argentina (420 dollars) but almost doubling the record of the third (Cuba) (Ocampo & Bértola, 2010, p. 138). According to the origin of the capitals, United Kingdom represented 43 per cent of the total, standing as the absolute leader among the core of the world economy (France, Germany, United Kingdom and the United States, which accounted for 99 per cent of this total). In fact, «*few countries were so completely absorbed by the informal British empire*» than Uruguay (Finch, 1980, p. 146).<sup>2</sup> Probably one of the main expressions of this process were railways, as Uruguay ranked in the second place among Latin American countries in terms of mileage per capita along all the period (as before, the leader of the ranking was Argentina) (Herranz-Loncán, 2011). This attraction of capital inflows extended to other productive factors as labour, but the dynamism changed rapidly.

Immigration rates of the initial decades (1870-1890) were among the highest of the Americas (even exceeding those corresponding to United States and Argentina), but in

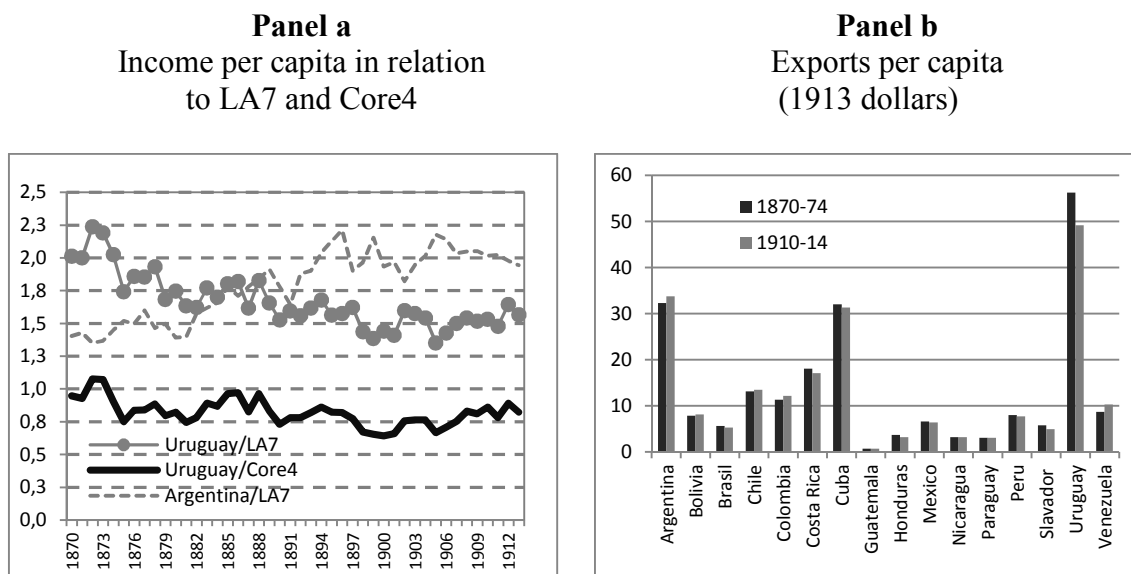
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<sup>2</sup> Own translation: «*Pocos países fueron absorbidos tan completamente en el informal imperio británico*». Finch (1980) takes this idea from Winn (1975).

the eve of WWI the situation had changed and even during some years Uruguay registered negative net migration rates. In 1901-1910 the average immigration rate was 21 per thousand, whereas in the same period the rates of Brazil, Argentina, Canada and United States were 34, 311, 154 and 103 per thousand, respectively.

Under these conditions, Uruguay achieved high levels of per capita incomes at a world scale. In the beginning of the period, Uruguay presented levels that were equivalent to those from the core of the world economy (France, Germany, United Kingdom and the United States). The posterior evolution was irregular and during the 1890s moved away from that club, recovering a (modest) convergent path since the start of the 20th century (Figure 1, Panel a).

**Figure 1: Economic performance, 1870-1914**



Sources: Maddison (2003) and Federico & Tena-Junguito (2015).

In the context of the Latin American region, the trajectory was quite different. Uruguay doubled Latin-American (LA7) average in 1870 and the income gap was 74 per cent in favour of Uruguay during the 19th century (1870-1899), although with a

clear decreasing trend until the beginning of the 20th century.<sup>3</sup> In other words, Uruguay maintained a privileged situation with respect to the rest of Latin America during the First Globalization, but the huge initial advantages were reduced along the *Belle Époque*. This path contrasts with the trajectory registered by Argentina that, in spite of having similar factor endowments, presented a successful and divergent evolution with a clear upward trend. The progressive lag showed by Uruguay in terms of economic performance did not seem so intense for the external sector of the economy.

According to Federico & Tena-Junguito (2014), in 1870-1874 Uruguay led the Latin American ranking of per capita exports (Figure 1, Panel b) and this position did not change along the whole period. However, Uruguay presented one of the worst performances with a decrease of 13 per cent that contrasts significantly with Argentina (which experienced an expansion of 4 per cent) or the Latin American average (which decreased only 3 per cent).

This evolution occurred in a regional context characterized by deep transformations during the second half of 19th century. Those territories with «open frontiers», imprecise definitions of national borders, predominant liberal economic policies and large «empty» areas of land, generally practised open policies especially for capital and labour demands that fostered technological progress. The institutionalization of countries as independent and formalized states was encouraged by the spread of the railway network, «closing» frontiers and «nationalizing» internal spaces that, together with the spread of telegraph, made possible the national control of the territory and the different (and many times distant) provincial jurisdictions. However, these processes were not always favourable for Uruguayan development and especially for its commercial elite.

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<sup>3</sup> LA7 = Argentina, Brazil, Chile, Colombia, México, Uruguay and Venezuela (Bértola & Ocampo, 2010).

Some external shocks as the new modern development of Buenos Aires' port during the two final decades of the 19th century produced a partial substitution of Montevideo's *entrepôt* activity. Buenos Aires' technical improvements in terms of transport, storage and harbour logistic were complemented by the expansion of the Argentinian railway network. At the beginning of the 1890s Montevideo still resisted and showed commercial advantages in comparison with Buenos Aires, although this situation changed radically afterwards. The strong weakening of transit trade, the arising of protectionist policies, changes in relative power of elites, and the financial consequences related to *Banco Nacional's* Crisis constituted deep changes in the economic external relations of Uruguay from mid 1890s.<sup>4</sup>

Conventional wisdom presents the deficient export development as an explicative variable of the Uruguayan relative bad performance during the *Belle Époque* years. Here we propose the argument in the other way around: the relative slow export growth and modest structural change of the Uruguayan economy is a clear signal of a low institutional and political capacity to promote those commodity sectors with higher value added. Uruguay did not take advantage of the opportunities that globalization did offered during the *Belle Époque*.<sup>5</sup> This process could be determined by several factors that acted with different intensity along the period in terms of natural endowments (essentially the types of lands), delayed incorporation of new technology (especially in the meat packing plants) and the incidence of measures of economic policy in an international market where trade protection effectively arose.

One of the first outcomes of this paper is to discuss the accuracy of the Uruguayan export growth official data. The bad reputation on the accuracy of 19th century Latin

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<sup>4</sup> In 1888 a law was issued that imposed higher taxes to import transactions that meant, in fact, an increase in the protectionist character of the external policy.

<sup>5</sup>On the main differences of this process with the Argentinian case see Tena-Junguito & Willebald (2013).

American foreign trade statistics should be extended to Uruguay.<sup>6</sup> The Uruguayan statistical bureau in charge of computing the value and quantity of exports flows was relatively efficient but, as many others bureaus were not able to avoid different relevant bias that affected physical quantities and unit values recorded in the statistics. These problems were even recognized in the Statistical Yearbooks published by the bureau. First of all, transit operations usually meant severe difficulties to export and import registrations, and it was usual that national statistical agencies failed in the correct identification of the geographical origin and destination of commodities. Second, export and import taxes, trade licenses, quantity limitations, and exchanges rates restrictions as well as no reporting of some trade flows (typically smuggling), may severely affect quantities and price records, which means that trade records may offer a systematic undervaluation or overvaluation bias that should be corrected. Two revisions of the official data have been attempted so far; these are a book written by Henry Finch in 1980 and a conference paper of Belén Baptista and Luis Bértola presented in 1999. Are these evolutions coherent with historical facts? Can we trust these series as an accurate description of the export performance of Uruguayan economy?

Henry Finch, in his book *Historia económica del Uruguay contemporáneo*, presents a revision of the official exports values, but for only three years of the period 1870-1913 (1900, 1910 and 1913). The aim of his revision is try to solve the problem of the use of official prices in the valuation of exported goods. Finch makes some “raw adjustments to official values” (footnote to Table 5.1, p. 260) for the years 1900 and 1910, using market prices.<sup>7</sup> It also includes an official estimate of the export value at market prices for 1913.<sup>8</sup>

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<sup>6</sup> See Cortés Conde et al. (1965), Platt (1977), Kuntz (2007), Llona (2012), Tena-Junguito & Willebald (2013) and Absell & Tena (2014).

<sup>7</sup> Own translation: “*gruesos ajustes de las cifras oficiales*”.



Luis Bértola and Belén Baptista propose a new series of adjustments to official data for the period 1870-1913. The authors work with a sample of thirteen exported goods, which represented 88 per cent of exports in 1913, and adjust the prices used to value them in order to express the series at local market prices.<sup>9</sup> As for quantities, the only correction made refers to exports of live cattle, in which an attempt was made to include smuggling across the border with Brazil. The goods that receive greater attention in the adjustments are live cattle (whose data are adjusted for the period 1870-1912) and wool (which is corrected for 1885-1912). These two goods stood in average for only 34% of the exports in the whole period. Most of the adjustments were made for the period 1905-1912, which explains why before 1905 differences between their adjusted series and the official one are minor.

Besides this introduction and motivation, we order the presentation in the following sections. Initially, we consider the incidence of transit trade and smuggling in the statistics of exported quantities and correct the structure of exports by geographical destination. Secondly, we reevaluate the official unit values with international prices and discuss the consistence of the bias founded with the political economy of exporters' interest to evade taxes. We focus especially in the period 1888-1892 when trade regulations changed significantly and promoted transformations in the taxation by type of good. In the fourth section we use the new export series to present a new interpretation of the Uruguayan export-led failure. Finally, the last section is devoted to summarize the most relevant results of the investigation.

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<sup>8</sup> Finch does not specify the goods whose prices are adjusted, only mentioning that export market prices were used when it was possible to obtain them. Moreover, he does not tell the sources from which he obtains the market prices used in the corrections.

<sup>9</sup> The only exceptions are preserved meat and meat extract, for which the authors use Australian prices. Other goods included in the sample are: live bovine and ovine cattle, frozen meat, salted beef (*tasajo*), tallow, salted and dried bovine hides, wool, maize, linen and wheat.

## 2. Transit and rustling: the accuracy of export quantities

Montevideo and Buenos Aires have had an important role as transit ports during the 18th and 19th centuries and even nowadays both ports maintain a fluent commodity exchange based on *entrepôts* relationships. We find several mentions to transit trade in the Statistical Yearbooks, which reveal the relevance of the topic during our period.

«In the previous publications of this Direction, we have proven that most part of the commercial movement between Argentina Republic and Uruguay is constituted by transit trade of products and manufactured goods from foreign countries, whose products and merchandise are transported from Custom warehouses or reshipped from an Uruguayan port to an Argentinian port or from one of these latter to an Uruguayan port. [...] The same occurs with the tables of exports by destination, in which are included goods of the country similar to the ones of the Argentina Republic, exported with destination to such Republic that does not consume them but re-exports them in transit to consumer countries» (Statistical Yearbook, 1886, p. 274).<sup>10</sup>

That is, Montevideo's harbour, because its special geographical position at the entrance of *Rio de la Plata* (River Plate), had a significant economic activity as *entrepôts* linking Argentina, Paraguay, Bolivia and the South of Brazil with international

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<sup>10</sup> Own translation: "En las publicaciones anteriores de esta 'Direccion', hemos demostrado que la mayor parte del movimiento comercial entre la República Argentina y la Oriental lo constituye el comercio de tránsito en productos y artículos manufacturados procedentes de países 'extranjeros', cuyos productos y mercaderías son transportados desde los almacenes de depósito de Aduana ó reembarcados de un puerto Oriental para un puerto Argentino ó de uno de estos últimos para un puerto Oriental. [...] Lo mismo sucede con los cuadros de 'Exportacion' por destino, en los cuales figuran frutos del 'pais' similares á los de la República Argentina, exportados con destino á dicha república que no los consume y solo los reexporta en tránsito para los 'paises' consumidores." In this quote, we respect the original writing so we admit spelling errors (words marked by inverted commas).

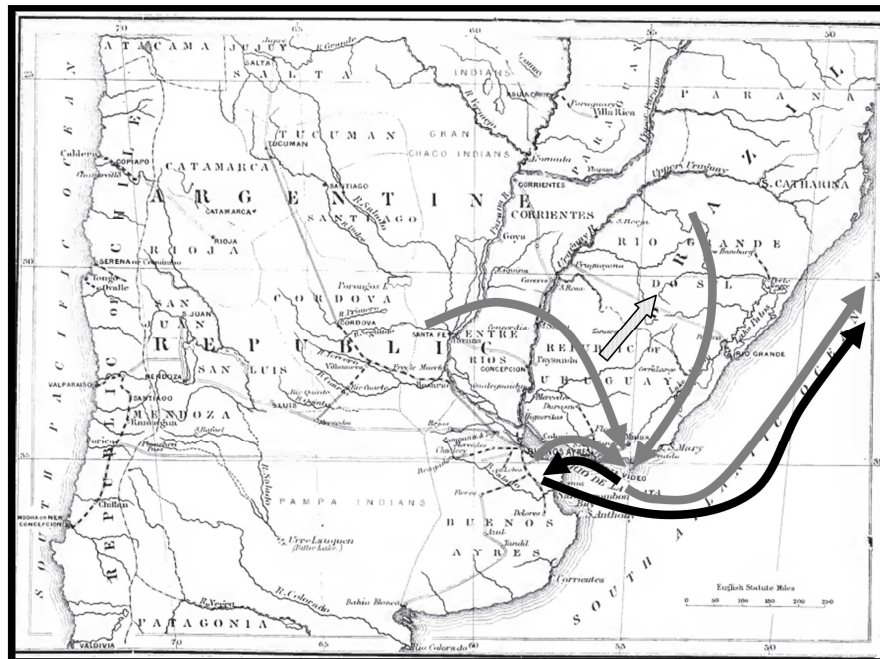
markets (Zanotti, 1992). The relevance of this commercial activity is also remarked in Platt (1971): “Before the improvement of the port of Buenos Aires, late in the nineteenth century, a substantial proportion of Argentine imports was transhipped from ocean steamers at Montevideo, but the new docks reversed the flow, so that Uruguayan imports might now arrive through Buenos Aires.” (Platt, 1971, pp. 119-120).

We believe that this prosperous activity introduced problems in national trade statistics. Transit operations usually meant severe difficulties to export and import registrations, and it was usual that national statistical agencies failed in the correct identification of the geographical origin and destination of commodities.

In Figure 2 we represent the two flows of transit trade that affects Uruguayan official export records: Uruguayan products exported through the port of Buenos Aires (black arrow), and regional products exported via Montevideo’s harbour (grey arrows) from Argentina and Brazil and adjoining regions (as Paraguay and Bolivia). According to Statistical Yearbooks, both transit trades through Montevideo and through Buenos Aires are wrongly registered in Uruguayan official statistics.

Especially during the period 1889-1909, the importance of Uruguayan goods exported via Buenos Aires remained between 10 and 20 per cent of total Uruguayan official exports (Figure 3, Panel a).

**Figure 2: Transit trade and smuggling in the River Plate region**



Source: map from Mulhall & Mulhall (1975), pp. 65-66; arrows added by the authors.

Apparently, Uruguay exported goods that Argentina did not consider imports from Uruguay, and re-exported these commodities to other geographical destinations. The magnitude of these figures is large enough to induce statistical problems in the series and, specifically, in the geographical distribution of Uruguayan exports.

Transit trade through Montevideo was also important during this period (Figure 3, Panel b) reaching an average of 6 per cent of total Uruguayan exports (Appendix B). This merchandise exported through Montevideo's port was in fact produced in Argentina and Brazil, but was wrongly added into Uruguayan export statistics.<sup>11</sup>

Transit trade is a statistical problem related to accuracy in quantities. We deal with these transactions and consider adequate adjustments to correct official data. First, we

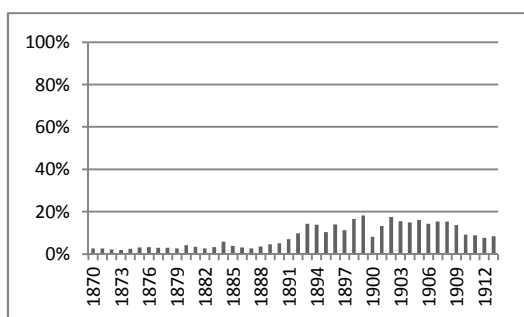
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<sup>11</sup> Probably, part of the exports coming from Bolivia and Paraguay moved by Argentinian and Brazilian ports also. We do not determine these different origins although we know this can induce bias in our conclusions. In particular, we would be considering commodity transit from bordering countries when the origin corresponds to farther economies.

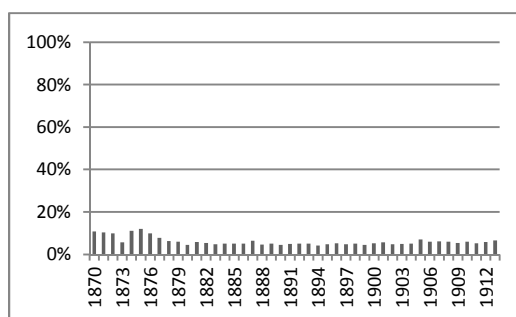
evaluate the export accuracy according to the standard method proposed in the literature (the country accuracy index) and then we identify the dynamics of under and overvaluation of official export data. After that, we propose corrections to improve the accuracy of the statistics.

**Figure 3: Transit trade Buenos Aires-Montevideo, 1870-1913**

**Panel a.** Share of Uruguayan exports through Buenos Aires on total Uruguayan exports



**Panel b.** Share of transit exports through Montevideo on total Uruguayan exports



Sources: calculated with official data from the Statistical Yearbooks (several years).

Following studies by Federico & Tena-Junguito (1991), Tena-Junguito (1992), Carreras & Badía-Miró (2008) and Tena-Junguito & Willebald (2013), we apply the partner records Country Accuracy Index (CAI) to test the accuracy of Uruguay's export records.

We employ official bilateral data in current British Sterling pounds (see exchange rates in Appendix A). We compare the official export records of Uruguay by countries with the imports of the same flows recorded by the official statistics of Argentina, Belgium, Brazil, France, Germany, Italy, Spain, United Kingdom and the United States. These countries account for more than 80 per cent of the geographical distribution of Uruguay's total exports during the period, reaching in several years more than 95 per cent (Appendix B for construction of the index).

$$CAI_t = \frac{\sum_{j=1}^n X_{jt}}{\sum_{j=1}^n M_{jt}} \quad [1]$$

where,

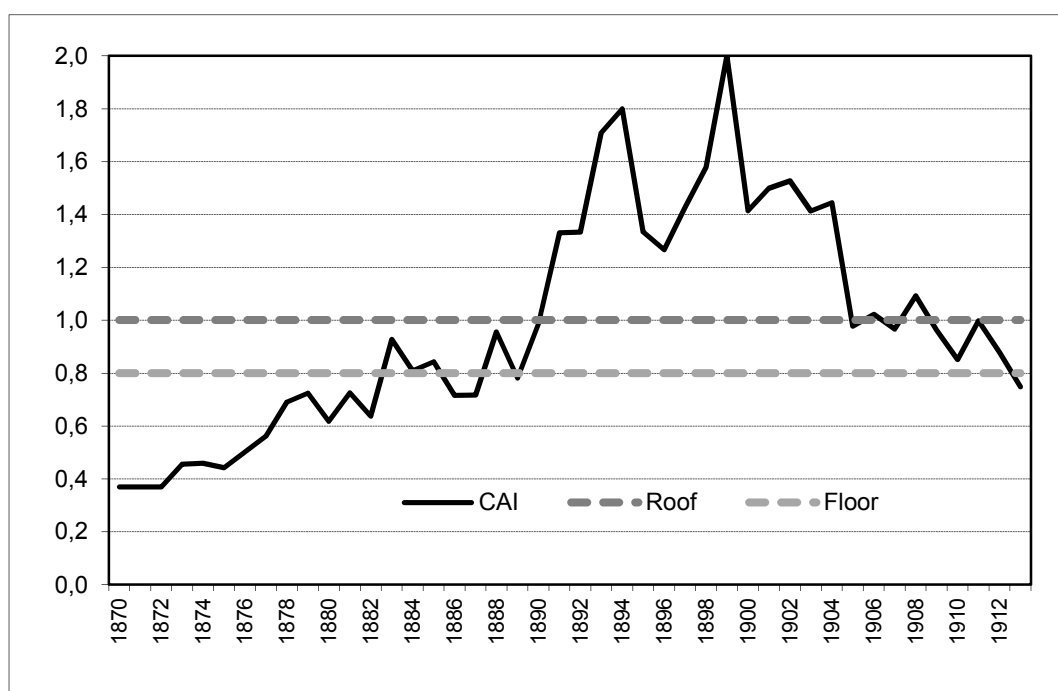
$X_{jt}$  stands for Uruguayan exports to country  $j$  in year  $t$  according to Uruguayan official statistics;  $M_{jt}$  stands for imports of country  $j$  from Uruguay in year  $t$  according to its own official statistics.

The «accuracy index» for year  $t$  is computed as the ratio of the total trade sum of Uruguayan exports to the countries in the sample, according to its official statistics, with respect to the same flows according to the import statistics of its partners in that year. The difference between the numerator and denominator of this ratio includes a transportation cost component, i.e. the difference between c.i.f. valuation of import records and f.o.b. valuation of exports. According to Federico & Tena (1992), the percentage of transportation cost and insurance (the so-called “freight factor”) depends more on the commodity composition of trade than on its geographical distribution. Following the results found by Tena-Junguito & Willebald (2013) for Argentina, and considering that the commodity composition of Uruguayan and Argentinian exports in the period were quite similar, the CAI is presented with an interval from 0.80 (the «floor») to 1 (the «roof»)<sup>12</sup>. Results over or below this interval are considered to represent an over or undervaluation of the export series, respectively.

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<sup>12</sup> Average difference between c.i.f. and f.o.b. exports was almost 20 per cent from 1870 to 1913 in the case of Argentina (Tena-Junguito & Willebald, 2013).

**Figure 4: Country Accuracy Index (CAI), 1870-1913**



Source: Appendix B.

According to the evolution of CAI (Figure 4), two important periods of inaccuracy are identified. From 1870 to 1882 Uruguayan official export data would be undervalued, while from 1891 to 1904 an important overvaluation would have taken place.<sup>13</sup> In the usual context where authorities set export's registration prices and they were not regularly modified (see Federico & Tena-Junguito, 1992) the common finding is that CAI and export prices evolved in opposite directions. As export prices decrease and the official prices are maintained fixed CAI tends to increase because the valuation of imports in the partner countries assimilates the changes while the export valuation does not. The contrary happens when export prices increase.

Taking into account their relevance as destinations (Figure 5), the most important results to remark are the considerable overvaluation of the exports to Argentina in the

<sup>13</sup> CAI could not be computed for the years 1870, 1871 and 1876, as there are no available official data of exports disaggregated by country of destination for those years. The value of total exports for those years is officially estimated from taxation incomes. We complete the series with linear interpolations.

period 1893-1913, along with the lack of Brazilian, German and Italian trade records (before 1902, 1889, and 1888 respectively) which, strictly, is a problem of their statistics. It is also noticeable the persistent overvaluation of exports to Belgium from 1886 onwards, which may be due to the fact that Antwerp operated as a transit port. The same may apply for the overvaluation registered for the United Kingdom in the period 1878-1899, and for Italy from 1891 to 1911 (especially related to Genoa's port).

Platt (1971) enumerates and describes many cases of transit ports, as Antwerp: "Antwerp was one of the principal markets for hides, horns and cattle products generally, to which large quantities were exported by Argentina and Uruguay, later to be shipped on to Britain." (Platt, 1971, p.120).

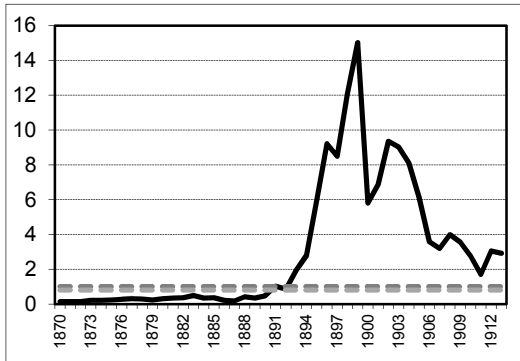
These detected mismatches correspond to the usual criterion used in the period to register the origin and destination of traded merchandise. In the case of exported merchandise, the usual registered destination was the first port to where the merchandise was sent, whereas in the case of imported merchandise, the registered origin was the last port from where it has arrived. For the same reason, the accuracy of exports to typical final destinations —as France, Germany and Spain— results in acceptable levels.

From the previous analysis, it becomes clear the opportunity to adjust Uruguayan export data to Argentina, removing the amount corresponding to transit exports. As these figures are anyway Uruguayan exports, it becomes also necessary to reassign them to their final destinations. In order to do that, we assume that this type of exports follows the same geographical distribution than the rest of Uruguayan non-regional exports (Appendix B).

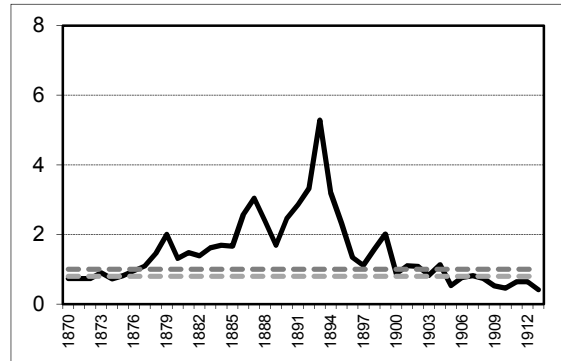


**Figure 5: Country Accuracy Index (CAI) by pairs of countries, 1870-1913**

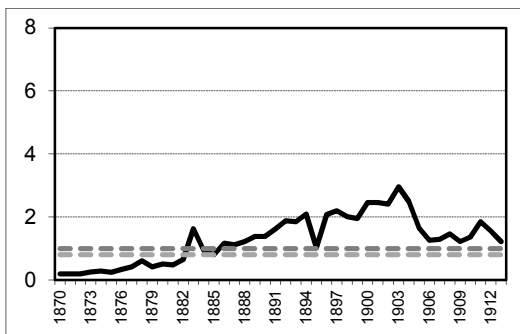
**Panel a. Argentina**



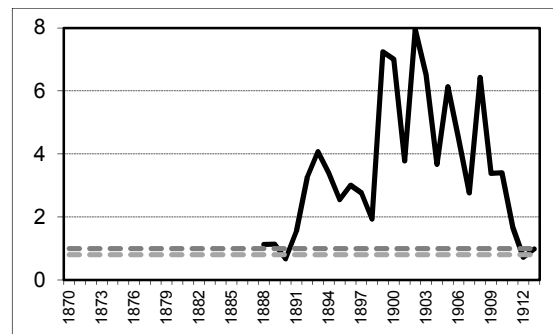
**Panel b. United Kingdom**



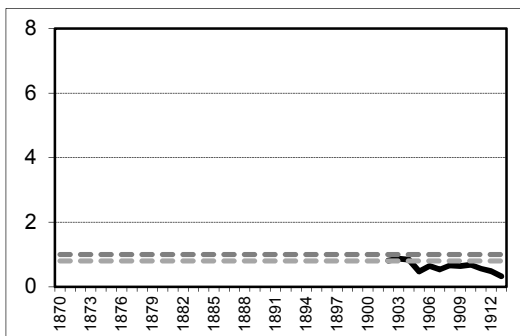
**Panel c. Belgium**



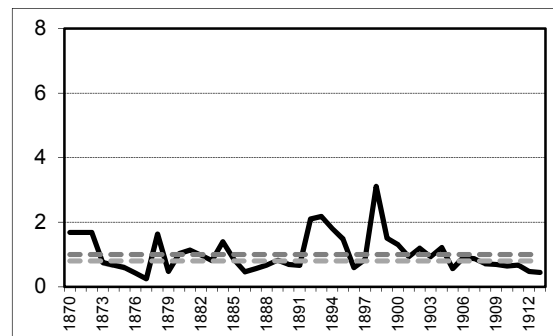
**Panel d. Italy**



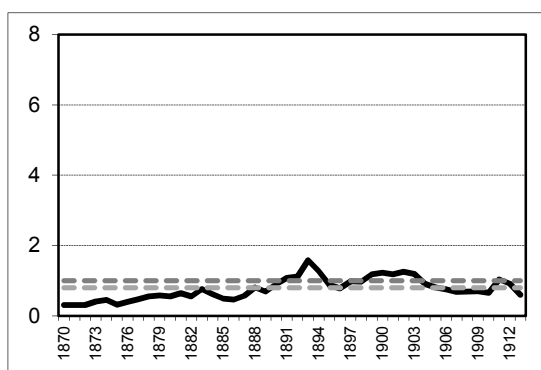
**Panel e. Brazil**



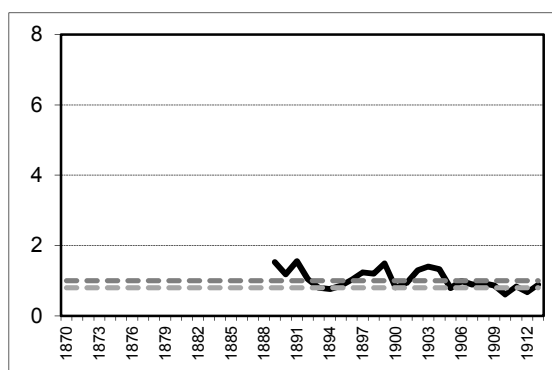
**Panel f. Spain**



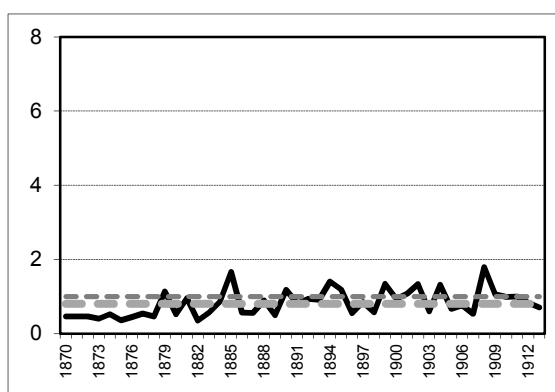
**Panel g. France**



**Panel h. Germany**



**Panel i. United States**



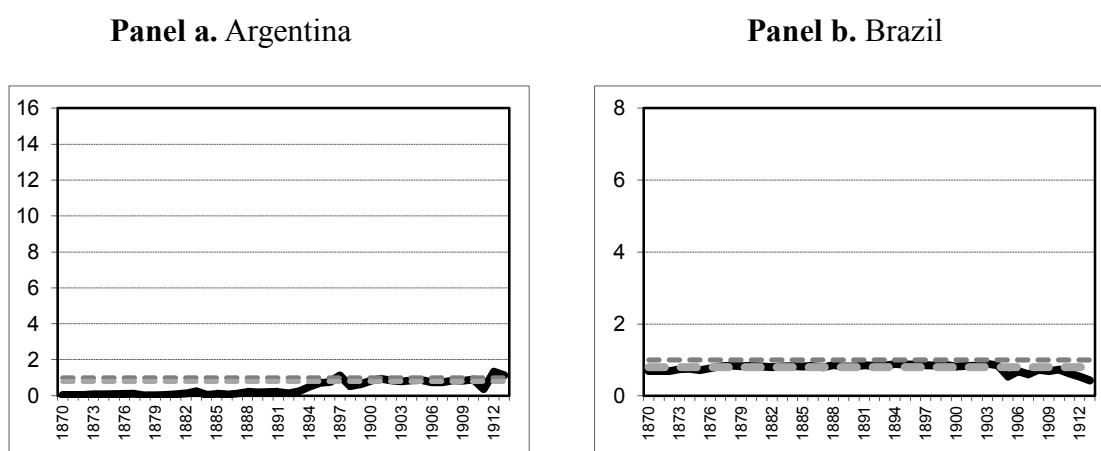
Source: Appendix B.

Acknowledging the problems of accuracy in Argentinian official data, we used the Price Accuracy Index (PAI) from Tena-Junguito & Willebald (2013) to revalue Argentinian imports from Uruguay.

The other important problem we faced was the lack of Brazilian data of imports from Uruguay for the period previous to 1902. We have available data of Brazilian imports from Uruguay for the years 1866 (from the UK Board of Trade - Foreign Countries) and 1902 (Official data), so we interpolated these two figures, assuming that the evolution in the period was the same as the one registered by Uruguayan exports to Brazil. So we fill out the data for Brazilian imports from Uruguay for 1870-1901 and recalculated the corresponding CAI.

After completing these calculations (sources and assumptions in Appendix B), we obtain the following results with respect to bilateral Accuracy Indexes with Argentina and Brazil (Figure 6). Adjustment of Argentinian CAI is surprising, showing the high importance of transit trade through Buenos Aires. The movement of Brazilian CAI shows a stable evolution in reasonable levels.

**Figure 6: Bilateral CAI with Argentina and Brazil, adjusted, 1870-1913**



Source: Appendix B.

We also assign data for Germany and Italy for the 1880s. In both cases, the official statistics identify a category «River Plate» that we presume it refers to imports coming from that region including, indistinctly, commodities from Argentina and Uruguay. Basically, we assign the average share of imports that corresponds to Uruguay in recent periods according to local registers. For Germany, available import data that differentiate Argentina from Uruguay correspond to 1890-1891 and 1893-1895, and for Italy figures correspond to 1888-1892; we apply this structure to the corresponding category «River Plate» in the 1880s.

Finally, the last problem to evaluate refers to the role of Montevideo as the «external door» of the River Plate region. According to diverse expressions of the

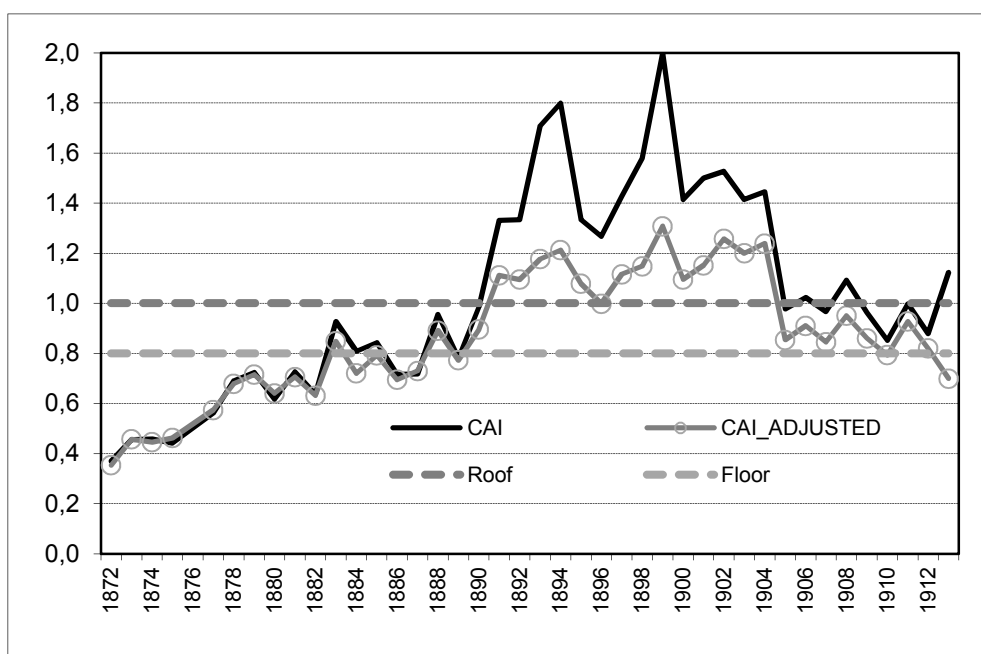
Statistical Yearbooks and contemporary commentaries, Uruguayan statistics usually included commodities not produced locally but in other places of the River Plate region (Argentine seacoast and the south of Brazil). These wrong records should not affect the CAI because the commercial partner would have made the same error registering imports from Uruguay instead of their true origins. However, the existence of transit trade in European ports can represent overvaluation as well. We find data of this type of trade from Statistical Yearbooks corresponding to 1872-1874, 1879-1881 and 1914-1917. We estimate annual data combining interpolation and rescaling methods in different periods (Appendix B).

The last trade flow represented in Figure 3 is the smuggling towards Rio Grande do Sul (south of Brazil), consisting mainly of live cattle (dashed arrow), that obviously affected exports official registers. Rustling was an historical activity in the territory—from colonial times—that involved actors from Uruguay, Argentina and Brazil in times when the national border in the frontier economies had no precise definition. Just well into the 19<sup>th</sup> century the state consolidation advanced on the national construction of a vast region, where free transit of people and commodities had been the dominant pattern. First Globalization coincided with the deepening of this process and the smuggling became an activity penalized by national states with more rigour.

We correct official data adding estimates in volume of live cattle's smuggling following Bértola et al. (1998) and Baptista & Bértola (1999) and considering official prices as good proxies to market prices. Estimates combine a fixed value (100,000 heads of cattle) plus a variable value depending on official data (25 per cent over official registers). With this criterion, authors obtain an average for the period which is consistent with contemporary declarations (200,000 heads of cattle; see Millot & Bertino, 1996) and a series that change similarly to legal exports.

With the whole of corrections made, changes in the CAI do not modify our general evaluation (Figure 7) but the levels of the discrepancy are now more acceptable. This adjusted CAI shows an improvement of the export statistics' accuracy, demonstrating the appropriateness of our hypotheses.

**Figure 7: Adjusted CAI, 1870-1913**

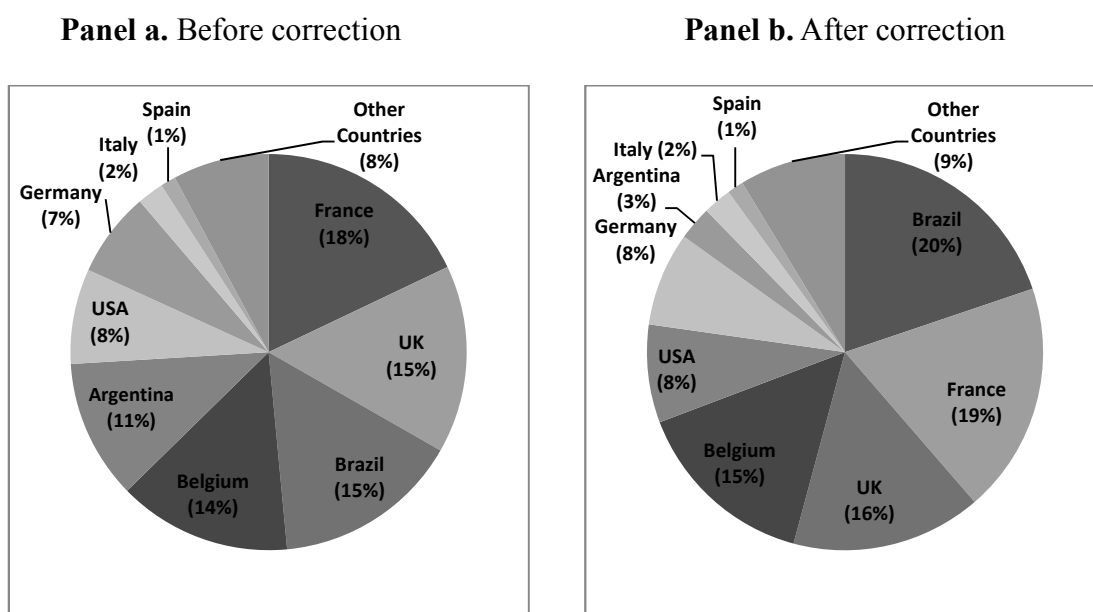


Source: Appendix B.

To sum up, we propose five corrections to deal with inaccuracy in quantities and detect problems of under and overvaluation, considering: (i) Uruguayan exports traded through Buenos Aires to Europe; (ii) Correction of Argentinian imports from Uruguay with the Argentinian PAI; (iii) Estimates of Brazilian, German and Italian imports from Uruguay (1870-1901, 1880-1888 and 1880-1887, respectively); (iv) Regional exports (from Argentina, Brazil, Paraguay, Bolivia) in transit through Montevideo's port that official data consider as local production; (v) Smuggling of cattle from Uruguay to Brazil. Only the two last corrections alter the total value of exports because they change

the quantities traded; we will pay attention to this point in the adjusted series that we present in the last section previous to the conclusions. Nonetheless, all of these corrections imply changes in the Uruguayan export structure by countries (Figure 8).

**Figure 8: Geographical distribution of Uruguayan exports, 1872-1913 (average percentage)**



Source: Appendix B.

Considering the average of the period (1872-1913) the most important change in the export structure is the decline in the share of Argentina. As it represented 11 per cent of total Uruguayan exports according to official data, after our correction this share reduces to only 3 per cent, in favour of Brazil and typical European destinations as United Kingdom, France and Belgium. This result of our correction seems suitable. Argentina and Uruguay presented a similar productive structure and, in times when trade was predominantly inter-industrial, the relevance of Argentina as such an important trade partner did not make any sense. The types of goods exported to Brazil

are relevant to understand the high share of this country. Salted beef (*tasajo*) and live cattle exports correspond to an «old» commercial specialization in times when the «new» paradigm was to export refrigerated meat and cereals (as Argentina did; see Tena-Junguito & Willebald, 2013, for a recent review).<sup>14</sup>

Therefore our main conclusions from the previous analysis refer to four main issues: (i) transit trade in the River Plate region induced important accuracy problems in the export statistics of Uruguay in terms of traded quantities; (ii) the most intense problems corresponded to the 1890s when transit through Montevideo was in a clear decline and Uruguayan exports left the region of the River Plate through Buenos Aires; (iii) an additional source of inaccuracy during this period would correspond to transit trade within Europe through the typical European *entrepôts* and the wrong registration of countries of final destination (commodities similar to those coming from Argentina but noticeably inferior in quantities); (iv) the high relevance of Brazil as a trade partner in times when the rich and more dynamic markets were located in Europe.

### **3. POLITICAL ECONOMY OF TAXES AND THE ACCURACY OF EXPORT VALUES**

Having addressed in the previous section problems related to inaccuracies in the registration of quantities, we proceed now to test the accuracy of prices used to value exported merchandise. We compare the prices used to value exported goods, calculated from the official Statistical Yearbooks, with international prices, considering

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<sup>14</sup> For a recent discussion on the problems of geographical assignment for other countries in Latin America, see Carreras-Marin & Badia-Miró (2008) and Carreras-Marin, Badia-Miró & Perez-Cajias (2013).

as proxies prices used in the United Kingdom's official statistics to value imports from Uruguay. We do so using an index, called the Price Accuracy Index (PAI), which is defined as follows (see Appendix D for construction of the index):

$$PAI_t = \frac{\sum_i P_{i,UY} * Q_{i,UY}}{\sum_i P_{i,UK} * Q_{i,UY}} \quad [2]$$

where,

$P_{i,UY}$  is the price of good  $i$  exported in year  $t$  according to Uruguayan official statistics;

$P_{i,UK}$  is the price of good  $i$  imported from Uruguay in year  $t$  according to statistics from the United Kingdom;

$Q_{i,UY}$  is the quantity exported of good  $i$  in year  $t$  according to Uruguayan official statistics.

We value exported goods at international prices based on the price demand theory. We consider that the quality of Uruguayan goods exported to high-income markets tended to be superior to that corresponding to the local market and then we assume that Uruguayan export prices were more related to international prices than to domestic ones (Borcherding & Silberberg, 1978; Hummels & Skiba, 2004) (Appendix D for a detailed explanation).

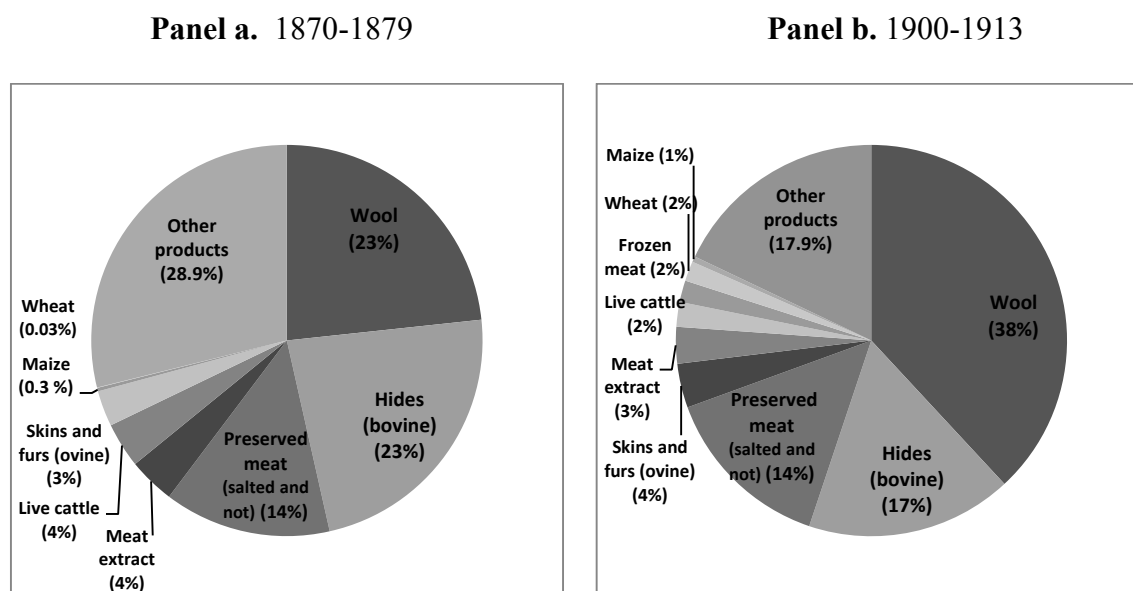
We consider a sample of ten products: preserved meat (other than by salting), salted beef (*tasajo*), meat extract, bovine frozen meat, mutton and lamb's frozen meat, hides (not tanned), sheep and lamb's skins and furs, wool, maize and wheat. These goods account in mean for 80 per cent of total Uruguayan exports during the period (according to official data).

Taking into account that prices of exported goods used in Uruguayan statistics are valued f.o.b., while prices of imported goods used in statistics from the United



Kingdom are valued c.i.f., we make a few adjustments to make this comparison possible. We adjust international prices deducting from them the cost of freight and insurance per unit of good. We also express prices from Uruguayan official records in British Sterling pounds in order to be able to compare them with prices from United Kingdom's official statistics (exchange rates in Appendix A).

**Figure 9: Distribution of Uruguayan exports by type of good (average percentage, adjusted data)**

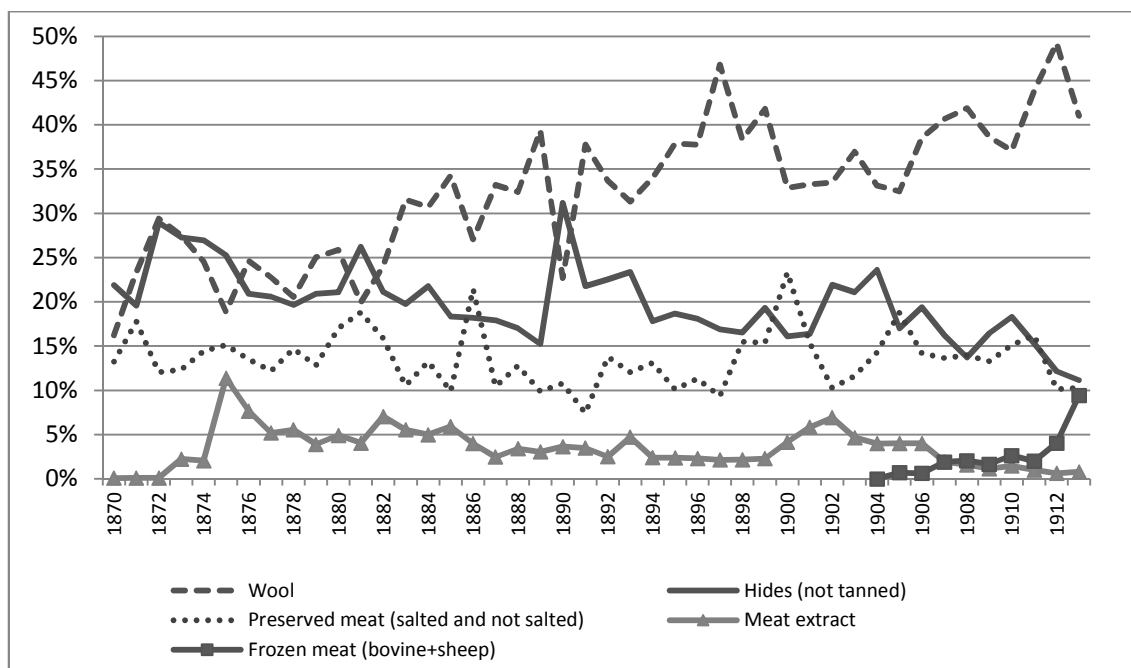


Source: Appendix D.

We present the structure of Uruguayan exports by type of good in international prices in Figure 9, comparing the situation at the beginning and the end of the period of analysis. The observation of the two figures reveals some major differences, as the increase of the importance of wool, which rose its weight in total exports by two thirds, and the decrease of the importance of hides. Other products, such as preserved meat, retained its importance during the whole period.

A more complete visualization of the changes can be obtained from Figure 10, which shows the annual weight of the main exported products.

**Figure 10: Distribution of Uruguayan exports by commodity, main goods, 1870-1913 (percentage, adjusted data)**



Source: Appendix D.

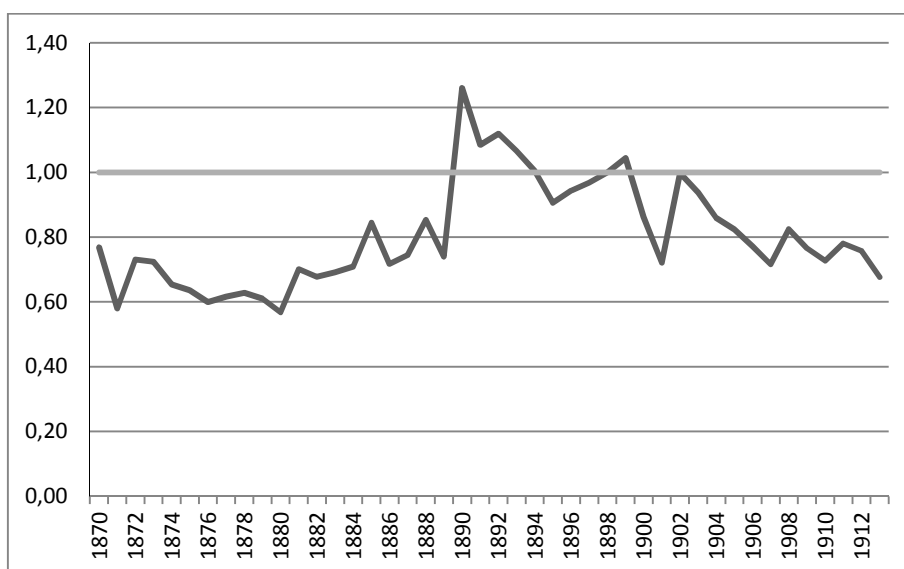
Uruguayan exports are concentrated in three products: wool, bovine hides and preserved meat (salted and not salted), which aggregated represent in average 66 per cent of total exports during this period. The evolution of the exports of these three products has been quite different. Although at the early 1870s wool and bovine hides accounted for the same percentage of total exports (23 per cent), the weight of wool did not stop growing during these years, while the opposite happened to hides. At the end of the period, the weight of wool more than doubled the one of hides. In addition, the importance of preserved meat showed a very stable trajectory.

We assume the undervaluation of export official values as a working hypothesis. On the one hand, in the case of *ad valorem* taxes, official values' commission in which

exporters were represented would have maintained official prices in low levels in order to exporters effectively pay less taxes. On the other hand, in the case of specific taxes, lower official prices would have showed an apparent high taxation when this was presented in percentage, which would have been utilized as an argument for lobbying to reduce taxes. Obviously, under this hypothesis the influence on this commission depends on the political power of producers and the evolution of *aforos* and taxes would be direct evidence of these power relationships. Higher political influence will imply lower taxation and higher official price undervaluation for some activities than others.

As it can be seen in Figure 11, we observe a general undervaluation of the exported merchandise in Uruguayan official records. This would correspond to the use of official prices (*precios de aforo*), that did not respond to changes in international market prices. It would also support the hypothesis of the existence of pressures over the commission in charge of updating official prices.

**Figure 11: Price Accuracy Index (PAI), 1870-1913**



Source: Appendix D.

From the evolution of the PAI index we can distinguish two clearly different periods. From 1870 to 1889 we detect a relatively stable level of undervaluation of Uruguayan official prices. In contrast, from 1890 onwards we notice a process of progressive undervaluation after an abrupt increase in the index, as the PAI shows a clear decreasing trend. These two markedly different stages are the result of the implementation in the period 1888-1890 of specific economic policy measures regarding customs taxes.

In 1888 new Customs laws were approved by Uruguayan Parliament, which reduced to 0 per cent the taxes to exports, as cattle breeders demanded, in exchange for an import tax increase. Besides, a new customs tax scheme was implemented for imports, substituting the usual *ad valorem* taxes for specific ones, determined as a function of the quantity exported instead of its price. With respect to the export tax reduction, three arguments were used by the government to support it: the decline in the prices of wool, hides and tallow; the overcrowding of these products in the warehouses, as merchants hesitated about selling; and a similar reduction in export taxes taken previously by Argentina.<sup>15</sup>

Problems with public finances, in a period dominated by a serious international crisis (with the bankruptcy of Baring's Bank as its most clear expression) that caused serious local economic and financial difficulties, forced Uruguayan government in 1890 to increase import taxes and to re-implement export taxes.<sup>16</sup> Moreover, specific taxes were introduced for exports, with higher differentiation according to sectors.

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<sup>15</sup> According to our own calculations, between 1881 and 1888 the prices of wool and bovine hides decreased 18 per cent and 27 per cent, respectively.

<sup>16</sup> The bankruptcy of the *Banco Nacional* was one of the most serious impacts of the international crisis in Uruguay, which led to a declaration of debt default by the government in 1891.

The following analysis considers the influence of taxes on official prices (Table 1). In this sense, it is an analysis that reflects the "administrative" dimension of the political process (a similar reasoning was applied in Tena-Junguito & Willebald, 2013) as an expression identified in previous literature where the specific response of the state depended on the character of the export elites and to what extent they were articulated in social, political and economic terms (Cárdenas et al., 2000).

**Table 1: Export tax rates by type of product, 1870-1887 vs. 1891-1913**

	<b>Export tax rate</b>	
	1870-1887	1891-1913
<b>Preserved meat</b>	0.0%	4.0%
<b>Salted beef (<i>tasajo</i>)</b>	0.0%	4.4%
<b>Meat extract</b>	0.0%	3.7%
<b>Bovine hides (not tanned)</b>	5.7%	4.9%
<b>Sheep and lamb's skins and furs</b>	6.3%	2.3%
<b>Wool</b>	6.0%	4.7%
<b>Maize</b>	0.0%	0.0%
<b>Wheat</b>	0.0%	0.0%

Source: calculated with official data from the Statistical Yearbooks (several years).

Note: Export tax rates were calculated over official prices (*precios de aforo*).

Comparing how export tax rates changed after the reform of the customs tax system, we can distinguish three different situations, concerning meat, bovine hides, and ovine hides and wool sectors. In the case of meat sector (preserved, salted or extract) the reform implied an increase in the tax rate from 0 to around 4 per cent, while the sector of bovine hides registered only a minor decrease in the tax rate.<sup>17</sup> Quite different was

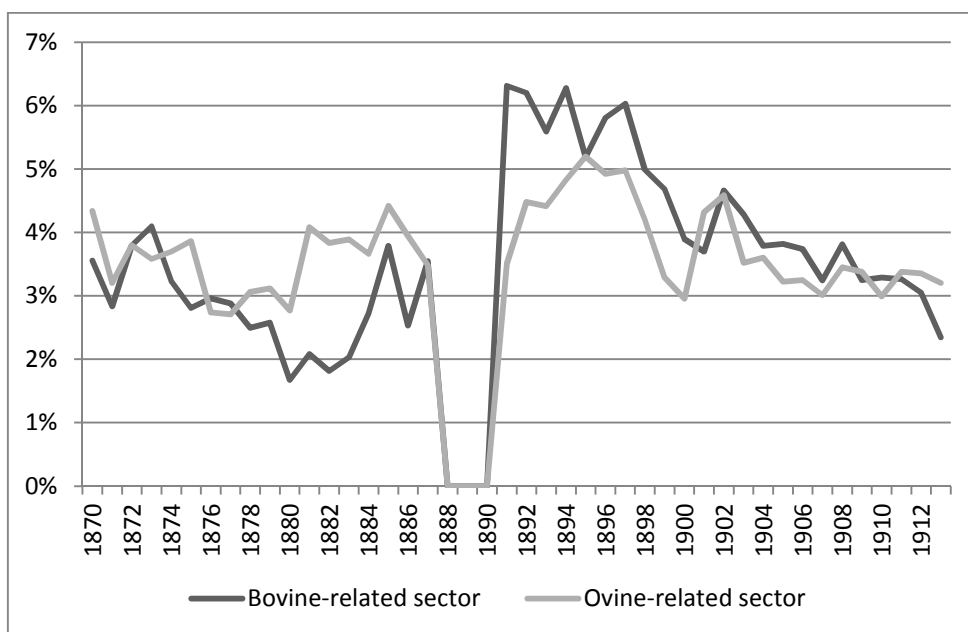
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<sup>17</sup> Remember that exports of frozen meat just started in the end of our period.

the situation for the ovine-related producer sector (hides and wool), which experienced a sharply decrease in its export tax rate.

However, the effective price that exports received were different, and we replicate the exercises considering market prices as a reference. In Figure 12 we represent the annual evolution of average tax rates for the bovine and ovine-related sectors. The averages were computed considering the tax rates of the main products of each sector (preserved meat, salted beef, meat extract and bovine hides in the case of bovine sector; sheep and lamb's skin and furs, and wool in the case of ovine sector) and weighting them according to their participation in total sector's exports.

**Figure 12: Tax rates, 1870-1913 (average per sector)**



Source: calculated with data from the Statistical Yearbooks (several years), the *Annual Statement of the Trade of the United Kingdom* and data detailed in Appendix G.

Note: Export tax rates were calculated over f.o.b. market prices.

Here, we can appreciate three interesting points. Firstly, early 1890s represent a break in the long run evolution of Uruguayan export's tax structure. Secondly, tax rates

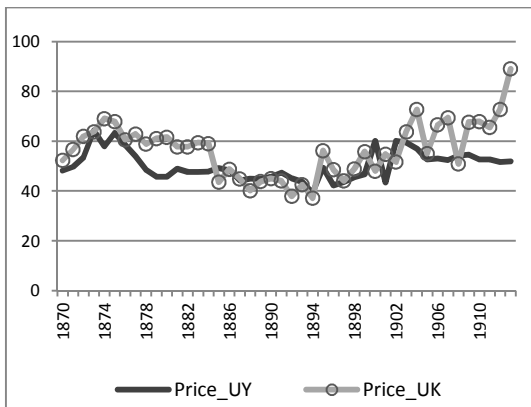
by (large) sectors are clearly different before and after that break. Before 1888 the average tax rate of the ovine-related sector was higher than that of the bovine-related, whereas the situation clearly changed after 1890. The third interesting element to notice is the convergent evolution of tax rates towards the end of the period.

Thus the reform affected in very different ways ovine-related and bovine-related producers, clearly benefitting more the first group, which is usually identified with the «progressive» livestock producers. Sheep production incorporated technological changes more actively than bovine production in a process that combined low incentives for innovation in the meat production chain—a sector dominated by meat extract and *tasajo* (Finch, 1980)—and the highest participation of dynamic immigrants in the ovine production (Milot & Bertino, 1996). This conclusion of wool exporters as the tax-winner sector is confirmed if we compare wool's official price with its international price.

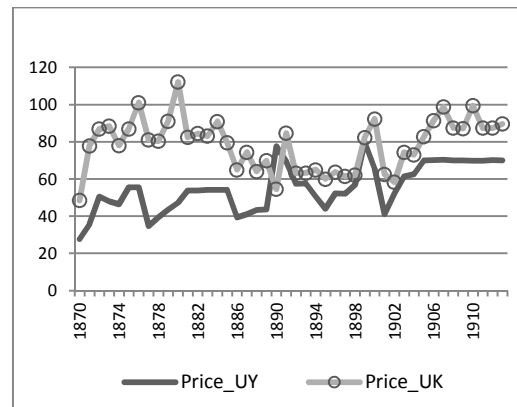
In Figure 13 we can see the evolution of official and international prices for the two main products exported by Uruguay in this period, wool and bovine hides. In the case of wool the undervaluation of official prices is much clearer than in the case of hides. After 1890 and the implementation of specific taxes, the undervaluation of wool's official price made that tax pressure on this sector seemed higher than it really was, giving arguments to wool's lobbying group to influence government on maintaining taxes at a low level or even reducing them.

**Figure 13: Prices, 1870-1913 (sterling pounds per long ton)**

**Panel a. Bovine hides (not tanned)**



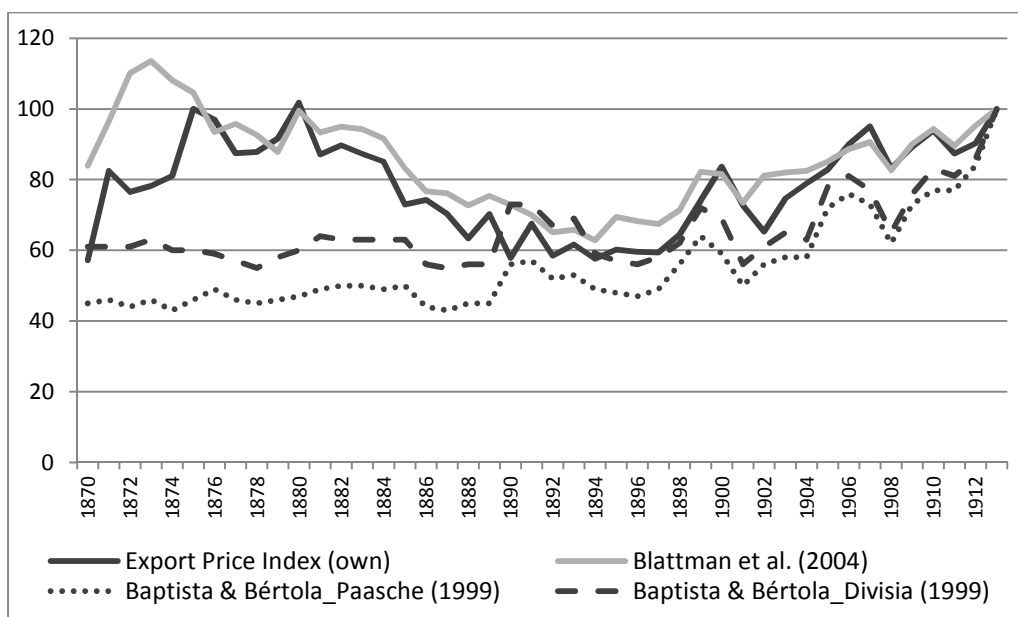
**Panel b. Wool**



Source: Appendix D.

To complete our consideration of export prices, we finally present our new Uruguayan export f.o.b. price index. It is a Paasche index number (uses exported quantities, year by year, to weight the respective prices adjusted for freights). Figure 14 shows our Export Price Index (EPI) in comparison with those corresponding to Blattman et al. (2004) and Baptista & Bértola's Paasche and Divisia indexes (1999).

**Figure 14: Export Price Indexes, 1870-1913 (1913=100)**



Sources: Appendix E; Baptista & Bértola (1999); Blattman et al. (2004).



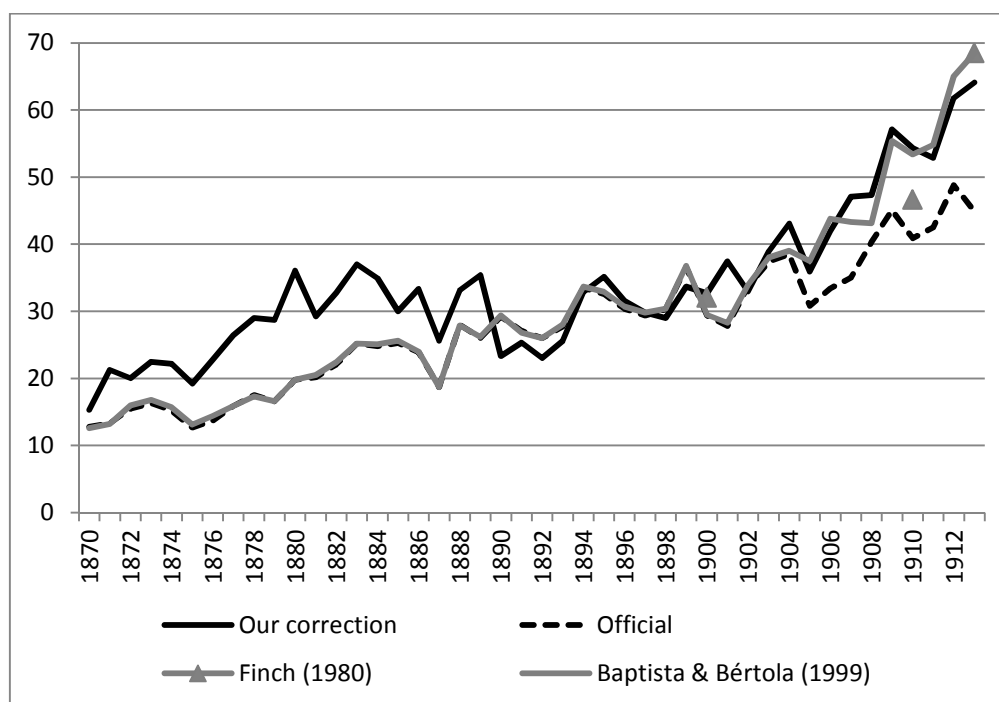
According to our EPI, during the 1870s Uruguayan export prices registered an upward trend that was followed by a persistent decline until the late 1890s. Forthcoming years showed a clear recovery of export prices, which reached in 1913 the levels achieved in the beginning of the period.

The evolution of our index resembles that one of Blattman et al. (2004) and agrees with what literature on the topic says about the evolution of international prices during this period. That is, international prices of primary commodities decreased until the 1890s and recovered onwards. The strong stability of export prices in Baptista & Bértola (1999) is the result of their adjustment decisions. As we mention previously, the majority of price corrections in their export series corresponds to 20th century and, in consequence, in the 19th century the *precios de aforo* predominate. As these prices were stable, the evolution of the index is flat.

After implementing the required adjustments in order to deal with inaccuracies in quantities (summarized in Section 3) we re-value exports at international prices. In order to do this, we firstly compute the value of the sample of exported goods considered at international market prices and at official prices. Then we calculate the ratio between these two series and multiply it by the total official value of exports, obtaining as a result the series of total exports valued at international prices.

The new adjusted export series is presented in Figure 15 along with the other already available series.

**Figure 15: New corrected and previously available Export series, 1870-1913  
(million pesos; current prices)**



Sources: Appendix F; Statistical Yearbooks (several years); Finch (1980); Baptista & Bértola (1999).

As it can be seen in Figure 15, our new proposed corrected series of exports clearly differentiates from the official series and from previous attempts of correction. The differences are truly remarkable in the first half of the period.

#### 4. EXPORT GROWTH AND ECONOMIC PERFORMANCE

The evolution of exports expressed in constant prices is shown in Figure 16. We found that there was no continuity in the growth of exports. The 1870s and 1900s were the most favorable in terms of exports' growth, while the 1890s appear to have been a "lost decade". This evolution contrasts with the one of Argentina, where a more stable growth process was registered, with growth rates of 0.8, 7, 5.6 and 7.5 per cent in each respective decade (Tena-Junguito & Willebald, 2013). This discrepancy is important to precise differences between economies usually considered as a whole. Cárdenas et al.

(2000) argue that the extent of export expansion in Latin America relative to the domestic economies can be best measured by the value of exports per capita in the eve of WWI. Under this consideration, Argentina, Chile, Cuba and Uruguay would be the leaders of the process. However, this was not true in the case of Uruguay which began the period with high levels of exports per capita and the phase of expansion were irregular and slight (even, considering the entire period this ratio decreased). In other words, the level of Uruguay in the eve of the WWI is not necessarily representative of an export led-growth process as in the case of the other countries.

**Figure 16: Export volume growth rates, 1870-1913  
(annual average, exports in constant prices)**



Source: Appendix F.

The evolution of exported volumes for some specific products is summarized in Table 2. The most remarkable features are the outstanding increase in exports of meat extract in the period 1870-1875 along with the expansion of exports of preserved meat

at the turn of the century.<sup>18</sup> Exports of both products were promoted by Liebig's Extract of Meat Company, a firm located in Fray Bentos, over the coast of the river Uruguay, and, probably, the unique Uruguayan firm with international reputation.<sup>19</sup> Wool exports, although with some transitory falls, showed an ascendant evolution, accounting at the end of our period for almost half of total exports; the decay of salted beef (*tasajo*) started in the beginning of the century, as a reflection of the loss of importance of Brazilian and Cuban traditional markets. In the case of grain exports, in spite of having registered important growth rates, it must be remembered they started from a very low level and their relevance never compared to the one they reached in Argentina.

**Table 2: Annual export volume growth rates, main commodities, 1870-1913**

	Preserved meat	Meat extract	Salted beef	Hides (bovine)	Skins & furs (sheep)	Wool	Maize	Wheat
1870-1875	---	158%	-3%	2%	-7%	-4%	44%	-35%
1875-1880	25%	-1%	8%	10%	10%	13%	20%	323%
1880-1885	-6%	6%	0%	1%	12%	9%	35%	2%
1885-1890	-41%	6%	3%	5%	-4%	-6%	-2%	55%
1890-1895	-50%	-7%	8%	-6%	7%	18%	73%	41%
1895-1900	106%	0%	1%	-1%	-7%	-12%	-63%	-17%
1900-1905	72%	5%	-5%	1%	8%	4%	8%	6%
1905-1913	8%	-11%	-6%	-4%	6%	10%	-24%	-63%

Source: calculated with official data from the Statistical Yearbooks (several years).

We evaluate the grade of openness of the economy in this period through the ratio Exports/GDP. Which evolution of this ratio would be reasonable to expect? On the one

<sup>18</sup> Meat extract was very valued as food for armies during wars, such as in the Franco-Prussian War (1870-1871) or in the Second Anglo-Boer War (1899-1902), while preserved meat was seen as food for working classes, especially during periods when fresh meat was scarce.

<sup>19</sup> Strictly, it was not an Uruguayan firm. Capitals were obtained from London market and it was constituted as a public limited liability company.

hand, Uruguay opened to international markets and participated actively in regional and overseas trade. Then, we would expect an increasing trend of the ratio as an expression of the growing participation of the country in international trade. This pattern would be similar to the Argentinian evolution, where the increasing trajectory occurred from the 1870s to 1890s to acquire a relatively stable evolution afterwards (Tena-Junguito & Willebald, 2013, p. 48). On the other hand, Uruguay evidenced changes in the production side of its economy related to urbanization, extension of local markets, and agrarian diversification that could imply a growth pattern where the domestic economy resulted more dynamic than the external sector.<sup>20</sup> In addition, any economic policy that discriminates against exports in favour of the internal development would have similar results. Under these conditions we could expect a decreasing trend of the ratio Exports/GDP (as was suggested, previously, in Bértola & Porcile, 2000, p. 65, using a proxy to this index).<sup>21</sup> We are initially inclined towards this last hypothesis because of three reasons. First, Uruguay was «born» to the independent life devoted to overseas trade because it was the opportunity to materialize the natural (and idle) wealth faced to a dynamic European demand. Second, it is expected that the initial high proportion of exports on total production decreases as internal markets, population and urbanization evolve. Third, the structure of exports by type of good would not have induced favourable consequences over the internal production for implying spillovers and positive feedbacks on exports. However, we do not expect effects on exports from changes in economic policy because the incentives directed to support the incipient manufacturing had limited consequences (Bértola, 2000).

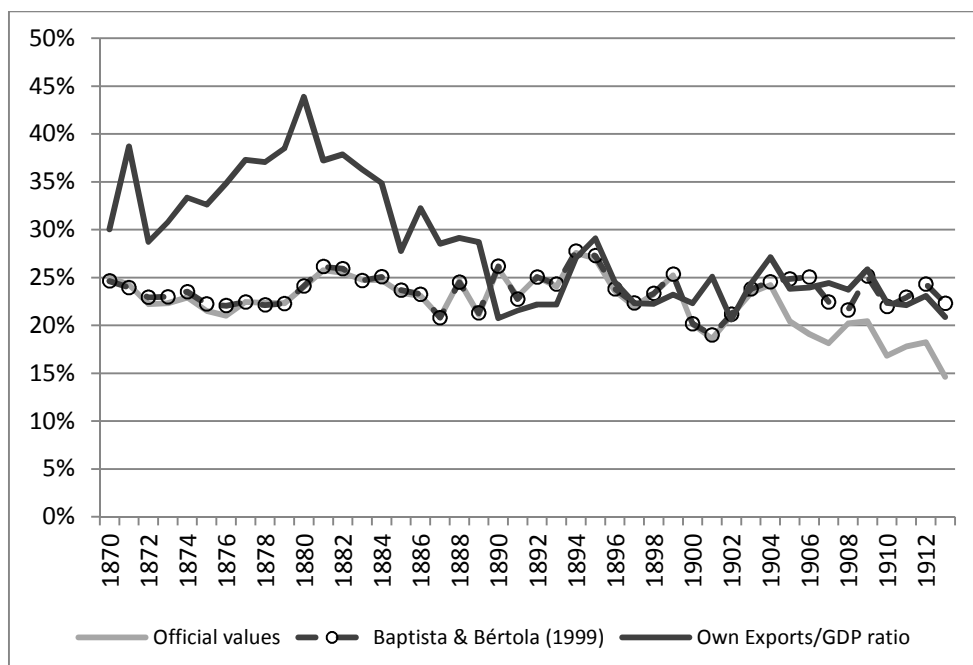
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<sup>20</sup> In 1908 urbanization reached 46 per cent of total population (Millot & Bertino, 1996), a very high record in Latin America where the ratios for Argentina (1914) and Chile (1907), for instance, were 57 and 43 per cent, respectively.

<sup>21</sup> Authors present an openness index as the relation between an indicator of exports in physical volume and an index of real GDP.

The Exports/GDP ratio computed from the new adjusted export values is showed in Figure 17, along with the ones calculated from official and Baptista & Bértola's values. The new proposed ratio reflects an initial process of openness in Uruguayan economy that lasted until the end of the 1870s. This evolution is coherent with the initial growth of a new economy, focused on external markets to place its production. From 1880 onwards a relative enclosure occurs, which could be explained by several reasons: a process of economic maturation, as a result of increasing urbanization and development of internal markets; specialization in areas of poor technological dynamism (traditional sectors, such as production of preserved meat and hides) and incapacity or delay to enter in more dynamic markets, such as frozen meat and cereals; last, but not least, a small economy as Uruguay could have been more affected by levels of protection similar to those applied by its neighbor Argentina.

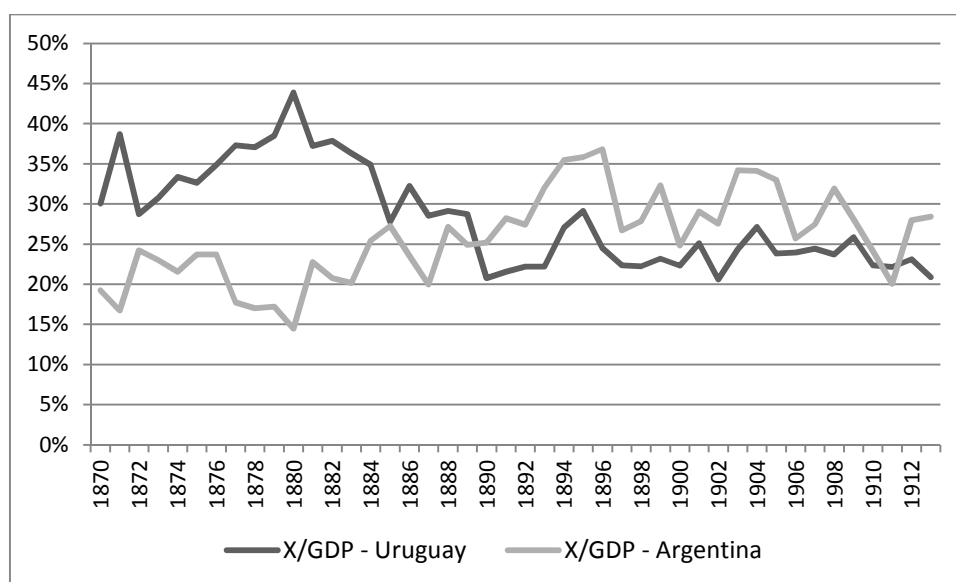
**Figure 17: Exports/GDP ratio, 1870-1913**



Sources: calculated with export data from the Statistical Yearbooks (several years), Baptista & Bértola (1999) and corrected data; GDP data from Bonino et al. (2012) based on Bértola et al. (1998) and Bertino & Tajam (1999).

The comparison with Argentina enriches our image of the evolution of the grade of openness of Uruguayan economy. The relevance of this contrast stems from the fact that both countries shared similar conditions in terms of natural resources, commodity production, attraction of productive factors and international integration.<sup>22</sup> Although these similarities, Argentina's and Uruguay's Exports/GDP ratio registered very different evolutions during this period, as it can be seen in Figure 18. The explanation could be that Argentina successfully changed its production pattern and so its exports, while Uruguay did not.

**Figure 18: Exports/GDP ratio, Uruguay and Argentina, 1870-1913**



Sources: Uruguay: calculated with export data from Appendix F; GDP data from Bonino et al. (2012) based on Bértola et al. (1998) and Bertino & Tajam (1999).  
Argentina: Tena-Junguito & Willebald (2013).

<sup>22</sup> Bértola & Ocampo (2010) consider both countries as members of the same group in Latin America (“*agricultura de clima templado*”) and Bulmer-Thomas (2003) deal with those economies together in his simulations of economic performance in Latin America.

As time went by the specialization of these countries, both in terms of products and destinations, became more and more different. In 1891 Argentina sold to the United Kingdom products like meat and cereals.<sup>23</sup> The exterior market of this country, the most dynamic of all, kept its importance in Argentinian exports during the following years. Uruguay, on the other hand, sold in 1891 to the United Kingdom mainly wool and hides and this market lost importance as a destination for Uruguayan exports. Then Uruguay decreased its presence in the most dynamic market of the First Globalization, i.e. United Kingdom, and remained attached to one less dynamic, as Brazil, where Uruguay sold salted beef (*tasajo*), a product in process of disappearance.

These results are consistent with the new geographical distribution of Uruguayan exports, obtained from adjusted data and presented earlier in Figure 8b.

The basis for these so different patterns of evolution registered in Uruguay and Argentina would be low externalities or spillovers of exports into the Uruguayan economy, which did not foster enough structural change in the production activities. This process could be determined by several factors that acted with different intensity along the period in terms of natural endowments —essentially the types of lands that were not so appropriate for cereals as in Argentina<sup>24</sup>—, the expansion of the agricultural frontier registered in Argentina and already consummated in Uruguay —which allowed to relocate cattle breeding activities and incorporate cereal production—, delayed incorporation of new technology —especially in meat packing plants— and the

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<sup>23</sup> These products accounted for 30 and 39 per cent of total Argentinian exports in 1891.

<sup>24</sup> Gerchunoff & Llach (2011) explain the Argentinian expansion of the period in terms of an “agricultural revolution” that did not occur in Uruguay. In accordance with their argument, the low fertility of Uruguayan lands and the limited territory explain this transcendent difference between both countries.



incidence of measures of economic policy in an international market where trade protection effectively arose.<sup>25</sup>

The modernisation and urbanization of the economy deserve special comments. Bulmer-Thomas (2003) proposes an exercise to evaluate the export-led model in Latin American economies (according to targets of expansion) obtaining, with the exceptions of Argentina and Chile, unsatisfactory performance of regional exports (from mid-19th century to WWI). However he recognizes that the assumption of low productivity labour in the non-export sector can be not justified in the case of Uruguay. Its urban centers (particularly Montevideo) proved attractive for European immigrants, and the non-export sector expanded rapidly in the years before the WWI. Although the long-run rate of growth of exports was unimpressive, Uruguay may still have been able to raise living standards at a fast rate as a result of above-average performance by its non-export sector. According to his “guesstimates” labour productivity “would have to rise by 2 percent a year before export performance in Uruguay could be made consistent with the target (assuming an export share of 0.3 to 0.4)” (Bulmer-Tomas, 2003, p. 63, footnote 39).<sup>26</sup> Precisely, the exports shares we obtain until the 1880s are within that range confirming the Bulmer-Thomas’ conjecture and the increasing importance of the non-export sector in the period.

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<sup>25</sup> The first meat packing plant set up in Uruguay was *La Frigorífica Uruguaya*, which started its operations in 1904. This was more than 20 years after the first plant of this kind started functioning in Argentina (1883).

<sup>26</sup> This target corresponds to the annual expansion of the GDP per capita and is assumed in 5.3 - 6.8 per cent.

## 5. FINAL REMARKS

The bad reputation on the accuracy of 19th century Latin American foreign trade statistics is confirmed in the case of Uruguay, a small economy of the south of the continent that headed the ranking of per capita exports and was one of the richest economies of the region. Its particular position between two large and wealthy countries characterized an economic evolution dominated for constituting the «exit door» of an extensive region producer of raw materials, food and other commodities. Montevideo and Buenos Aires had an important role as transit ports during the 18th and 19th centuries and even nowadays both ports maintain a significant trade based on *entrepôts* relationships. Therefore, Uruguay constitutes a clear illustration of the statistical difficulties related to transit trade in the world periphery as previous literature showed for European ports as Antwerp or Amsterdam. In the case of Uruguay statistical problems related to transit trade had consequences on the valuation of exports but, fundamentally, in terms of the regional distribution of external sales.

Official statistics showed a share of exports to Argentina that was non reasonable considering the similar productive structure of both countries and our adjustment by transit trade and smuggling –in terms of quantities– corrects this problem in a satisfactory manner.

Then, we analyse accuracy problems related to the use of *valores de aforo* to value, officially, Uruguayan exports. From the evolution of our accuracy price index, we distinguish two different trajectories. From the beginning of the period to 1889 we detect a relatively stable level of undervaluation of Uruguayan official prices. On the contrary, from 1890 onwards we appreciate a progressive process of undervaluation (our index shows a clear decreasing trend) after an abrupt increase in overvaluation. These

two different stages are the result of the implementation of specific economic policy measures regarding customs taxes in the period 1888-1890.

To correct the undervaluation—in both stages—we revalue the official unit values with international prices—British import prices corresponding to goods' purchases of Britain from Uruguay—and discuss the consistence of the bias founded with the political economy of the of exporters' interest to evade taxes. We focus our attention on the years 1888-1892 when trade regulations changed and promoted transformations in the taxation by type of commodity. These policy changes affected in very different ways ovine-related and bovine-related producers, clearly benefiting more the former than the latter. Therefore, the most benefited one was an interest group usually identified with the progressive sector of livestock producers of Uruguay because of its efforts to modernize sheep production, in technological terms, and promote a more efficient use of land.

During the *Belle Époque*, the evolution of exports expressed in constant prices was irregular. The 1870s and 1900s were the most favorable in terms of exports' growth, while the 1890s appear to have been a «lost decade». This evolution contrasts with the one of Argentina, where a sustainable growth process was evidenced. The fundamentals for these so different patterns would be low externalities or spillovers of exports into Uruguayan economy, which did not foster enough structural change in the domestic production. This process could be determined by several factors that acted with different intensity along the period in terms of quality of land, the expansion of the agricultural frontier registered in Argentina and already consummated in Uruguay, delayed incorporation of new technology (specifically in the beef industry) and the incidence of measures of trade policy.

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## Appendix A

**Table A.1 Export values: official data and corrected values previously available, 1870-1913 (million pesos; current prices)**

<b>Year</b>	<b>Official</b>	<b>Finch (1980)</b>	<b>B&amp;B (1999)</b>
1870	12.8	-	12.6
1871	13.3	-	13.2
1872	15.5	-	16.0
1873	16.3	-	16.8
1874	15.2	-	15.7
1875	12.7	-	13.1
1876	13.7	-	14.4
1877	15.9	-	15.9
1878	17.5	-	17.3
1879	16.6	-	16.6
1880	19.8	-	19.8
1881	20.2	-	20.5
1882	22.1	-	22.4
1883	25.2	-	25.2
1884	24.8	-	25.1
1885	25.3	-	25.6
1886	23.9	-	24.0
1887	18.7	-	18.7
1888	28.0	-	27.9
1889	26.0	-	26.2
1890	29.2	-	29.4
1891	27.1	-	26.8
1892	26.0	-	26.0
1893	27.7	-	28.0
1894	33.5	-	33.7
1895	32.6	-	32.9
1896	30.4	-	30.7
1897	29.4	-	29.8
1898	30.3	-	30.4
1899	36.6	-	36.8
1900	29.4	32.1	29.5
1901	27.8	-	28.3
1902	33.7	-	33.9

1903	37.4	-	38.0
1904	38.5	-	39.0
1905	30.8	-	37.5
1906	33.4	-	43.8
1907	35.0	-	43.3
1908	40.3	-	43.1
1909	45.1	-	55.4
1910	40.9	46.7	53.4
1911	42.5	-	54.8
1912	48.8	-	65.0
1913	44.9	68.5	68.5

Sources: Statistical Yearbooks (several years); Finch (1980); Baptista & Bértola (1999).



**Table A.2 Exchange rate, 1870-1913 (pesos per 1 British sterling pound)**

<b>Year</b>	<b>Exchange rate</b>	<b>Year</b>	<b>Exchange rate</b>
1870	4.68	1892	4.69
1871	4.68	1893	4.70
1872	4.68	1894	4.65
1873	4.68	1895	4.66
1874	4.68	1896	4.67
1875	4.68	1897	4.68
1876	4.69	1898	4.67
1877	4.69	1899	4.63
1878	4.69	1900	4.66
1879	4.69	1901	4.64
1880	4.69	1902	4.65
1881	4.69	1903	4.64
1882	4.69	1904	4.64
1883	4.69	1905	4.64
1884	4.70	1906	4.64
1885	4.70	1907	4.63
1886	4.69	1908	4.64
1887	4.71	1909	4.65
1888	4.68	1910	4.65
1889	4.69	1911	4.65
1890	4.69	1912	4.64
1891	4.64	1913	4.64

Sources: calculated with data from Boletín de la Bolsa de Montevideo, Año I, N° 1 (1873); Statistical Yearbooks (several years).

## Appendix B. Country Accuracy Index

We use Uruguayan official export data and the import records of Uruguay's main export trade partners (Argentina, Belgium, Brazil, France, Germany, Italy, Spain, the United Kingdom and the United States). We compare then Uruguayan official exports with the same flows as registered by its trade partners. The formulation of the index is the following:

$$CAI_t = \frac{\sum_{j=1}^n X_{jt}}{\sum_{j=1}^n M_{jt}} \quad [3]$$

where,

$X_{j,t}$  stands for Uruguayan exports to country  $j$  in year  $t$  according to Uruguayan official statistics

$M_{j,t}$  stands for imports of country  $j$  from Uruguay in year  $t$  according to its own official statistics.

All data are expressed in British Sterling Pounds. Sources and references are detailed in Appendix G.

Prior to the calculation of the index, we adjust data in response to several inadequacies in the registration of values, specially related to transit trade and smuggling.

In relation to transit trade, we adjust data taking into account two trade flows: Uruguayan exports traded through Buenos Aires's port mainly to Europe and regional exports traded through Montevideo's port. Data is obtained from Statistical Yearbooks.

The first of these flows were indeed Uruguayan exports but were wrongly registered as exported to Argentina instead of its actual destination. We geographically re-distribute these values to other countries in each year, according to the importance of

each country in total non-regional Uruguayan exports (i.e. total Uruguayan exports that were sent neither to Argentina nor to Brazil).

The second of these flows were not Uruguayan exports, therefore it must be taken off from export's figures. Considering again the importance of each country in total non-regional Uruguayan exports, we remove these figures from Uruguayan official values.

We also take into account smuggling of cattle to Brazil, which was a significant activity during the period. Following Bértola et al. (1998) and Baptista & Bértola (1999) and considering initially official prices as good proxies to market prices, we add estimates of smuggling to Uruguayan official records of exports to Brazil.

To deal with the lack of data from several trade partners (Brazil, Germany and Italy) we compute estimates for their imports from Uruguay for the periods 1870-1901, 1880-1888 and 1880-1887, respectively. In the case of Brazil, we consider two official Brazilian values for 1866 and 1902 and then interpolate them following the evolution of Uruguayan exports to Brazil (we re-scale the series). For Germany and Italy, we consider values recorded as «Argentina, Paraguay and Uruguay» or «Stati del Plata» and estimate the portion correspondent to Uruguay, according to the importance of Uruguay in the same category for nearby years.

Finally, we notice that Argentinian official imports' figures present problems of valuation that complicate the comparison with Uruguayan exports' data. As the types of goods exported from Uruguay to Argentina are quite similar to the ones exported by Argentina, we adjust Argentinian import values from Uruguay with the Argentinian PAI, obtained from Tena-Junguito & Willebald (2013).

**Table B.1 Distribution of Uruguayan exports by country of destination  
(official values, in percentage, selected periods)**

<b>Country/ Years</b>	<b>1872-1880</b>	<b>1881-1890</b>	<b>1891-1900</b>	<b>1901-1913</b>
Argentina	4	7	14	17
Belgium	10	14	15	16
Brazil	17	15	21	10
France	19	16	18	19
Germany	1	3	8	13
Italy	2	2	2	3
Spain	0	1	2	2
United Kingdom	28	19	11	8
United States	9	10	6	6
Other countries	10	13	3	6

Sources: calculated with official values from the Statistical Yearbooks (several years).

**Table B.2 Distribution of Uruguayan exports by country of destination  
(own corrected values, in percentage, selected periods)**

<b>Country/ Years</b>	<b>1872-1880</b>	<b>1881-1890</b>	<b>1891-1900</b>	<b>1901-1913</b>
Argentina	1	3	2	4
Belgium	9	14	17	18
Brazil	24	21	24	13
France	18	16	20	21
Germany	1	3	9	15
Italy	2	2	2	3
Spain	0	1	2	2
United Kingdom	26	18	12	9
United States	9	10	7	7
Other countries	10	12	5	8

Sources: calculated with own corrected values.

**Table B.3 Official and Adjusted CAI, 1872-1913**

<b>Year</b>	<b>Official CAI</b>	<b>Adjusted CAI</b>
1872	0.37	0.35
1873	0.46	0.46
1874	0.46	0.45
1875	0.44	0.46
1876	0.50	0.52
1877	0.56	0.57
1878	0.69	0.68
1879	0.72	0.72
1880	0.62	0.64
1881	0.73	0.71
1882	0.64	0.63
1883	0.93	0.85
1884	0.81	0.72
1885	0.84	0.79
1886	0.72	0.70
1887	0.72	0.73
1888	0.96	0.89
1889	0.78	0.77
1890	0.99	0.90
1891	1.33	1.11
1892	1.33	1.09
1893	1.71	1.18
1894	1.80	1.21
1895	1.33	1.08
1896	1.27	1.00
1897	1.43	1.12
1898	1.58	1.15
1899	2.00	1.31
1900	1.41	1.10
1901	1.50	1.15
1902	1.53	1.26
1903	1.41	1.20
1904	1.45	1.24
1905	0.98	0.85
1906	1.02	0.91
1907	0.97	0.85
1908	1.09	0.95

1909	0.96	0.86
1910	0.85	0.79
1911	1.00	0.93
1912	0.88	0.82
1913	0.75	0.70

Sources: Appendix B.

## **Appendix C. Commodities' freight rates**

We estimate unit freight and insurance costs for the sample of commodities considered in the PAI and the export price indexes in order to transform c.i.f. prices in London to f.o.b. prices at the Uruguayan border.

Data for transatlantic freight rates from Montevideo is scarce, so we had to make a number of assumptions to obtain a complete estimated series. For some commodities in some periods data of freight cost from Montevideo to England could be obtained from the Statistical Yearbooks: salted beef (1900, 1915); hides and wool (1885-1900; 1911-1913); maize (1896-1900; 1911-1913); wheat (1898-1900; 1911-1913). To complete these series we proceeded in two ways. For the years in the 19th century we assume they followed the same variations as the East American Grain Index, offered in Mohamed-Williamson (2004, p. 182, Table 2). For the years in the 20th century we assume the freight costs evolved as the ones corresponding to Argentina. In the case of salted beef we assume that in the period 1885-1899 the freight cost varied as the freight cost of hides. Four commodities (frozen meat —bovine and sheep—, preserved meat and extract meat) deserve a special comment. We consider the freight rate for frozen meat in 1883 from Critchell & Raymond (1912, p. 144) and in 1910 from Vázquez-Preedo (1979). Then we interpolate geometrically the figures from 1884 to 1909; for 1911-1913 we assume the freight cost followed the evolution of the one corresponding to hides. Moreover, for preserved meat we consider the freight cost in 1925 from the Statistical Yearbook and interpolate the figures for the previous period according to the evolution of the above mentioned East American Grain Index from 1870 to 1884, and of hides' freight cost from 1885 onwards. Data for prices of extract meat considered was already valued f.o.b., so we did not considered any freight rate in this case.

For insurance we adopt a fixed 2 per cent insurance in 1900 and moved it backwards and forwards with the respective shipping freight rates. The 2 per cent insurance factor is based on Simon (1960, p. 659).

**Table C.1 Transatlantic freight rates of main Uruguayan export commodities, 1870-1913 (British sterling pounds per long ton)**

	<b>Salted beef</b>	<b>Preserved meat</b>	<b>Frozen meat</b>	<b>Hides</b>	<b>Wool</b>	<b>Maize</b>	<b>Wheat</b>
1870	1.84	1.05	-	1.70	0.89	0.80	0.78
1871	2.28	1.29	-	2.11	1.10	1.00	0.97
1872	2.39	1.35	-	2.21	1.15	1.04	1.01
1873	2.54	1.44	-	2.35	1.22	1.11	1.08
1874	2.39	1.35	-	2.21	1.15	1.04	1.01
1875	2.42	1.37	-	2.23	1.16	1.05	1.03
1876	2.24	1.27	-	2.07	1.08	0.98	0.95
1877	2.08	1.18	-	1.92	1.00	0.91	0.88
1878	1.91	1.08	-	1.76	0.92	0.83	0.81
1879	1.86	1.05	-	1.72	0.89	0.81	0.79
1880	2.11	1.20	-	1.95	1.02	0.92	0.90
1881	2.16	1.23	-	2.00	1.04	0.94	0.92
1882	2.16	1.23	-	2.00	1.04	0.94	0.92
1883	1.91	1.08	-	1.76	0.92	0.83	0.81
1884	1.96	1.11	-	1.81	0.94	0.86	0.83
1885	1.81	1.03	-	1.67	0.87	0.79	0.77
1886	1.69	0.96	-	1.57	0.90	0.70	0.68
1887	1.81	1.02	-	1.67	0.78	0.86	0.83
1888	1.72	0.98	-	1.59	0.74	0.84	0.82
1889	1.73	0.98	-	1.60	0.64	0.97	0.95
1890	1.71	0.97	-	1.58	0.92	1.07	1.05
1891	1.79	1.02	-	1.66	0.90	1.30	1.27
1892	1.78	1.01	-	1.65	0.93	1.06	1.03
1893	1.80	1.02	-	1.67	0.75	0.93	0.90
1894	1.76	1.00	-	1.63	0.88	0.97	0.95
1895	1.76	1.00	-	1.62	0.63	0.84	0.82
1896	1.77	1.00	-	1.64	0.57	0.75	0.73
1897	1.92	1.09	-	1.78	0.52	0.55	0.68
1898	1.85	1.05	-	1.71	0.65	0.83	0.87



1899	1.89	1.07	-	1.74	0.72	0.93	0.85
1900	2.03	1.15	-	1.88	0.79	0.88	0.88
1901	1.99	1.09	-	1.77	0.72	0.93	0.85
1902	2.11	1.26	-	2.06	0.31	0.75	0.70
1903	1.9	0.95	-	1.56	0.69	1.07	0.98
1904	1.84	0.86	5.38	1.41	0.74	1.19	1.08
1905	1.84	0.87	5.01	1.43	0.95	1.13	1.03
1906	1.79	0.80	4.67	1.30	0.74	0.77	0.72
1907	1.79	0.80	4.36	1.30	0.57	0.71	0.66
1908	1.75	0.74	4.06	1.20	0.76	0.62	0.59
1909	1.75	0.74	3.78	1.20	0.53	0.59	0.56
1910	1.76	0.74	3.53	1.22	0.45	0.47	0.46
1911	1.83	0.86	4.06	1.40	0.39	0.39	0.39
1912	1.86	0.89	4.22	1.46	0.86	1.15	1.15
1913	1.84	0.88	4.14	1.43	0.85	1.15	1.15

Sources: Appendix G.

Note: in general, we consider the route Montevideo-Liverpool.

## Appendix D. Price Accuracy Index

We analyse the accuracy of the official prices used to value Uruguayan exports until 1913. In order to do so we revalue at international prices the quantities of the different products exported by the country and compare it with the value of the same quantities at official prices.

It is important to explain that we consider that the correct procedure is to value Uruguayan exported goods at international prices. This stems from price demand theory, as we consider that the quality of Uruguayan commodities exported to high-income markets tended to be superior to that corresponding to local market goods and, therefore, we assume that Uruguayan export prices were more related with international prices than with domestic ones.<sup>27</sup>

We compute Uruguayan official implicit prices from the records of values and quantities in the Statistical Yearbooks. Furthermore, we take import unit values from Uruguay recorded by the Annual Statement of United Kingdom as a proxy to the international c.i.f. prices effectively obtained by Uruguayan exporters. In the case of salted beef we considered the unit value of salted beef exported by Rio Grande do Sul, in Brazil, as a reference for international price. Moreover, for meat extract we use data of Australian unit value of this product exported from Rockhampton to the United Kingdom, as well as data of meat extract's unit value in London (see Appendix G for sources).

We adjust c.i.f. prices discounting taxes and freight cost from them, in order to be able to compare international prices with Uruguayan official f.o.b. prices.

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<sup>27</sup> The model that predicts that products of better quality will be exported is presented in «Shipping the good apples out: the Alchian and Allen theorem reconsidered» (Borcherding & Silberberg, 1978). Assuming shipping cost is equal in good and bad quality products, high quality products will become relatively cheaper in foreign markets. For a recent discussion, see «Shipping the good apples out? An empirical confirmation of the Alchian-Allen conjecture» (Hummels & Skiba, 2004).

**Table D.1 Commodity export f.o.b. prices, 1870-1913**  
(tax and freight adjusted; expressed in sterling pounds per long ton)

	Salted Beef	Preserved Meat	Meat Extract	Hides	Skins -Furs (sheep)	Wool	Maize	Wheat
1870	19.38	60.40	811.96	52.33	20.77	48.52	5.87	9.30
1871	35.65	39.81	1,014.35	56.66	38.88	77.83	6.39	11.42
1872	16.95	24.97	973.87	61.93	57.81	86.89	5.49	12.01
1873	17.39	110.92	1,135.78	63.84	36.97	88.42	5.66	12.79
1874	21.64	85.57	933.39	69.07	48.93	77.99	7.46	11.61
1875	23.78	143.11	1,095.30	67.84	65.50	86.98	6.72	9.83
1876	26.61	69.98	973.87	60.57	65.01	101.11	7.01	7.59
1877	27.87	40.66	852.44	62.91	62.45	81.16	6.08	9.81
1878	27.45	130.67	852.44	58.88	68.21	80.37	5.20	10.17
1879	27.63	211.77	690.53	61.11	49.83	91.11	4.70	7.88
1880	30.05	108.41	852.44	61.66	53.99	112.24	6.50	8.89
1881	28.37	79.94	811.96	57.79	63.94	82.42	5.63	8.44
1882	22.38	92.16	933.39	57.75	82.70	84.52	7.13	10.92
1883	22.12	74.52	933.39	59.44	92.01	83.15	6.51	7.87
1884	19.39	68.66	852.44	59.06	82.71	90.94	5.31	6.84
1885	15.05	71.05	650.06	43.58	62.80	79.61	4.59	5.94
1886	33.24	55.42	488.15	48.79	41.00	64.92	4.23	5.41
1887	21.08	27.96	326.24	44.94	55.68	74.39	4.52	5.95
1888	19.27	29.33	447.67	40.16	60.80	64.06	4.29	7.81
1889	20.81	22.42	447.67	43.84	64.46	69.84	3.30	6.56
1890	14.68	43.65	235.27	45.03	61.81	54.56	3.57	5.51
1891	12.86	38.94	285.24	44.06	45.25	84.70	3.63	7.32
1892	18.00	49.97	252.01	37.93	53.58	63.16	3.68	6.90
1893	15.85	27.96	562.19	42.51	53.79	63.21	3.74	5.08
1894	17.53	49.35	277.60	37.13	42.00	64.97	3.79	4.31
1895	14.75	38.91	330.12	56.24	38.32	59.97	3.85	4.67
1896	14.79	41.47	238.09	48.59	41.62	63.73	2.94	5.12
1897	13.84	45.15	369.78	44.05	51.77	61.48	2.99	6.32
1898	19.93	54.68	299.41	48.89	41.26	62.12	2.83	7.35
1899	20.00	66.64	315.24	55.87	44.19	82.35	3.07	5.67
1900	30.34	42.59	540.16	48.03	36.08	92.34	3.88	5.94
1901	28.27	44.36	746.63	54.83	37.47	62.51	4.28	5.92
1902	17.90	37.20	662.56	51.64	40.37	58.33	4.76	5.91

1903	17.73	35.46	587.95	63.79	46.03	74.30	3.69	5.44
1904	20.87	61.80	521.75	72.75	52.49	73.06	3.49	5.59
1905	30.61	79.41	463.00	55.02	39.70	82.80	3.57	6.04
1906	27.97	93.93	410.86	66.60	48.06	91.41	4.28	6.37
1907	29.77	126.31	364.60	69.48	50.13	98.76	5.13	6.73
1908	31.53	73.13	323.54	50.91	36.73	87.49	6.17	7.64
1909	32.03	71.97	287.11	67.68	48.83	87.14	5.93	8.38
1910	30.47	62.69	254.78	67.93	49.01	99.45	5.70	8.20
1911	31.24	63.89	226.09	65.57	47.31	87.40	4.95	7.38
1912	31.78	85.25	301.66	72.84	52.55	87.41	4.30	6.64
1913	34.89	115.15	407.46	89.09	64.28	89.68	4.61	6.00

Sources: *Annual Statement of United Kingdom* and Appendix G.

We define the Price Accuracy Index (PAI) in year  $t$  as:

$$PAI_t = \frac{\sum_i P_{it,UY} * Q_{it,UY}}{\sum_i P_{it,UK} * Q_{it,UY}} \quad [4]$$

where,

PAI is the ratio between the volume of exported goods valued at the Uruguayan border (f.o.b. value of commodity exports) and the volume of the same products valued with the corresponding prices in international markets discounting freight and insurance costs. The commodities considered are: salted beef, preserved meat, meat extract, frozen meat (sheep and bovine), hides (not tanned), skins and furs (sheep and lambs), wool, maize and wheat.

$P_{it,UY}$  is the price of good  $i$  exported in year  $t$  according to Uruguayan official statistics (expressed in pounds)

$P_{it,UK}$  is the price of good  $i$  imported from Uruguay in year  $t$  according to statistics from the United Kingdom (freight adjusted; expressed in pounds)

$Q_{it,UY}$  is the quantity exported of good  $i$  in year  $t$  according to Uruguayan official statistics

$Q_{it,UY}$  and (implicit)  $P_{it,UY}$  were derived from official statistics of the Statistical Yearbooks (*Anuarios Estadísticos*). Information is not available for some commodities in some years and we complete the series in different ways. For preserved meat (1870-1874), salted beef, hides, skins and furs, wool, maize and wheat (1870-1871) we assume the series had the same evolution as the Argentinian corresponding price.

(Implicit)  $P_{it,UK}$  were derived from unit value of the UK import quantities and values from Uruguay which are taken from several volumes of the Annual Statement of the Trade.  $P_{it,UK}$  is freight adjusted to get f.o.b. prices free of tax in the Uruguayan border. Data are not available for some commodities for the whole period and we complete the series in several manners. For bovine frozen meat (1904-1906), ovine frozen meat (1905-1906) and meat extract (1870-1888; 1902-1910) we complete the series with the movement in Sauerbeck's prices (Sauerbeck, 1886, 1893, 1909, 1917). For sheep's furs and skins (1904-1913), we assume that the price followed the same evolution of the price of hides. For maize and wheat (1870-1886) we complete the series with the movement in the corresponding Argentinian price.

**Table D.2 Price Accuracy Index (PAI), 1870-1913**

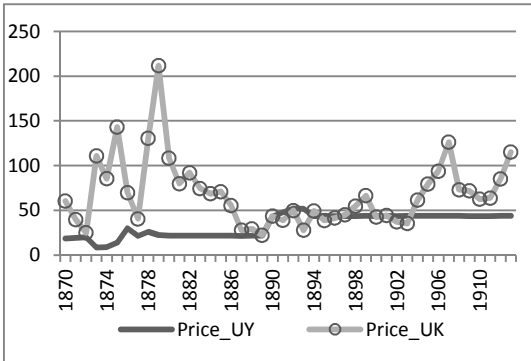
Year	PAI	Year	PAI
1870	0.77	1892	1.12
1871	0.58	1893	1.07
1872	0.73	1894	1.00
1873	0.72	1895	0.91
1874	0.65	1896	0.94
1875	0.64	1897	0.97
1876	0.60	1898	1.00
1877	0.62	1899	1.04
1878	0.63	1900	0.86
1879	0.61	1901	0.72
1880	0.57	1902	1.00
1881	0.70	1903	0.94
1882	0.68	1904	0.86
1883	0.69	1905	0.82
1884	0.71	1906	0.77
1885	0.84	1907	0.72
1886	0.72	1908	0.82
1887	0.74	1909	0.77
1888	0.85	1910	0.73
1889	0.74	1911	0.78
1890	1.26	1912	0.76
1891	1.08	1913	0.68

Source: calculated with data from the *Annual Statement of United Kingdom* and Appendix G.

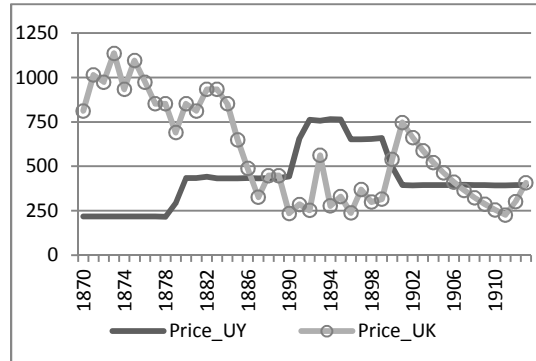
The inaccuracy of Uruguayan official prices varied greatly across the different exported goods, as it can be seen in Figure D.3. The most outstanding cases of separation between official and international market prices are preserved meat, meat extract, skins and furs, wool and wheat.

**Figure D.3 Prices, 1870-1913 (sterling pounds per long ton)**

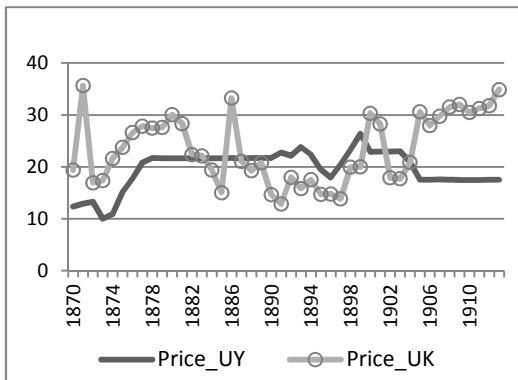
**Panel a. Preserved meat**



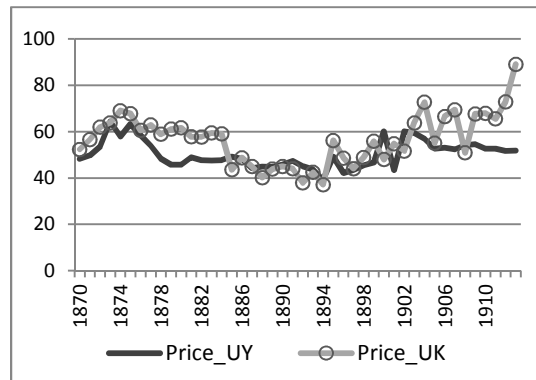
**Panel b. Meat extract**



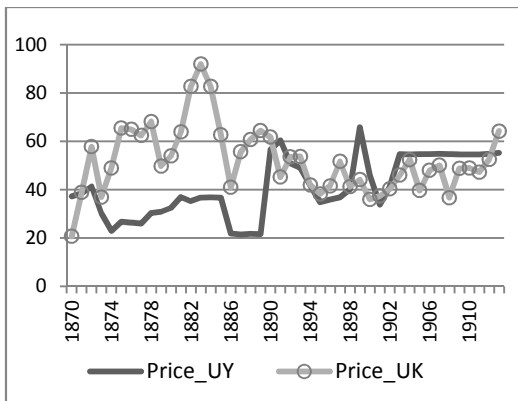
**Panel c. Salted beef (*tasajo*)**



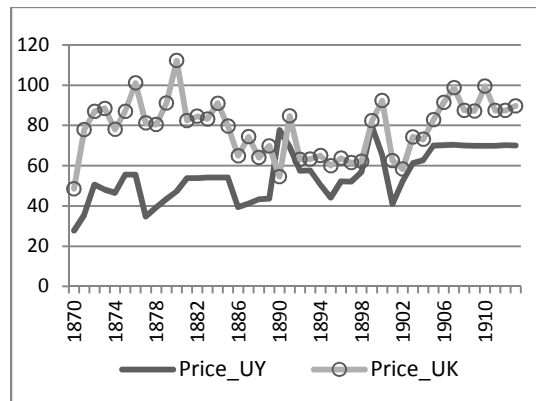
**Panel d. Hides (not tanned)**



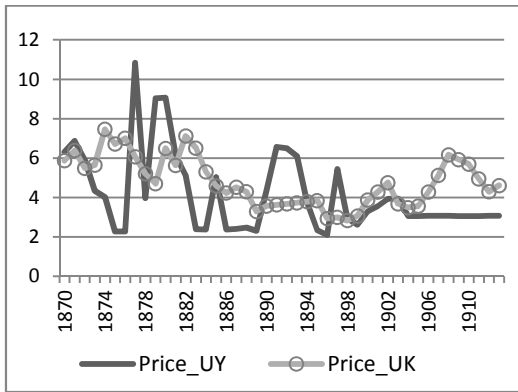
**Panel e. Skins and furs**



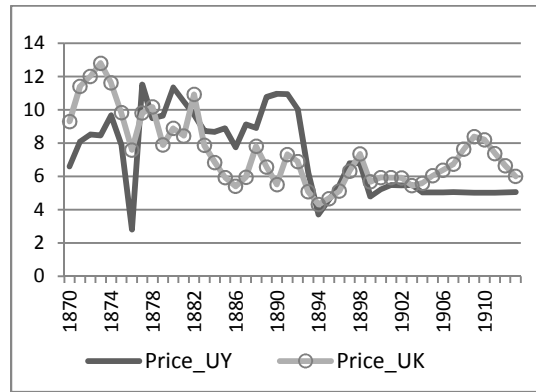
**Panel f. Wool**



**Panel g. Maize**



**Panel h. Wheat**



Sources: *Annual Statement of United Kingdom* and Appendix G.



## Appendix E. Export Price Index

We propose an index of free on board (f.o.b) export prices for Uruguay for the period 1870-1913.

Our reference data is the import unit value derived from the values and quantities of commodities imported by the United Kingdom from Uruguay registered in several volumes of the *Annual Statement of the Trade of the United Kingdom*. We converted all figures to sterling pound per ton from different measures. These figures were c.i.f. prices, which were then adjusted for freight and insurance costs to get f.o.b. prices at the Uruguayan border.

The index proposed is a Paasche Index Number, which uses exported quantities, year by year, to weight the respective prices. Therefore, changes in the structure of exports would be incorporated to the index. The formulation of the index is the following:

$$XPI_{t,1909-1911} = \frac{\sum_{i=1}^N P_{it} * Q_{it}}{\sum_{i=1}^N P_{i,1909-1911} * Q_{it}} \quad [5]$$

where,

$XPI_{t,1909-1911}$  is the Export Price Index of Uruguay in the period  $t$  considering 1909-1911 average as the base period

$P_{it}$  is the international price of commodity  $i$  in period  $t$

$P_{i,1909-1911}$  is the average international price of commodity  $i$  in the period 1909-1911

$Q_{it}$  is the exported volume of commodity  $i$  in period  $t$  (according with Uruguayan official statistics)

We compare our XPI with other export price indexes for Uruguay available in the literature, one from Blattman et al. (2004) and two others from Baptista & Bértola (1999). To make this comparison possible we change the base period of our index to 1913.

**Table E.1 Export Price Indexes, 1870-1913**

<b>Year</b>	<b>Export Price Index (Own)</b>	<b>Blattman et al.</b>	<b>Baptista &amp; Bértola (Paasche)</b>	<b>Baptista &amp; Bértola (Divisia)</b>
1870	57.20	83.97	43	61
1871	82.52	96.49	43	61
1872	76.52	110.13	42	61
1873	78.25	113.58	42	63
1874	81.00	108.10	40	60
1875	100.06	104.63	45	60
1876	96.97	93.48	43	59
1877	87.42	95.76	39	57
1878	87.84	92.67	40	55
1879	91.64	87.88	42	58
1880	101.74	99.52	43	60
1881	87.11	93.34	46	64
1882	89.72	94.96	47	63
1883	87.28	94.23	47	63
1884	85.10	91.68	46	63
1885	72.95	83.21	47	63
1886	74.25	76.71	47	56
1887	70.25	76.19	45	55
1888	63.37	72.68	51	56
1889	70.24	75.44	49	56
1890	57.87	72.91	54	73
1891	67.53	69.99	54	73
1892	58.53	65.09	50	67
1893	61.68	65.82	53	69
1894	57.58	62.84	47	59
1895	60.23	69.48	47	57
1896	59.61	68.27	47	56
1897	59.39	67.49	48	58

1898	64.43	71.38	55	62
1899	74.08	82.18	68	72
1900	83.66	81.55	61	69
1901	72.74	73.39	53	56
1902	65.24	81.13	58	61
1903	74.67	82.02	62	65
1904	78.94	82.45	64	63
1905	82.86	85.07	75	78
1906	90.03	88.66	79	81
1907	95.08	90.61	76	77
1908	83.31	82.68	63	65
1909	89.15	90.09	75	76
1910	93.88	94.37	80	83
1911	87.40	89.55	80	81
1912	90.28	95.22	85	86
1913	100.00	100.00	100	100

Sources: Export Price Index (Own) calculated with data from the Statistical Yearbooks of Uruguay, the *Annual Statement of the Trade of the United Kingdom* and data detailed in Appendix G; Blattman et al. (2004); Baptista & Bértola (1999).

## Appendix F. New series

**Table F.1 Corrected Export series, 1870-1913  
(million pesos; current and constant prices of 1913)**

<b>Year</b>	<b>Exports (current prices)</b>	<b>Exports (constant prices)</b>
1870	15.32	26.78
1871	21.29	25.80
1872	20.03	26.17
1873	22.49	28.75
1874	22.20	27.41
1875	19.24	19.23
1876	22.79	23.51
1877	26.41	30.21
1878	28.99	33.00
1879	28.71	31.33
1880	36.07	35.45
1881	29.23	33.55
1882	32.75	36.50
1883	37.00	42.39
1884	34.93	41.04
1885	30.02	41.15
1886	33.33	44.89
1887	25.60	36.45
1888	33.16	52.33
1889	35.37	50.36
1890	23.34	40.33
1891	25.35	37.53
1892	23.04	39.36
1893	25.57	41.46
1894	32.86	57.07
1895	35.14	58.35
1896	31.58	52.98
1897	29.80	50.18
1898	29.01	45.02
1899	33.68	45.46
1900	32.69	39.07
1901	37.47	51.51

1902	32.98	50.55
1903	38.90	52.10
1904	43.08	54.57
1905	35.94	43.38
1906	41.93	46.57
1907	47.08	49.52
1908	47.32	56.80
1909	57.08	64.03
1910	54.36	57.90
1911	52.84	60.47
1912	61.77	68.42
1913	64.09	64.09

Source: Appendix G.

## Appendix G. Statistical sources and references for the construction of indicators

Concept	Sources and comments
Uruguay	<ul style="list-style-type: none"> <li>• Barrán, J. P.; Nahum, B. (1967), <i>Historia Rural del Uruguay Moderno 1851-1885</i>. Apéndice Documental (pp. 338-342). Montevideo: Ediciones Banda Oriental. Sources quoted: Mesa de Estadística General, Cuadernos N° 4, 8, 10, 11, 12, 13 y 14.</li> <li>• Dirección General de Estadística (several years), <i>Anuario Estadístico de la República Oriental del Uruguay</i>.</li> </ul>
Argentina	<ul style="list-style-type: none"> <li>• Board of Trade, <i>Statistical abstract for the Principal and other foreign countries in each year from 1871 to 1880-81 (as far as can be stated)</i>. Ninth number.</li> <li>• Dirección General de Estadística (several years), <i>Anuario del Departamento Nacional de Estadística</i>. Buenos Aires.</li> <li>• Ministerio de Hacienda de la Nación (several years), <i>Estadística del Comercio Exterior y de la Navegación de la República Argentina</i>. Buenos Aires.</li> </ul>
Belgium	<ul style="list-style-type: none"> <li>• Ministère del' Intérieur et del' Instruction Publique (several years), <i>Statistique General de la Belgique</i>. Bruxelles: T. Lesigne.</li> </ul>
Brazil	<ul style="list-style-type: none"> <li>• Sector Externo, Estadísticas Económicas, Estadísticas del Siglo XX, IBGE URL: <a href="http://seculoxx.ibge.gov.br/en/economicas/sector-externo/tabelas">http://seculoxx.ibge.gov.br/en/economicas/sector-externo/tabelas</a> (accessed September 7, 2012)</li> <li>• <i>Anuario estadístico de Brasil</i> (several years).</li> <li>• Ministerio de Fazenda, <i>Comercio Exterior de Brasil, Años 1933-1937</i>.</li> </ul>
France	<ul style="list-style-type: none"> <li>• Tableau Général du Commerce de la France (several years), <i>Annuaire Statistique de la France</i>. Paris.</li> </ul>
Germany	<ul style="list-style-type: none"> <li>• Statistisches Reichsamts (several years), <i>Statistisches Jahrbuchfür Deutsche Reich</i>. Berlin: R. Hobbing.</li> </ul>
Italy	<ul style="list-style-type: none"> <li>• Ministero delle Finanze, <i>Movimento commerciale del Regno d' Italia</i>.</li> </ul>
Spain	<ul style="list-style-type: none"> <li>• <i>Comercio de importación entre España y sus colonias y las naciones extranjeras. Comercio total, por países de procedencia y destino</i>. Anuarios. Fondo Documental del Instituto Nacional de Estadística.</li> </ul>

United States	<ul style="list-style-type: none"> <li>• Bureau of Statistics (several years), <i>Statistical Abstract of the United States</i>. Washington: Government Printing Office.</li> </ul>
United Kingdom	<ul style="list-style-type: none"> <li>• Board of trade (several years), <i>Statistical Abstract for the United Kingdom</i>. London.</li> </ul>
Freight and insurance	<ul style="list-style-type: none"> <li>• Mohamed, S. I. and Williamson, J. G. (2004), "Freight rates and productivity gains in British tramp shipping 1869-1950", <i>Explorations in Economic History</i>, 41, no. 2: 172-203.</li> <li>• Dirección General de Estadística (several years), <i>Anuario Estadístico de la República Oriental del Uruguay</i>.</li> <li>• Vázquez-Preledo, V. (1979), <i>El caso argentino: migración de factores, comercio exterior y desarrollo 1875-1914</i>. Buenos Aires: Eudeba.</li> </ul>
Exchange rates	<ul style="list-style-type: none"> <li>• Officer, L. (2008), "Gold Standard". EH.Net Encyclopedia, edited by Robert Whaples. March 26, 2008. URL: <a href="http://eh.net/encyclopedia/article/officer.gold.standard">http://eh.net/encyclopedia/article/officer.gold.standard</a> (accessed August 6, 2012)</li> <li>• Bolsa de Montevideo, <i>Boletín</i>, Año I, N° 1, 1873.</li> <li>• Dirección General de Estadística (several years), <i>Anuario Estadístico de la República Oriental del Uruguay</i>.</li> </ul>
Price-Salted beef ( <i>tasajo</i> )	<ul style="list-style-type: none"> <li>• Dalmazo, R. A.; Caravantes, R. R. (2004), "As relações de comercio de Rio Grande do Sul — do século XIX a 1930", Documentos FEE n. 60, Fundação de Economia e Estatística Siegfried Emanuel Heuser.</li> </ul>
Price – Meat extract	<ul style="list-style-type: none"> <li>• Australian newspapers. URL: <a href="http://trove.nla.gov.au/">http://trove.nla.gov.au/</a> (accessed January 10, 2014)</li> </ul>