OFFICIAL BOLIVIAN TRADE STATISTICS (1910-1949): LANDLOCKNESS AND THE LIMITS OF A STANDARD ACCURACY APPROACH*

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ABSTRACT

This paper aims to evaluate the accuracy of official Bolivian foreign trade statistics. Results show large discrepancies between Bolivian records and those of its main trade partners during the First World War. Whereas the gap decreased thereafter, it stayed particularly high in the case of exports. This seems to be explained by mistakes in the geographical assignment by the trade partners rather than by an overvaluation of official Bolivian figures. This suggests that landlockness may have had a significant negative effect on the accuracy of trade statistics from the, *a priori*, more reliable countries. The study also helps to revisit the debate concerning the effect that tin exploitation had on the rest of the Bolivian economy during the first half of the 20th century.

Keywords: Geographical Accuracy, Latin America, Tin, Tin Barons

JEL Code: F14, N76

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RESUMEN

Este artículo analiza la fiabilidad de las estadísticas bolivianas de comercio exterior. Se observan grandes diferencias entre los datos bolivianos y aquellos de sus principales socios comerciales durante la Primera Guerra Mundial. Si bien las brechas se redujeron posteriormente, permanecieron particularmente elevadas en el caso de las exportaciones. Ello parece deberse más a una mala asignación geográfica por parte de los socios comerciales que a una sobrevaloración de las exportaciones bolivianas. Esto sugiere que la mediterraneidad afectó negativamente la calidad de las estadísticas de aquellos países a-priori más confiables. El estudio permite también revisitar el debate en torno al efecto que tuvo la explotación del estaño sobre el resto de la economía boliviana durante la primera mitad del siglo XX.

Palabras clave: Fiabilidad geográfica, América Latina, Estaño, Barones del Estaño

1. INTRODUCTION

This paper aims to contribute to the debate concerning the accuracy of official foreign trade statistics by analysing the Bolivian case during the first half of the 20th century[1]. The standard approach in the accuracy literature consists of the so-called *mirror analysis*: that is, the comparison of the statistical records of a country with those of its trade partners. It is based on the notion that a trade flow is registered twice (as an export and as an import) and that both registrations must match. If they differ, it can only be due to the costs of transportation, which are usually included in imports but excluded in exports. The standard accuracy check can be carried out bilaterally, by pairs of countries (Morgenstern 1963), or multilaterally, using an aggregate index (Federico and Tena 1991; Tena 1991; Tena-Junguito 1991). Both approaches have been used in this work.

To the best of our knowledge, this is the first systematic analysis of Bolivian foreign trade statistics using this methodology[2]. Thus, this work represents an original contribution that places Bolivia in the Latin American historiography on statistical accuracy (Kuntz Ficker 2002; Tena-Junguito

[1] In contrast with other case studies discussed in this volume, we cover a more recent period. This is determined by the delay in the publication of the first coherent collection of official Bolivian foreign trade statistics. Indeed, whereas they officially started in 1895, it was not until 1912 that they were published according to international norms, which included bilateral and detailed data (Peres-Cajías 2016).

[2] For instance, Carreras-Marín and Badia-Miro (2008) merely outlined the differences between official and market prices of imports from 1917 to 1919, but did not use the mirror approach.

and Willebald 2013; Bonino-Gayoso *et al*. 2015; Absell and Tena-Junguito 2016). Furthermore, due to the landlocked nature of Bolivia, our study sheds light on the debate concerning the quality of Latin American foreign trade statistics. Indeed, Carreras-Marín and Badia-Miro (2008) found a statistically significant relationship between discrepancies of Latin American foreign trade statistics and those of its main trade partners, and the geographical origin and destination of trade. These authors stressed that some of these discrepancies were not caused by inaccuracies in Latin American sources, but by a lack of geographical accuracy in European and U.S. statistics, a problem that was considered to be extremely severe in the Bolivian case. This paper confirms this idea and highlights that landlockedness may have restricted the accuracy of trade statistics of the most developed economies because of the inability to distinguish between direct trade and transit trade. Therefore, by dealing with this methodological issue, the paper also suggests that the geographical accuracy of both European and U.S. foreign trade statistics must be treated with caution in the case of small landlocked countries.

The article is organised as follows. First, the standard accuracy methodology has been applied to test the quality of official Bolivian statistics. This has been done bilaterally, considering Bolivia's main trade partners, as well as multilaterally, aggregating all trade partners in one single index. Our results reveal huge statistical discrepancies, which are greater for exports than for imports. Discrepancies also vary over time, being worse during the First World War, but improving thereafter.

Second, we have explored the potential causes of such discrepancies in the two subsequent sections. The first step consisted of the analysis of a potential overestimation of the export values declared in Bolivian sources. To this end, we focussed on tin prices, the main commodity exported by Bolivia throughout the first half of the 20th century. This allowed us to compare the implicit unit price of tin (total value exported divided by total quantities exported) obtained from Bolivian sources within a data set of international prices. Given the available information, it is not possible to identify a systematic overestimation of export values in Bolivian sources. In the next section, we explored the incidence of some additional causes of overvaluation: the erroneous inclusion of specie as merchandise, especially in the case of silver, and the problem of re-exportation. Neither of them has been sufficient to explain the gap between Bolivian data and that of its trade partners.

Third, since we did not find any reasonable alternative explanation for the statistical discrepancies, we hypothesised that the main cause of this problem is related to an erroneous geographical assignment by Bolivia's main trade partners. Thus, official Bolivian foreign trade statistics, after being corrected for minor magnitudes, seem to be reliable. Following this argument, we present the series of Bolivia's exports and imports between

1910 and 1950 in internationally comparable units in Section 5. Our main findings are summarised in the concluding section.

2. THE ACCURACY OF OFFICIAL BOLIVIAN FOREIGN TRADE STATISTICS

On the eve of the 20th century the composition of Bolivian exports experienced huge changes. On the one hand, the relative importance of silver, the oldest and most traditional export good, was declining as a consequence of a sharp drop in international prices. This decrease took place in line with an upsurge in tin exploitation, a process that took place in the same regions where silver had been previously exploited since colonial times. Meanwhile, a new commodity, rubber, was emerging in a non-traditional export region in the north-east of the country. Thus, according to official statistics, silver represented 40 per cent of the total value exported in 1902, tin 30 per cent and rubber 20 per cent. The rest of exports consisted of other minerals. Ten years later, these shares had changed to 5 per cent, 67 per cent and 17 per cent, respectively. During the First World War, the rubber boom ended abruptly and, at the end of the war, the relative importance of silver, tin and rubber in the total value exported was around 4 per cent, 71 per cent and 6 per cent, respectively. Thereafter, tin exports represented between 65 per cent and 75 per cent of Bolivian total exports; the rest consisted of other minerals and it was not until the World War II that rubber exports recovered some importance (Peres-Cajías and Carreras-Marín 2017).

Besides this high dependence on one specific product, Bolivian exports were also concentrated in few markets. During the first half of the 20th century, exports to the United Kingdom and the United States constituted around 90 per cent of the total value exported according to official Bolivian foreign trade statistics (Table 1). Regarding imports, whereas intraregional trade occasionally played an important role for Bolivia (Carreras-Marín *et al*. 2013), it stands out that the United Kingdom, the United States and Germany supplied between 42 per cent and 60 per cent of Bolivian imports during the first half of the 20th century.

The identification of exports' destinations and imports' origins allows for a mirror accuracy analysis of official statistics. As previously noted, this analysis can be done by focussing on each bilateral trade or by looking at the whole picture via an aggregated index. The first exercise has been done using the ratio between Bolivian exports to country *j*, according to Bolivian sources (free on board (f.o.b.) prices), and imports from Bolivia, recorded in the sources from country *j* (cost, insurance and freight (c.i.f.) prices). Taking into account previous work on other Latin American countries (Tena-Junguito and Willebald 2013; Bonino-Gayoso *et al*. 2015) and reports from the Bolivian government Charles Mc Queen (1925), differences between

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TABLE 1
MAIN COUNTRIES OF DESTINATION OF EXPORTS AND ORIGIN OF IMPORTS, 1910-1949 (%, 5-YEAR AVERAGES)

	United Kingdom		United States		Germany		Chile		Peru		Argentina	
	Exports	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**
1910-14	73.5	18.5	1.1	9.8	9.2	13.7	1.0	11.0	0.5	5.0	0.4	3.0
1915-19	58.3	14.1	34.7	31.0	0.0	1.0	3.1	20.1	0.2	13.7	1.7	7.4
1920-24	56.1	21.9	36.4	27.1	0.3	7.2	1.1	16.0	0.1	7.9	2.5	5.6
1925-29	79.8	18.9	9.2	29.7	2.9	11.8	0.5	9.1	0.0	4.6	2.2	7.2
1930-34	82.2	17.3	6.2	28.8	1.1	12.5	0.3	5.7	0.0	8.2	3.0	9.9
1935-39	67.3	8.1	7.3	25.8	1.1	15.7	0.3	3.6	0.1	13.0	2.0	12.0
1940-44	39.0	5.6	57.3	37.8	0.0	0.4	0.1	6.9	0.1	12.0	1.7	25.4
1945-49	34.1	4.5	61.7	43.9	0.0	0.1	0.2	6.8	0.2	12.4	2.3	20.2

Source: Bolivian Foreign Trade Official Statistics, various years.

f.o.b and c.i.f. prices were set around 20 per cent. Therefore, a good fit of Bolivian foreign trade statistics takes place if the ratio moves between 0.8 and 1[3].

The aggregated index has been calculated based on (Tena-Junguito and Willebald 2013) as follows:

$$AI_i = \frac{\sum_{i=1}^{N} X_{ij}}{\sum_{j=1}^{N} M_{ij}}$$

The accuracy index is the ratio of the sum of Bolivian exports to all partner countries, according to Bolivian sources, with the sum of total imports from Bolivia, according to trade partners' sources. We have taken into account information from 13 different trade partners: Argentina, Belgium, Brazil, Chile, France, Germany, Italy, the Netherlands, Peru, Spain, Switzerland, United Kingdom and United States. The sample covers on average 85 per cent of Bolivian exports and 82 per cent of Bolivian imports (see Appendix 1). Both the bilateral approach and the aggregated index are based on trade flows in current U.S. dollars, using the exchange rates from Frederico and Tena-Junguito (2016), the MOXLAD database (Mc Queen 1925) and the Bolivian Central Bank yearbooks.

At this point, some features of Bolivian trade must be noted. First, Bolivian exports and imports were valued at official prices until 1907 and 1919, respectively (Societé des Nations 1927, pp. 138-139). Thereafter, export values were declared values f.o.b. at the Bolivian frontier, including export duties. Import values were declared values c.i.f. at the Bolivian frontier, excluding import duties (Societé des Nations 1927, pp. 138-139; US 1940, p. 5). Second, Bolivian trade was not always reported separately by its main trade partners. This was the case, for instance, of the official Swiss statistics until 1924[4]. Due to its small scale, Bolivian trade with some of its trade partners was often placed in a residual category named «Other countries».

Third, the accuracy literature has suggested that «import records are usually more reliable than geographical export assignment records» (Agramont and Peres-Cajías 2016). However, it has also been claimed that landlockedness may seriously distort the geographical assignment of trade. This fact was recognised in Societé des Nations (1927, p. 139), which claimed that part of the Bolivian trade could be systematically assigned wrongly to Chile and Peru, its most important transit countries (Agramont and Peres-Cajías 2016). In the same line, the office in charge of U. S. foreign trade statistics recurrently stressed the difficulties involved in properly assigning Bolivian trade. This is clearly stated in the following quote: «trade of Bolivia

[3] In the case of imports, the ratio between Bolivian imports from country *j* according to Bolivian sources (c.i.f prices) and exports to Bolivia from country *j* from sources of country *j* (f.o.b. prices) was considered. In this case, a good fit of Bolivian foreign trade statistics takes place if the ratio moves between 1 and 1.2.

[4] In the same vein, during the 1920s, U.S. statistics did not include trade values lower than 50,000 US$. This may explain the lack of data for imports from Bolivia in 1922 and 1923.

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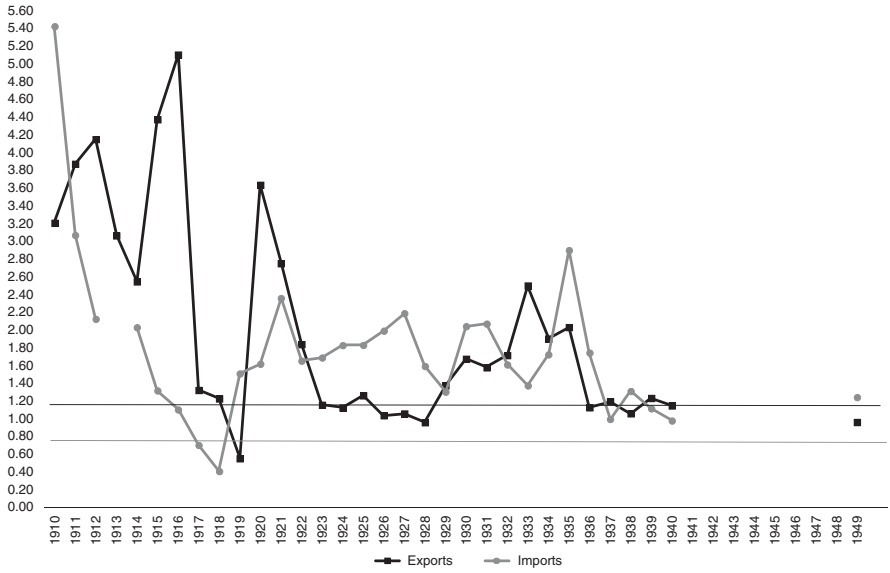
FIGURE 1
ACCURACY INDEX OF BOLIVIAN TRADE BY PAIR OF COUNTRIES: UNITED KINGDOM, 1910-1949 (%)



Sources: Official Bolivian and British foreign trade statistics, various years.

with the United States is difficult to ascertain accurately, owing to the fact that it must be transhipped through any one of four countries» (US, 1924).

The previous considerations have a strong influence on the interpretation of the mirror test results between official Bolivian foreign trade statistics and those of its main trade partners. In the case of the United Kingdom (Figure 1), the existence of four cycles stands out: large statistical discrepancies during the First World War, an improvement during the 1920s, a growing gap again in the early 1930s and a new improvement thereafter. The magnitudes of the statistical discrepancies in most years cannot be solely explained through transport costs. Thus, other factors must be at play in influencing the size of these discrepancies.

Differences between Bolivian and British official records could be caused by different reasons. A first explanation could be related with an over-estimation of Bolivian exports to United Kingdom in Bolivian sources; this would be the case if exports to continental European countries were assigned by Bolivia to the main port of destination. However, the Bolivian over-statement of its trade with United Kingdom, due to inaccurate geographical assignment, can be captured by using the information about re-exportation declared in British sources. In this way we found that some of the differences during the First World War diminish slightly, but the explanatory power of

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this correction is reduced significantly thereafter, when re-exports represented <1 per cent of U.K. imports from Bolivia.

Another cause of discrepancy can be placed on the British side, if there was an underestimation of Bolivian imports by British sources. There is some evidence to believe that this was part of the problem, at least during the 1930s. Indeed, during this period official British information detailed the sources of tin imports from South America and identified two principal suppliers, Bolivia and Chile. However, Chilean foreign trade sources, as well as mining production information from industrial censuses, show that Chile did not export tin to the United Kingdom during the 1930s, and did not even have any tin mining production during most of this period[5]. This lack of correspondence could be explained by the fact that 85 per cent of Bolivian exports transited through Chile (Agramont and Peres-Cajías 2016) and, therefore, British authorities may erroneously have registered as Chilean a product that originated in Bolivia.

If this is true and the so-called Chilean tin is added to total imports from Bolivia, the accuracy index should improve significantly[6]. The first column of Table 2, presents the results of the accuracy index between Bolivia and United Kingdom without any correction. The second column shows the value of U.K. imports from Bolivia, according to British sources. The third and fourth columns distinguish the value of tin imports in pounds as well as a percentage on British imports from Bolivia. The fifth column reflects the British records for tin imports from Chile. The sixth column calculates the accuracy index between Bolivia and United Kingdom, including the "presumably false" Chilean tin. The last column shows the difference between both accuracy indexes. These figures clearly prove that accuracy improves significantly if we correct for a mistaken allocation of tin imports in official British sources. It should be noted, however, that differences remain high even after this correction.

The bilateral contrast with the United States is even worse than in the British case (Figure 2)[7]. Statistical discrepancies were extremely high during the First World War; thereafter, whereas the imports' ratio converged to reasonable levels, differences were still noticeable in the case of exports. Once more, however, there is some evidence which suggests that this lack of

[5] We have verified that Chile did not export tin (or only exported negligible amounts occasionally) to any country during the overall period under study, according to official Chilean foreign trade statistics. There were some tin processing activities, of minor importance, consisting of the importation of Bolivian tin ores and the exportation of tin ingots, often to Bolivia again. However, its magnitudes were irrelevant, compared with the mining production of Chile and exports from Bolivia.

[6] This result is certainly explained by the high proportion of tin in total U.K. imports from Bolivia.

[7] Differences between Bolivian and U.S. sources are sometimes higher than 50 or even 100. Thus, in order to minimise a scale restriction in the visualisation of Figure 2, the upper bound has been set at 8. Therefore, those points that are represented in this number should be interpreted as a difference between Bolivian sources and U.S. sources similar to or higher than 8.

TABLE 2
BRITISH IMPORTS FROM BOLIVIA AND BRITISH TIN IMPORTS, 1928-1938

	Accuracy index Bolivia — UK (%)	Bolivian exports to UK (£)	Bolivian exports to UK: tin (£)	Share of tin on total exports (%)	Chilean exports to UK: tin (£)	Accuracy index Bolivia — UK* (%)	Accuracy index – accuracy index*
1928	0.96	7,234,585					
1929	1.37	5,828,384					
1930	1.67	3,387,402					
1931	1.58	2,263,662					
1932	1.71	1,875,312	1,860,549	99.21	387,934	1.42	0.29
1933	2.50	1,678,406	1,664,587	99.18	396,416	2.02	0.48
1934	1.90	3,305,070	3,301,107	99.88	479,463	1.65	0.25
1935	2.03	3,582,871	3,552,778	99.16	659,884	1.71	0.32
1936	1.13	3,735,658	3,655,070	97.84	440,970	1.01	0.12
1937	1.19	3,413,535					
1938	1.06	3,088,552					

Sources: Official Bolivian and British foreign trade statistics, various years. * = corrected with Chile.

correspondence could be due to statistical assignment problems outside Bolivia. In fact, as previously noted, U.S. records are full of quotes which stress the inability of U.S. statistics to reflect fairly the amount of imports from Bolivia, such as the following:

> The foreign trade of Bolivia must pass through bordering countries, since Bolivia has no seaport. Consequently, the United States statistics do not show accurately the trade with that country, particularly in the case of imports (US Official Foreign Trade Statistics, 1928).
>
> United States statistics of trade with Bolivia show exports (including reexports) to Bolivia, 1930, $4219000; 1931, $1784000; and imports from Bolivia, 1930, $152000; 1931, $42975. The marked difference between United States and Bolivian statistics is owing to the indirect trade through other countries (US Official Foreign Trade Statistics, 1932).
>
> It is probable also that some United States imports originating in Bolivia have been reported, even in the most recent years, as imports

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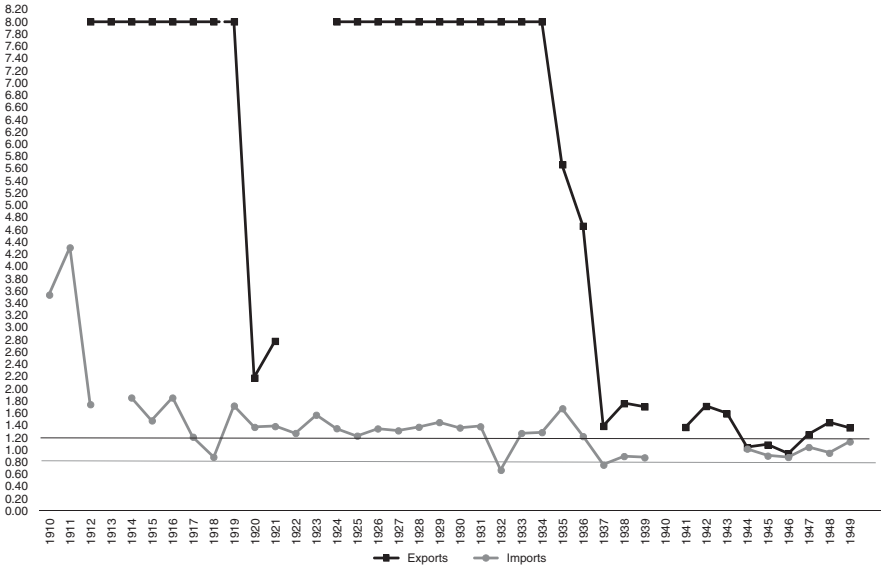
FIGURE 2
ACCURACY INDEX OF BOLIVIAN TRADE BY PAIR OF COUNTRIES: UNITED STATES, 1910-1949 (%)



Sources: Official Bolivian and USA foreign trade statistics, various years.

> from Argentina or other countries contiguous to Bolivia through which the merchandise was transhipped; this was undoubtedly the case, and on a very large scale, until few years ago (US Official Foreign Trade Statistics, 1940).

In contrast to the previous results, it is reasonable to expect smaller differences between Bolivian records and those of its neighbouring countries due to a reduction in the potential of erroneous geographical assignment. The bilateral contrast with Peruvian and Chilean sources shows that this is not necessarily true: regarding exports, notorious differences arise between Bolivian sources and those of both countries; as for imports, differences are particularly noticeable in the contrast with Peruvian sources (Figures 3 and 4)[8].

These gaps could be explained by the small quantities that Bolivia exported, that is a scale effect. In this context, smaller differences in absolute values between Bolivian statistics and those of its trade partners could generate large ratio changes; the smaller the trade flow, the higher the

[8] See footnote 7 for an explanation of the upper bound of Figures 2, 3 and 4.

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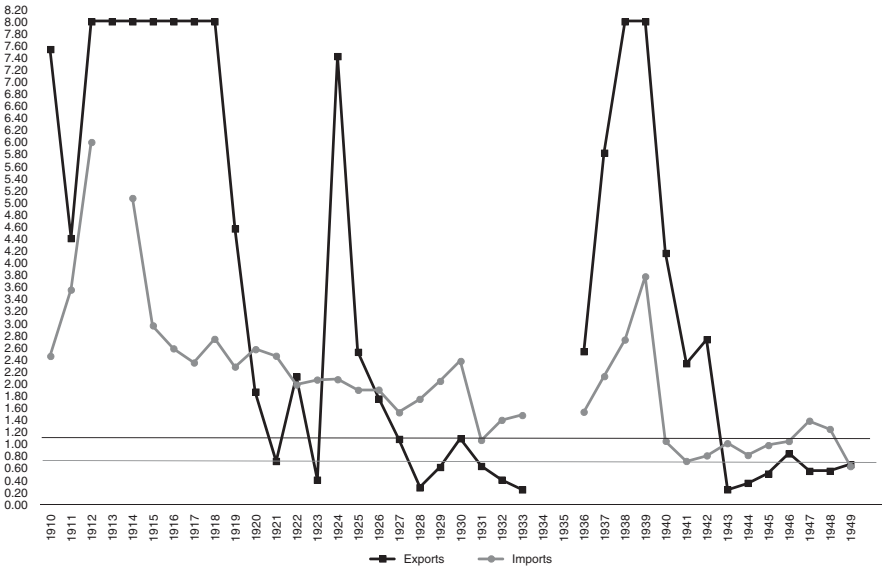
FIGURE 3
ACCURACY INDEX OF BOLIVIAN TRADE BY PAIR OF COUNTRIES: PERU, 1910-1949 (%)



Sources: Official Bolivian and Peruvian foreign trade statistics, various years.

potential of discrepancy in the accuracy ratio. For instance, the absolute difference in current US$ between Bolivia and United States was, on average, only one-third of the difference between Chile and United States for the period 1910-1938. However, despite the fact that the statistical discrepancy between Chile and Unitd States was higher in absolute terms, the statistical discrepancy between Chilean and U.S. sources is irrelevant in relative terms because of the higher magnitude of the trade flow (Bolivian exports to United States were, on average, 16 per cent of Chilean exports to United States). If we focus on even smaller trade flows, such as the case of Bolivian exports with neighbouring countries, it could be expected that the scale effect increases potentially.

Another explanation could be related with the existence of a porous border where smuggling activities were not rare (Langer and Conti 1991) and are still frequent to this day. We have explored this hypothesis through the comparison of product composition of Bolivian exports to Chile (using Bolivian sources) and Chilean imports from Bolivia (using Chilean sources). In 1917, Bolivian exports to Chile reached one of the highest levels throughout the period under study and the difference between Bolivian and Chilean sources is 1.75. The contrast shows the existence of problems in

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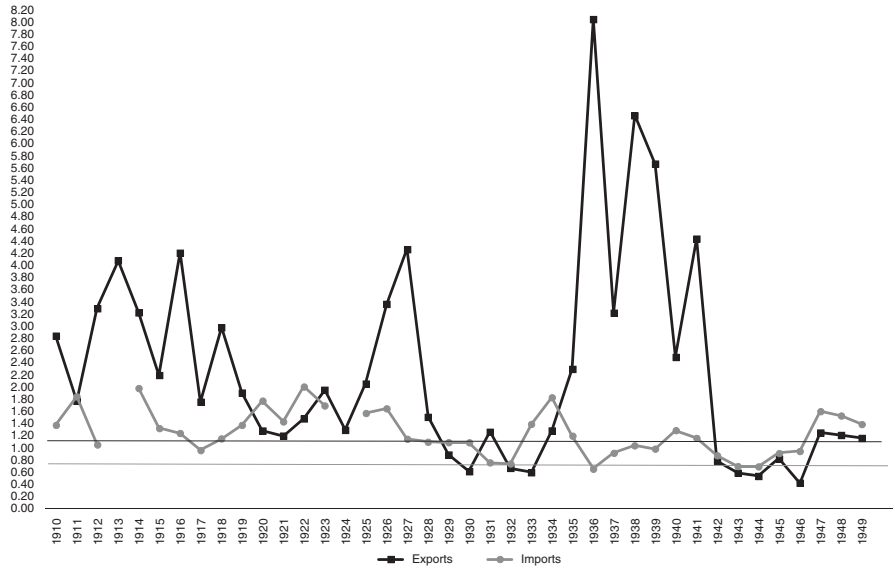
FIGURE 4
ACCURACY INDEX OF BOLIVIAN TRADE BY PAIR OF COUNTRIES: CHILE, 1910-1949 (%)



Sources: Official Bolivian and Chilean foreign trade statistics, various years.

Bolivian sources; they declare 328 units of cows exported, but Chilean sources declare 1088 units imported from Bolivia[9]. As a consequence, cows represented 0.58 per cent of the total value exported from Bolivia to Chile, according to Bolivian sources, but 19 per cent of Chilean imports from Bolivia, according to Chilean sources. However, there are also problems on the Chilean side; they do not declare imports of antimony and wolfram from Bolivia and under-declare (particularly in values) imports of tin and copper. These problems are critical since these mineral products are among the top 10 exports from Bolivia to Chile[10]. The contrast of both sources was repeated in 1927, a year when the difference between Bolivian and Chilean sources is 4.27. The analysis shows that the five most important

[9] In 1917, Bolivian sources declared the weight but not the number of cows exported. However, Bolivian sources declared both the number and the weight of cows exported in other years. Therefore, the number of cows exported in 1917 has been obtained by using an average weight of 200 kg.

[10] Chilean sources do not declare imports of coca leaves, the fourth most important Bolivian export, either. Even if coca leaves are labelled otherwise (probably "Cortezas, raíces, hojas, flores y semillas medicinales"), there could still be an undervaluation (both in values and quantities) in Chilean sources.

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exports from Bolivia to Chile[11] (which accounted for 80 per cent of the total value exported from Bolivia to Chile) are either undervalued (both in values and quantities) or not declared in Chilean sources. Thus, together with scale effects, smuggling or the lack of a precise control in custom offices, this could also explain statistical discrepancies between Bolivian sources and those of its neighbouring countries[12].

It should also be stressed that statistical differences between Bolivian foreign trade statistics and those of its main trade partners could be explained by the existence of different exchange rates; the gap would be a consequence of the use of different exchange rates in official statistics. Whereas plausible, the explanatory power of this idea is restricted to very specific periods. Indeed, the Bolivian Central Bank Yearbooks show the existence of up to three different exchange rates (and sometimes with huge differences) during the period 1935-1940. The Bolivian exchange rate was unified again in June 1940 and it was not until October 1947 that an additional exchange rate appeared once more.

Therefore, the high ratios of bilateral discrepancies, although with reasonable potential explanations, could generate pessimism both in the use of Bolivian foreign trade statistics and its reconstruction through foreign statistics. This would be in line with Morgenstern's (1963) claims. However, as suggested by other scholars (Federico and Tena 1991; Tena-Junguito 1991; Tena 1991), accuracy issues should also be approached via an aggregated accuracy index[13]. This is presented in Figure 5 and Table 3, which indicate a clear improvement in the accuracy of Bolivian foreign trade statistics after the First World War. Regarding imports, the ratio is within reasonable levels during the 1930s. As for exports, despite the previously mentioned improvement over time, the ratio suggests that the value of exports declared by Bolivian records was 50 per cent higher than the value of exports declared by its main trade partners.

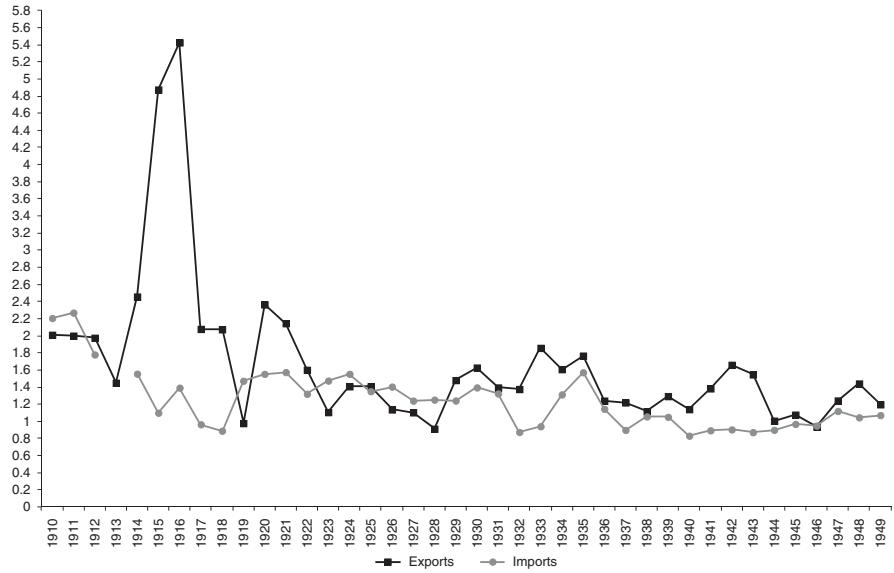
Summing up, both bilateral and aggregated indices reveal the lack of correspondence between Bolivian official records on exports and those of its main trade partners. It has been stressed that these differences may not

[11] In order of importance, these are cows, coffee, coca leaves, copper and tin.

[12] Undoubtedly, a key question still remains: why were these flows registered by Bolivian authorities but not by the Chilean ones? We believe that legal enforcement could be lower on the Chilean side of the border since Bolivian imports represented a very negligible amount of the total value imported (0.16 per cent, on average, between 1913 and 1950). It could also be the case that legal enforcement was higher (relatively speaking) on the Bolivian side of the border for two reasons: most Bolivian exports transited through Chile (which increased customs control at this border line) and some of the products declared in Bolivian sources had to pay export taxes. These ideas are simply hypotheses which need further research.

[13] The aggregate accuracy index presumes that geographical errors of assignment compensate each other. Regarding Bolivian exports, this could be the case between Bolivian exports to United Kingdom (overvalued according to the bilateral contrast) and Germany (undervalued according to the bilateral contrast).

FIGURE 5
AGGREGATED ACCURACY INDEX OF BOLIVIAN EXPORTS AND IMPORTS, 1910-1949 (%)



Sources: Bolivian and its trade partners Official Foreign Trade Statistics, various years.

TABLE 3
AGGREGATED ACCURACY INDEX, 1910-1949
(%, 10-YEAR AVERAGE)

	Exports	Imports
1910-19	2.53	1.51
1920-29	1.47	1.4
1930-39	1.45	1.16
1940-49	1.26	0.96

Sources: Bolivian and its trade partners Official Foreign Trade Statistics, various years.

necessarily have been caused by a lack of accuracy in Bolivian sources. Indeed, some of the problems can be reasonably related to inaccurate geographical assignments in British and U.S. sources, which absorbed most of Bolivian exports. This hypothesis is supported by qualitative information in U.S. sources and by the finding of an erroneous allocation of tin imports in British sources. We have also argued that the scale effect overstates

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statistical discrepancies that were not so extreme in absolute terms. In any case, the fact that accuracy indices are systematically above 1, still suggests that Bolivian sources overvalued exports during the first half of the 20th century. This hypothesis is further explored in the next section.

3. WAS THERE A PROBLEM OF OVERVALUATION IN BOLIVIAN SOURCES?

Previously, it has been stressed that, after 1907, Bolivian exports were valued according to market prices and included export taxes. The fiscal nature of exports may introduce some biases which could operate in opposite directions. On the one hand, it could affect the amount declared by exporters, in order to minimise the payment of taxes. On the other hand, government agents could have the incentive to increase the value registered in order to maximise revenues or, more in the spirit of political economy, to create an artificial impression of high taxation on tin exporters. Overall, the net effect of taxes on the value of exports is ambiguous.

Table 4 shows that export taxes represented a significant share of the Bolivian central government's total revenues (first column), but they were equivalent to a small share of Bolivian exports (fourth column). If we consider overall taxes on mining activities (second column), which constituted almost all Bolivian exports, it stands out that its relative importance over total revenues increased dramatically from the early 1920s to the 1950s. Likewise, its magnitude as a proportion of the total value exported achieved more significant shares over time (last column). Thus, whereas the impact of export taxes on the value of exports could be limited, the impact of overall mining taxes could affect the final price of exports. This would require the ability of mining producers to shift taxes to final consumers, a possibility that has been questioned elsewhere (Ingusltad *et al*. 2015; Peres-Cajías 2015).

An alternative to identifying the potential overvaluation of Bolivian exports is to compare the implicit price of Bolivian tin exports (total value exported divided by total quantities exported) with the international price of this commodity. The focus on tin prices is justified by its high relative importance in Bolivian total exports; between 65 per cent and 75 per cent, as previously mentioned. The comparison with international prices should be carried out with caution since the quality of Bolivian tin was lower than the ore from Malaysia and Cornwall (US 1940, p. 2; Gómez 1978). In relation to this, Table 5 shows that Bolivian tin exports were overwhelmingly composed of tin rods (*barilla de estaño*) and tin waste (e*scoria de estaño*), two products with a lower implicit price than tin bars (*barra de estaño*). In spite of this, it must be considered that the ore quality of these exports was not homogeneous, a factor which determined where Bolivian ores were smelted (Hillman 1988, 1990).

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TABLE 4
RELATIVE IMPORTANCE OF EXPORT TAXES AND MINING TAXES, 1910-1949 (%, 10-YEAR AVERAGES)

	Share of export taxes on total revenues	Share of mining taxes on total revenues	Export taxes/ total value exported	Mining taxes/ total value exported
1910-19	18	20	3	4
1920-29	18	28	6	9
1930-39	11	43	4	15
1940-39	N.d.	55	N.d.	18

Sources: Peres-Cajías (2014, 2015).

TABLE 5
COMPOSITION OF BOLIVIAN TIN EXPORTS AND IMPLICIT PRICES, 1918-1950 (£)

Pounds per ton	1918	1923	1942	1945	1948	1950
International price	381	162	206	187	267	257
Implicit price in Bolivian sources	215	129	137	168	240	297
Barrilla	214	129	145	168	271	355
Escoria			59		102	145
Barras	288	147	337	496	583	719

Sources: Official Bolivian foreign trade statistics and Tena-Junguito and Federico (2016).

Taking into account these considerations, Figure 6 compares different prices: the price of tin in the British and the U.S. markets, the price of tin straits (which were of higher quality), the price of tin ore and the implicit price of tin exports obtained from official Bolivian statistics[14]. In order to make the comparison feasible, the implicit Bolivian price of tin exports has been increased by 20 per cent, which represented the transport cost between Bolivia and the markets previously mentioned. The first feature to underline is the high correlation of the implicit Bolivian price with prices in the United Kingdom and the United States; a positive correlation of 0.80 and 0.75, respectively, for the period 1908-1949. Regarding price levels, the

[14] Prices in the U.K. and U.S. markets were obtained from official British foreign trade statistics (Annual Statement of Trade). With the exception of world wars, both prices evolved in similar ways throughout the period under study. Prices of tin straits and tin ore were obtained from Tena-Junguito and Federico (2016).

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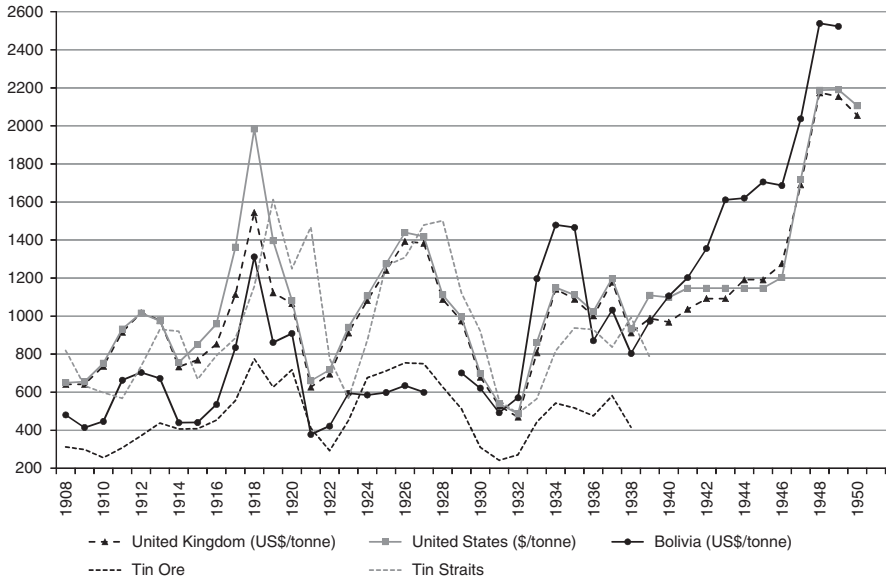
FIGURE 6
IMPLICIT PRICE OF TIN EXPORTS AND INTERNATIONAL PRICES, 1908-1950
(US$/TON)



Sources: Official Bolivian and British foreign trade statistics and Tena-Junguito and Federico (2016).

heterogeneous quality of Bolivian tin exports suggests that the implicit Bolivian price of tin does not have to fit perfectly with international prices. In this context, from 1908 to 1929, the implicit Bolivian price of tin is more in line with the tin ore price and below the price of tin in the British and U.S. markets; from 1930 to 1940, the obtained implicit price is around the same levels as the international price of tin in United Kingdom and United States; from 1941 to 1949, the implicit Bolivian price is certainly above international prices.

Summing up, with the exception of the period 1941-1949, the statistical discrepancy of Bolivian exports could hardly be attributed to an over-valuation of Bolivian export prices. Moreover, given that implicit Bolivian prices are sometimes below the international price of tin, following the common approach to correcting export values with international prices (Tena-Junguito and Willebald 2013; Absell and Tena-Junguito 2016), this would simply increase the gap between Bolivian records and those of its main trade partners, worsening the accuracy index. Likewise, it must be noted that the period with the highest differences between Bolivian and international prices, is the period with the lowest differences between official Bolivian statistics and those of its trade partners. All this suggests that, given

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the available information, the use of official Bolivian foreign trade records seems to be the best option to analyse the evolution of Bolivian exports. In any case, before concluding with this statement, the next section develops some additional issues regarding the accuracy of Bolivian trade statistics.

4. ADDITIONAL ISSUES CONCERNING BOLIVIAN STATISTICS

Despite the fact that, so far, the reasonable accuracy of official Bolivian foreign trade statistics has been stressed, there are some minor issues that have to be addressed. On the one hand, as a mining producer, Bolivia faced the problem of bullion; silver, gold and nickel could be exported as ore, as a manufacture or as coins. In the latter case and according to standard procedures, these flows do not have to be included in the trade balance of countries, but in the capital balance. Although the relative importance of silver exports decreased during the first half of the 20th century, we highlight this issue as an additional cause of discrepancy with trade partners' sources. This would be the case if Bolivia was recording minted minerals as merchandises while its trade partners were assigning them to capital inflows. On the other hand, Bolivian sources also face the problem of re-exportation. This could also be a source of overvaluation of exports due to an inaccurate record in the Bolivian side. In the following two sub-sections, we analyse the importance of both effects on the accuracy of official Bolivian statistics.

4.1. Ore or coin? The problem of coinage minerals

From colonial times until the end of the 19th century the Bolivian economy was under a (*de facto* or *de jure*) silver standard. Thereafter, Bolivia officially entered the gold standard in 1908. During the last decades of the 19th century and the early decades of the 20th century, nickel coins were allowed for small transactions (Benavides 1972).

These features of the Bolivian monetary system may affect the accuracy of Bolivian foreign trade statistics. In fact, a potential inaccuracy in the registration of silver exports would pose a major problem for the period in which silver was Bolivia's main export. This problem does not only affect official Bolivian statistics, but also the records of its trade partners since silver bars were usually treated as a monetary item, instead of a merchandise. Thus, this hypothetical classification of Bolivian exports of silver coins as bullion could contribute to the overvaluation of Bolivian exports of merchandises identified in the previous section. The same problem could arise in the case of nickel, since it was very well known that nickel coins were sometimes exported to foreign countries[15].

[15] See, for instance, *Ministerio de Hacienda. Memoria presentada al Congreso Nacional* (1919), pp. 62-63.

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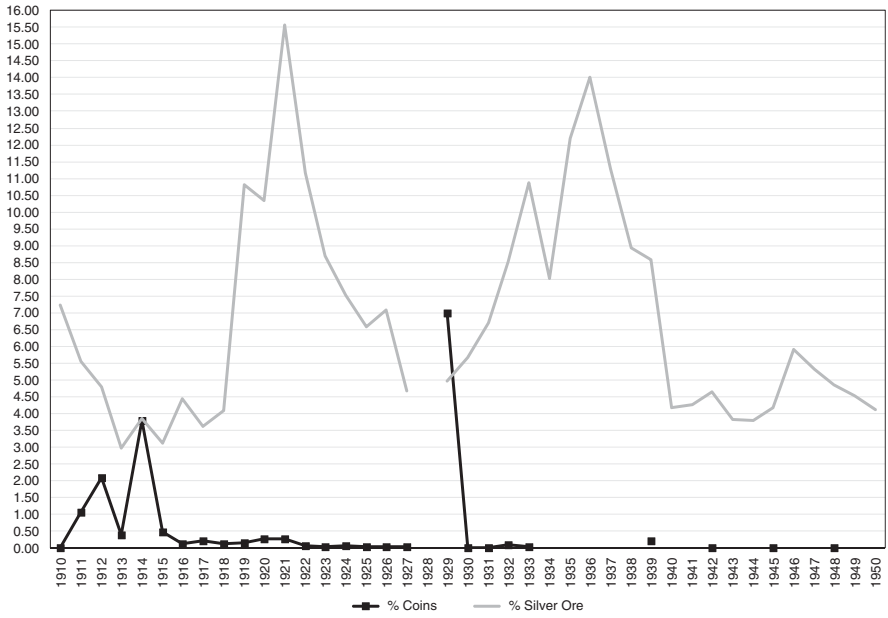
FIGURE 7
COINS AND SILVER ORE EXPORTED, 1900-1950 (%)



Sources: Official Bolivian foreign trade statistics.

Figure 7 shows the share of coins exported and that of silver as a mineral over the total value of Bolivian exports. Exports of coins were obtained from item V of the official Bolivian foreign statistics, titled «Unmanufactured Gold and Silver, coins»[16]. The graph shows that exports of silver ore, which had been hegemonic for Bolivia in earlier periods, were, on average, around 6 per cent throughout the period under analysis. On the other hand, the share of export coins for the entire period is much lower, since it never reached 1 per cent of the total value exported, at least for those years where information is available. It should be noted that in 1929 there was an extraordinary record of exports of gold coins which, due to the high value of this precious metal, reached 7 per cent of the total value exported. From 1940 onwards no more exports of any kind of coins appear in official Bolivian statistics.

Thus, although there is an inaccurate inclusion of specie in the exports of goods in Bolivian sources, its amount was almost insignificant throughout the period under study, except in 1914 and 1929, which lends further support to the hypothesis that official Bolivian sources were accurate enough.

[16] In some years, coin exports were included in the items called "plata sellada" and "oro sellado".

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TABLE 6
RE-EXPORTATION IN OFFICIAL BOLIVIAN FOREIGN TRADE STATISTICS, 1912 (BS)

	Import	Export
Total according to official data	49,508,990	90,122,987
Corrected Data (excluding re-export)	49,160,529	88,319,506
Differences over total	0.70%	2.00%
Differences over total, manufactures	0.23%	28.81%

Sources: Comercio especial de Bolivia. Exportación. Importación. Bancos. Año 1912. Dirección General de Aduanas. Sección de Estadística Comercial y Bancaria.

Despite their minor importance, we have excluded these values following the methodology developed by Kuntz Ficker (2007) for the Mexican case, according to which silver bars are considered merchandise while gold and silver coins are considered monetary items. On the other hand, the relatively high share of silver during the First World War as well as in the early thirties, seems to further contribute to explain the undervaluation of Bolivian exports by its trade partners, if they included silver in the capital account.

4.2. Did Bolivia export manufactures? The puzzle of re-exportation

An additional issue with official Bolivian statistics is related with the inclusion of re-exports. Table 6 analyses the relative importance of this problem in 1912. Re-exports have been identified, when they were not explicitly included as such in the statistics, by looking at those items that were not produced in Bolivia: automobiles and locomotives, sewing machines, precision machines or agricultural machinery. Whereas this issue affects the relevance of manufacture exports (re-exports represented 29 per cent of the value of manufacture exports), it has little effect on total exports due to the hegemony of minerals and rubber exports. Thus, in 1912, re-exportation had a very insignificant impact on total trade values: 0.7 per cent in the case of imports and 2 per cent for exports.

Table 7 shows that re-exports were of minor importance not only in 1912 but throughout the period under scrutiny, representing <1 per cent of the total value exported. The only exceptions were 1929 and 1930, when re-exports reached an extraordinary percentage of 7 per cent.

5. SERIES OF BOLIVIAN EXPORTS AND IMPORTS (1910-1950)

Until the recent reconstruction of the Bolivian GDP and GDP per capita from 1846 to 1950 (Herranz-Loncán and Peres-Cajías 2016), knowledge of the

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TABLE 7
RE-EXPORTATION IN BOLIVIAN OFFICIAL FOREIGN TRADE STATISTICS, 1912-1942

Years	Value (Bs)	% Over total exports	Years	Value (Bs)	% Over total exports
1912	1,803,422	2.00	1925	230,853	0.19
			1926	205,071	0.17
1918	72,319	0.04	1927	144,918	0.11
			1928	237,171	0.20
1920	770,012	0.49	1929	9,965,131	**7.12**
1921	469,892	0.70	1930	7,684,840	**7.57**
1922	363,710	0.38	1931	139,233	0.23
1923	315,771	0.29			
1924	255,462	0.22	1942	3121	0.00

Sources: Official Bolivian foreign trade statistics.

Bolivian economy, during the First Globalisation and the interwar period, relied essentially on the analysis of the official foreign trade statistics (Peñaloza Cordero 1985; Morales and Pacheco 1999; Bértola 2011). In this paper, we have not found a solid argument to reject the use of these figures. Indeed, we have stressed that the standard accuracy analysis, based on the mirror contrast with trade partners, presents too many flaws in the Bolivian case. Our main objection to the standard methodology is based on the systematic existence of a geographical bias on the trade partner side due to landlockedness and the effects of transit trade. This idea is supported both by quantitative and qualitative evidence, particularly in the case of the United States and United Kingdom. Furthermore, we have found no evidence of overvaluation of prices in Bolivian statistics which would have led us to distrust Bolivian data. Silver bars, wrongly assigned by trade partners' statistics, have also been put forward as a potential explanation, although with limited importance, of statistical differences. Thus, given the available evidence, we can state that official Bolivian foreign trade statistics are the best option for the study of Bolivian trade.

Once we have stated the reasonable accuracy of official Bolivian trade statistics, we can offer the series of exports at current prices (Figure 8). The new series does not match completely with the original official figures as we have modified them according to the minor changes explained in the previous section. These consisted of the subtraction of: (a) coinage goods, either from silver, gold or nickel; and (b) re-exportation of different kind of manufactures.

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FIGURE 8
BOLIVIAN EXPORTS: OFFICIAL VS. CORRECTED SERIES, 1910-1950 (US$ AT CURRENT PRICES)

Sources: Official Bolivian foreign trade statistics, various years.

As Figure 8 shows, these corrections are not of great significance and neither the official nor the corrected series is coincident throughout the whole period, with some exceptions at the beginning of the period and in 1929.

Figure 9 presents the export series of Bolivia in US$ at current and constant prices from 1900 to 1950[17] (see Appendix 3). This period is characterised by an increasing concentration of Bolivian exports in one specific product (tin) and three main local producers (the so-called Tin Barons). This generated an ongoing debate regarding tin exports as a potential engine of growth and their mitigation by the oligopolistic structure of the sector. Some scholars argue that the economic impact of tin exports, as a driver of structural change in Bolivia, was negligible (Peñaloza Cordero 1985). In this context, a widespread claim in Bolivian historiography has emphasised the Barons' lack of interest in promoting industrialisation, based on the fact that

[17] The series at US$ current prices have been deflated with a Fisher Index based on the prices of the main exports: tin, rubber and silver. These three products represented on average 83 per cent of Bolivian exports, from a minimum of 60 per cent to a maximum of 94 per cent over the period under study. Given the lack of detailed information for the period before 1910, we assumed that official series include exports of specie and re-exports. Therefore, we reduced official series from 1900 to 1909 by 3 per cent, the average correction from 1910 to 1915.

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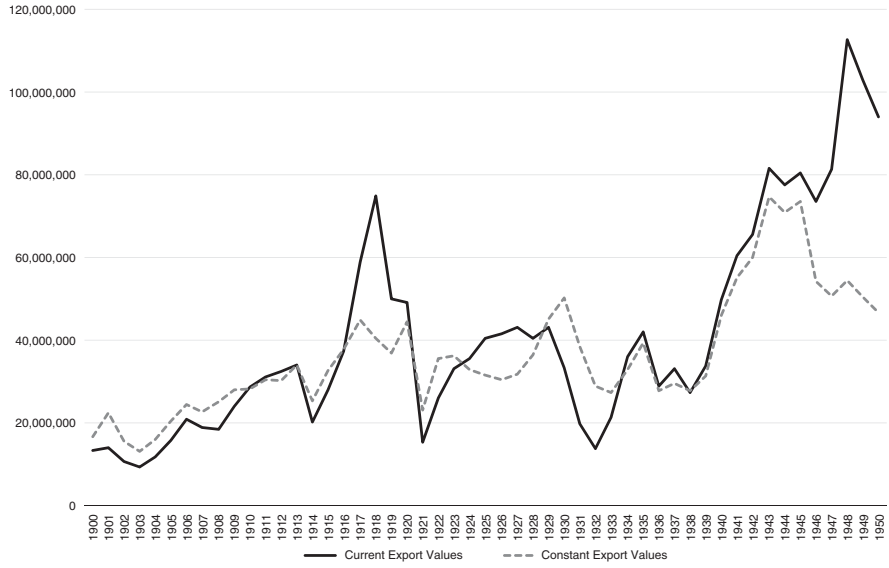
FIGURE 9
BOLIVIAN EXPORTS, 1900-1950 (US$ CURRENT AND CONSTANT PRICES)



Sources: Official Bolivian foreign trade statistics, various years.

most of tin exports were almost exclusively composed by raw mineral[18]. Moreover, taking into consideration the vertical integration and/or the registration of their companies in North America and Europe, it has been suggested that the Bolivian Tin Barons (namely Simón Patiño, José Avelino Aramayo and Mauricio Hotschild) behaved like foreign capitalists and transferred all their profits abroad (Albarracin Millan 1995)[19].

However, before studying the use of exports' earnings, a first basic condition in any export-led growth model is related with the analysis of export sector dynamism. Our data allow us to identify three clear periods concerning this issue: a clear upward trend from 1904 (the year when tin consolidated as the main export) to 1920; a second period from the early 1920s to the late 1930s, when Bolivian exports experience constant and significant oscillations; a third period characterised by a positive trend from the outbreak of the Second World War which lasted, in nominal terms, until 1949, but stopped abruptly at the end of the war in real terms. Therefore, our data suggest that the potential of

[18] See Mitre (1993) for the causes that may explain the failure of tin industrialisation in Bolivia.
[19] In a slightly different way, Thorp (1998:75) has stressed that the predominance of national capitalists (rather than international capitalists as in most other Latin American mining countries) was not enough to guarantee a process of economic development led by mining exploitation. Consequently, the nationality of mine owners would have had no significant impact on final outcomes.

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Bolivian exports as a growth engine was highest at the beginning of the 20th century. Further analysis (Peres-Cajías and Carreras-Marín 2017), which contrasts different indicators that show both the direct and indirect contribution of Bolivian exports, reaches similar conclusions. Thereafter, the impact of exports was reduced because of volatility, which was partly determined by the high concentration of Bolivian exports in one product and few markets.

6. CONCLUSIONS

This study has applied the standard international accuracy methodology to official Bolivian foreign trade statistics. This was done bilaterally, with Bolivia's main trade partners, as well as multilaterally, aggregating all trade partners in one single index. Our results reveal huge statistical discrepancies, showing a higher magnitude for exports than for imports. Differences also vary over time, being worse during the First World War, but improving in later periods.

The study has analysed the causes of statistical differences between Bolivian exports and records from its main trading partners. These differences may be caused by an overvaluation in Bolivian sources as well as an undervaluation in its main trade partners' sources. The latter case seems to be quite plausible according to the reports of U.S. authorities which, as late as the 1940s, included notes about the difficulties involved in clearly identifying imports from Bolivia due to the existence of transit trade. Geographical bias seems to have also been of some importance in British sources. Indeed, by looking at tin imports, we have been able to suggest an erroneous assignment of Bolivian tin to Chile. We also explored a potential overvaluation of exports in Bolivian sources. To this end, we compared the implicit price of tin exports (the main Bolivian export good) with a data set of international prices of this commodity. The comparison discards a systematic overvaluation of Bolivian exports. Additional causes of potential overvaluation were also studied: the erroneous inclusion of specie as merchandise and the problem of re-exportation. Neither of them appeared to be relevant in explaining the gap between Bolivian data and that of its trade partners.

Therefore, as long as we have not found any reasonable alternative explanation for the discrepancies, we hypothesised that both qualitative and quantitative evidence point to a systematically erroneous geographical assignment in the official records of Bolivia's trade partners. This statement is in line with another study (Carreras-Marín and Badia-Miro 2008), which via an econometric model, found a geographic bias on the statistics of developed countries with a sample of Latin American countries. As a consequence, we can conclude that, after being corrected by minor magnitudes, official Bolivian foreign trade statistics seem sufficiently accurate and reliable to study the evolution of Bolivian trade during the first half of the 20th century.

The study also opens the door for further research. First, the main hypothesis of this work (the geographical bias in official trade records of the

most developed economies) could be tested by looking at other small and landlocked economies as well as by evaluating the accuracy of Bolivian imports. Second, it is also necessary to contrast Bolivian sources and those of its neighbouring countries in order to identify differences in the quality and detail of trade registration. This may also help to evaluate the opportunity to reconstruct Bolivian trade before the publication of official statistics through transit trade. Indeed, the analysis of different methodologies which may help to reconstruct the evolution of Bolivian trade during the 19th century, a period for which official statistics are scarce, is a critical task for the near future.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/S0212610917000246

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APPENDIX A1
SAMPLE COVERAGE OF BOLIVIAN EXPORTS

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1910	1			1	1	1			1	1		1		90
1911	1			1	1	1			1	1		1		95
1912	1			1	1	1			1	1		1	1	96
1913			1	1	1	1			1	1		1	1	82
1914				1					1	1		1	1	86
1915	1		1	1	1				1	1		1	1	100
1916	1		1	1	1				1	1		1	1	100
1917	1		1	1	1				1	1		1	1	100
1918	1		1	1	1				1	1		1	1	100
1919	1		1	1	1				1	1		1	1	100
1920	1		1	1					1	1		1	1	98
1921	1		1	1					1			1	1	99
1922	1	1		1	1				1			1		58
1923	1	1	1	1	1				1			1		65
1924	1	1	1	1	1				1	1	1	1	1	99
1925	1	1	1	1	1	1	1	1	1		1	1	1	100
1926	1	1	1	1		1	1	1	1		1	1	1	99

APPENDIX A1 (*Cont.*)

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1927	1	1	1	1		1	1	1	1	1	1	1	1	99
1928	1		1	1		1	1	1	1	1		1	1	96
1929	1	1	1	1		1	1	1	1	1	1	1	1	100
1930	1	1	1	1		1	1	1	1	1	1	1	1	100
1931	1	1	1	1		1	1	1	1		1	1	1	100
1932	1		1	1		1	1	1	1	1		1	1	96
1933	1		1	1		1		1	1	1	1	1	1	96
1934	1		1	1				1	1	1	1	1	1	94
1935	1		1	1				1	1	1		1	1	94
1936	1		1	1					1			1	1	85
1937	1		1	1					1			1	1	69
1938	1		1	1					1			1	1	68
1939	1		1	1					1			1	1	75
1940	1		1	1					1			1		65
1941	1		1	1					1				1	64
1942	1		1	1					1				1	70
1943	1		1	1					1				1	66

APPENDIX A1 (*Cont.*)

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1944	1		1	1					1				1	65
1945			1	1					1				1	62
1946			1	1					1				1	60
1947			1	1					1				1	61
1948			1	1					1				1	63
1949			1	1					1			1	1	95
Average														85

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APPENDIX A2
SAMPLE COVERAGE OF BOLIVIAN IMPORTS

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1910	1			1	1	1			1	1		1	1	89
1911	1			1	1	1			1	1		1	1	89
1912	1			1	1	1			1	1		1	1	89
1913														
1914				1					1	1		1	1	54
1915	1		1	1					1	1		1	1	82
1916	1		1	1	1				1			1	1	90
1917	1		1	1	1				1	1		1	1	96
1918	1		1	1	1				1	1		1	1	97
1919	1		1	1	1				1	1		1	1	97
1920	1	1	1	1	1				1	1		1	1	94
1921	1	1	1	1	1				1	1		1	1	90
1922	1	1	1	1	1				1	1		1	1	87
1923	1	1	1	1	1				1			1	1	79
1924	1	1	1	1	1				1	1	1	1	1	81
1925	1	1	1	1	1	1	1	1	1	1	1	1	1	98
1926	1	1	1	1		1	1	1	1	1	1	1	1	94

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APPENDIX A2 (*Cont.*)

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1927	1	1	1	1		1	1	1	1	1	1	1	1	94
1928	1	1	1	1		1	1	1	1	1	1	1	1	95
1929	1	1	1	1		1	1	1	1	1	1	1	1	94
1930	1	1	1	1		1	1	1	1	1	1	1	1	94
1931	1	1	1	1		1	1	1	1	1	1	1	1	94
1932	1		1	1		1	1	1	1	1	1	1	1	91
1933	1		1	1		1		1	1	1	1	1	1	83
1934	1		1	1				1	1	1	1	1	1	70
1935	1		1	1				1	1	1		1	1	52
1936	1		1	1					1			1	1	67
1937	1		1	1					1			1	1	70
1938	1		1	1					1			1	1	63
1939	1		1	1					1			1	1	68
1940	1		1	1					1			1		41
1941	1		1	1					1				1	83
1942	1		1	1					1				1	90
1943	1		1	1					1				1	93

APPENDIX A2 (*Cont.*)

	Arg	Bel	Bra	Chi	Fra	Ger	Ita	Ned	Per	Spa	Swt	UK	US	Sample coverage
1944	1		1	1					1				1	94
1945			1	1					1				1	68
1946			1	1					1				1	65
1947			1	1					1				1	69
1948			1	1					1				1	68
1949			1	1					1			1	1	72
Average														82

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APPENDIX A3
BOLIVIAN EXPORTS, 1900-1950 (US$)

	Export corrected	Year	US$
1900	13,406,186	1926	41,640,603
1901	14,128,242	1927	43,160,967
1902	10,678,113	1928	40,502,204
1903	9,460,188	1929	43,254,358
1904	11,829,874	1930	33,289,566
1905	15,813,583	1931	19,695,144
1906	20,924,372	1932	13,745,532
1907	18,923,102	1933	21,464,905
1908	18,394,515	1934	35,962,877
1909	23,973,462	1935	42,068,526
1910	28,719,774	1936	28,897,626
1911	31,164,255	1937	33,107,434
1912	32,498,314	1938	27,360,189
1913	34,095,594	1939	33,733,553
1914	20,138,426	1940	49,769,085
1915	27,995,260	1941	60,576,925
1916	37,298,191	1942	65,655,920
1917	59,018,750	1943	81,600,568
1918	75,033,831	1944	77,553,779
1919	50,053,674	1945	80,431,630
1920	49,154,913	1946	73,650,220
1921	15,445,813	1947	81,429,262
1922	26,135,077	1948	112,825,943
1923	33,227,572	1949	102,970,100
1924	35,563,480	1950	94,072,364
1925	40,478,732		

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