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A new index of world trade, 1800-1950

1) Introduction

The spectacular growth of commerce was one of the most distinctive features of the 19th century modernization, and thus it is not surprising that states wanted to know more about it. A handful of advanced countries (USA, UK, Sweden) had started to publish trade statistics in the late 18th –early 19th century, and they were soon imitated by almost all independent states and also by colonial powers, which wanted to know the trade potential of their colonies. As early as 1851, Levi (1851) summed up the available data in the first ever estimate of world total, and he was later imitated by others, most notably Von Neumann-Spallart (1885-1890) and Mulhall (1892), who put forward tentative estimates since 1720. Schou (1900) was the first to estimate a constant price series, by deflating Von Neumann-Spallart's series with the index of London prices by Sauerbeck (1886 and ff.). Roughly at the same time, the statistical offices of major countries started to collect and publish yearly series of trade at current prices, the League of Nations imitated them immediately after its establishment. The German Statistisches Amt (Statistisches Jahrbuch 1939/40) and the League of Nations (1939) published also indexes of volume of world trade – the latter being continued by the United Nations to present. These official collections have been used by all modern estimates of world trade (Lewis 1981, Maddison 1962, Vidal 1990). Thus, apparently there is no shortage of data on trade, and there is a strong consensus on what happened: world trade has been growing fast and steadily from the mid-19th century to World War One, recovered in the 1920s from the war-time shock and collapsed during the Great Depression (Findlay-O'Rourke 2007).

The conventional wisdom is so well established that in recent times scholars have moved away from the traditional country-by-country approach. Williamson and associates have focused on the movements of terms of trade from the early 19th century onwards (Hadass and Williamson 2003, Blattman et al. 2007, Williamson 2011). Many others have used the currently fashionable gravity models to analyse the causes of changes in trade volume, dealing with specific issues such as the trade liberalization of the mid-19th century (Accominotti and Flandreau 2008, Lampe 2009a), the construction of telegraph network (Lew and Cater 2006), the gold standard (Lopez-Cordoba and Meissner 2003), the empires (Mitchener and Weidenmeir 2008) and the fall in transaction costs (Estevadeordal et al 2003, Jacks et al 2009). In the latest and most ambitious work in this line, Jacks et al (2009) argue that economic growth accounted for about 55% of the increase in trade from 1870 to 1939, and that falling costs for the remaining 45%. This approach suffers from two distinct problems. First, the 19th and early 20th century trade statistics do not match its heavy data requirements, in quality and quantity. The data on bilateral trade are often missing or incomplete, even in the statistics of advanced countries, and collecting what is available is very difficult. So the number of country pairs is always much smaller than the potential: the largest data-base, by Mitchener and Weidenmeier (2008), covers 880 dyads – i.e. about a tenth of all pairs which can be computed between the 133 polities existing in 1913. The missing dyads are likely to have low or no bilateral trade, and coefficients to be biased upwards. Furthermore, the data on bilateral trade are notoriously the least reliable pieces of information from trade statistics (Federico and Tena 1991). Second, gravity models focus on long-term changes at a world level, and thus they cannot capture short and medium-term fluctuations of trade, nor analyse the performance of individual countries.

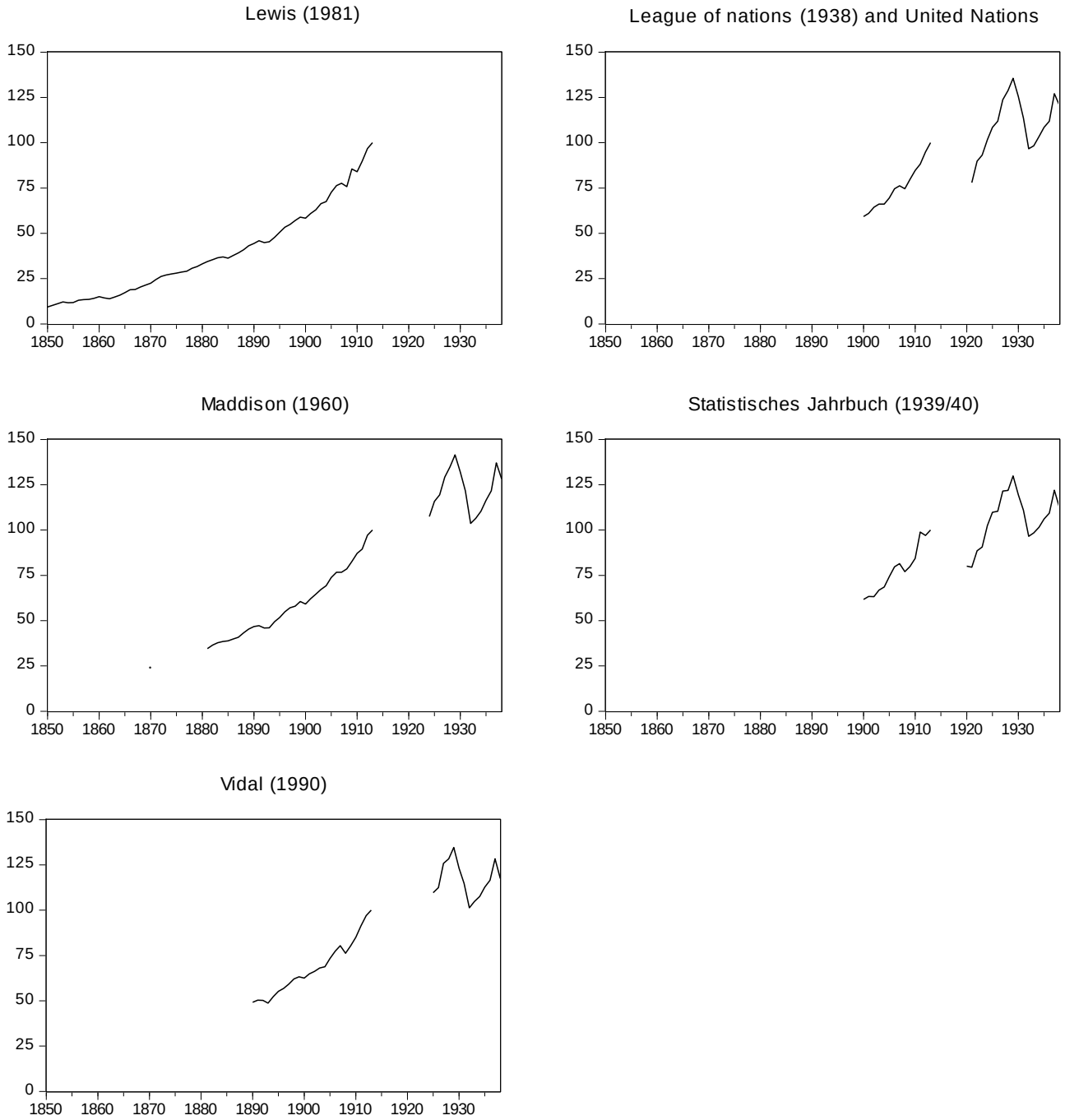
The existing series of world trade do capture short and medium term fluctuation, but, as detailed in the next Section, they are technically flawed and, above all, provide very few, if any, disaggregation by country. The present paper is the first outcome of a research project which addresses both issues. We estimate world trade as sum of series for "trading polities" – defined as any territory which either published its own trade statistics or was quoted by other polities' statistics, irrespective of its political status (independent country, formal colony, dominion, custom union etc.). For each polity we estimate series of imports and exports at current and constant (1913) prices, and at current and 1913 boundaries, for a total of eight different trade series, plus implicit deflators for its imports and exports (Section Three). These series can be analysed individually or summed up in any group deemed to be historically relevant. All series start at least in 1850, and earlier if possible. Thus, our estimate of world total covers the whole world since 1850, with the exception of territories not yet organized in recognized polities – most notably Sub-Saharian Africa before colonization. Although most polity series cover also the war years, too many of them are missing to build a meaningful world series from 1914 to 1925. Section Four illustrates trend in total world exports at constant prices (the traditional measure of trade), the changes in their ratio to world GDP (a measure of openness) and the distribution of exports by continent. Section Five deals with movements in world price of tradables (as measured by the ratio of series at current and constant prices) and in transaction costs (as measured by the ratio of import and export series at current prices). Section Six moves to the performance of individual polities, relating it, so far informally, with some characteristics. Section Seven concludes.

2) A short look to available series

As far as we know, all series of world trade refer to exports at current borders. They thus do not cover imports, nor adjust for boundary change, although Maddison (1960 p.146) does put forward a tentative estimates of the effect of borders changes after World War One (a 5% increase relative to trade at pre-war borders). Figure 1 compares the five longest and most representative series[1]. One.

[1] We do not consider the series by Schou (1900), because he deflates Von Neumann-Spallart current price data with London prices. Hilgerdt (1945) and Svennilson (1950) are arguably intermediate products of the research effort by the League of Nations and then the United Nations. Rostow (1978) uses Mulhall's series, slightly adjusted and deflated domestic British prices for the period to 1870, and the Svennilson-Hilgerdt data thereafter.

Figure 1
Available series of world exports, constant prices (1913=100).



A visual inspection highlights two main critical points of the existing series. First, none of them covers the whole period. Lewis starts in 1850, but stops in 1913. The other main series start later, and, while they all straddle World War One, they disagree on its effects. In 1924, six years after the end of the conflict, world exports were 2% lower than in 1913 according to the League of Nations (1939) and 7.5% higher according to Maddison (1960). By 1929, the difference between the most and the least optimistic estimates still exceeded 10 percentage points.

The graph does not show two other major shortcomings of the series. First, the country coverage, although usually fairly comprehensive for the interwar years at current prices, is quite limited for the "long" 19th century. As Lewis refreshingly admits, "it is hardly worthwhile to spend a day in the library discovering that a particular country's exports were valued at 5 million $ in 1855 (0.2% of world trade)" (1981 p.33). He reports separate series at current prices for a sizeable number of polities (33 in 1850, increasing to 45 in 1913), but he publishes data at constant prices for two only, the United Kingdom and the United States. He lumps together all other polities in four groups ("North-Western Europe", "Other Europe", "Temperate Settlements", "Tropical" and "East Asia"). Second, the deflation procedures are rather haphazard. Lewis (1981) uses his own index of prices of tropical products (Lewis 1969) for all tropical countries and on French import prices from Levy-Leboyer (1970) for the "Other Europe", which includes so widely different countries as Spain, Italy, Austria and Russia. For the same period, Maddison (1960) uses country-specific unit value indexes, mostly from the book by Kindleberger (1956), for eleven Western countries and a trade-weighted average of import price indexes of four major countries for all other polities. The post-war estimates are more accurate, as they can rely on the price indexes which many countries and the League of Nations started to estimates in the early 1920s. The League of Nations (1939) collects and presumably uses for deflation thirty such indexes, covering 77% of world exports. The effects of missing polities or biased deflation on the estimates of world trade may be not so large, provided that they do not affect major countries, which dominated total trade. However, the bias can be serious for the analysis of trade performance by country.

Of course, it would be unfair to belittle the efforts of these pioneers. They had to work with limited evidence and scarce technical resources. Luckily, nowadays both the technical resources and the evidence are more abundant. Mitchell's well-known collections of historical statistics (2007a, 2007b, 2007c) provide series at current prices and national currencies for 138 polities (26 in Europe, 44 in Africa, 24 in Asia, 7 in Oceania, 37 in the Americas). Scholars have published series of trade at current and constant prices for a large number of countries. Some of them are by products of the estimation of national accounts, (e.g. Batista 1997 for Venezuela), while others focus on trade, either by re-elaborating national trade statistics with consistent definitions (Tena 2007), or estimating trade from statistics of main trading partners when national ones proved to be unreliable, as for the Ottoman Empire (Pamuk 1987).

3) Sources and methods

3.1 According to our listing (Appendix B), over the whole period from 1800 to 1938 there have existed 297 "trading polities" of different size and duration [2]. In principle, we should estimate series for each of them, but this has proven

[2] The list based on Correlates of War (….)

impractical. We have been forced to omit some great port cities, such as Aden or Gibraltar, as most of their commerce consisted of transit, which is excluded from trade according to the United Nation definition, which we use. Furthermore, we have decided not to estimate trade of very small polities, arbitrarily defined as having a population inferior to 0.1% of world total in 1913 (i.e. about 1.8 million), if there are no official sources. However, we guesstimate trade of all polities with population exceeding this threshold and we do include polities below the threshold, such as Iceland (Jonsson and Magnusson 1997), when we have a reliable series.

As said, whenever possible we use recent reconstruction of trade series. Otherwise, we get data at current prices from original sources, and, as a last resort, from Mitchell (2007, a, b and c) which, although generally reliable, is sometimes inaccurate. We use national sources, such as the French Annuaire Statistique and the British Annual statement of trade, colonial yearbooks (e.g. the Statistical Abstract for British colonies) and international compilations, such as the American Statistical Abstract of foreign countries and so on. In some cases, the sources provide only crude estimates, which we accept if consistent with later data. As a rule, we accept the data at face value, unless they appear in contrast with other, more reliable, series. Actually, several scholars have raised doubts about the quality of trade statistics, since the seminal work by Morgestern (1965). Others have argued that situation is not that bad (Federico-Tena 1991, Carreras-Marin and Badia-Miro 2008). To some extent, this divergence of opinion reflects a confusion between reliability and comparability (Federico et al 2012). A trade statistics can be defined reliable if it reports faithfully the trade flows according to a well-defined set of criteria, while two statistics are comparable if they adopt a common set of criteria. Unfortunately, until the 1950s each country adopted his own criteria, which, with some approximation, can be grouped in two systems, usually labelled "Anglo-Saxon", adopted by USA, UK and its empire, and "Continental", used by European countries (Petruzzelli 1946, Allen and Ely 1953). These two systems were to converge to a common one, broadly based on the Continental one, only in the 1950s, after decades of efforts to harmonization by the League of Nations and the United Nations. Two highly reliable trade statistics may be hardly comparable. A classic case is the registration of bilateral trade in British statistics before 1904, which directly affects the reliability of data for the gravity models. They registered the imports as originating from the country where the product had been embarked and exports as shipped to the country where they had been disembarked. Thus, Swiss goods exported via Le Havre were registered as French products by British statistics. These goods were not recorded as French exports by statistics recorded as French exports only goods produced in France, These goods were not recorded in the French statistics, which defined French exports as the produce of France only. Thus, the total amount of French export to the United Kingdom had to differ even if both statistics were perfectly reliable.

Comparability, although not strictly necessary for country analysis, is obviously necessary for our work. Thus, we have tried to adjust, as far as possible, the series to the modern definitions. To this aim

i) we exclude goods in transit (transhipment) and also goods imported for later re-exporting, without processing ("special trade") [3]. This definition raises a major problem for polities using "Anglo-Saxon" definition of trade, which included imports for re-exporting. Trade statistics for Britain, USA and other major Anglo-Saxon countries do distinguish exports for domestic produce (i.e. exports according to our definition) from re-exports and thus it is possible to compute "special" trade. Unfortunately, the trade statistics for British colonies separate exports and re-exports only in 1913 and since 1922 [4]. Mitchell tackles this inconsistency by reporting data for total trade, inclusive of re-exports. His

[3] This distinction, although clear on paper, was not always respected, especially in the trade statistics of small and heavily trading countries. The "special trade" included a lot disguised transit (Lampe 2009b).

[4] For instance "throughout this Abstract the figures shown for imports include goods subsequently recorded as re-exporters" Statistical Abstract British colonies 1924 to 1930 p.ix). problema also for some French colonies, which report general trade.

series are consistent over time for each polity, but they overstate trade relative to countries which adopt the continental system. Thus, we prefer to estimate re-exports as a fixed share of total exports, and deduct them from both exports and imports.

ii) we exclude bullion (coins) and also gold/silver, for not producing countries [5].

ii) we express all data in calendar year. When necessary, we convert data in fiscal year (quite popular in Anglo-Saxon countries (USA, Canada, Australia) into calendar years by assuming that trade distributed equally over year

iv) we value trade at the national boundaries. In jargon imports must be measured c.i.f. (cost, insurance, freight) and exports f.o.b. (free on board) and the difference estimate of transportation costs. A small number of countries do not follow this rule: for instance, US imports were valued f.o.b. from ??? (Simon 1960). Whenever possible, we try to adjust these differences.

This preliminary work yields series in national currency or in the currency of the colonial powers (pound sterling, French Francs and so on). We have decided to convert them into US dollars, even if before 1913 the reference currency for international trade was the pound sterling, because post-war statistics are denominated in dollars. Whenever possible we take exchange rates from country-specific sources or contemporary international compilations, such as the Statistisches Jahrbuch or the League of Nations (1939). We use the handy, but often flawed, data from Global Financial Data (www.globalfinance.com) only as a last resort. The use of dollars raises a specific problem for the period 1862-1879, when the greenback was no longer convertible in gold. In 1862-1865, the dollar was devalued by 27.4% relative to the pound sterling (i.e. to the gold parity) according to the GFD and by 56.2% according to the more reliable series by Officer (Sutch et al 2006 series Ee 618). Converting gold-based currencies (e.g. sterling) in dollars at the current market rates would overvalue trade at current prices also relative to US trade, which expressed in gold dollars (Simon 1960). Thus we use gold dollars at the 1860 parity with sterling or other gold-based currencies, and we adjust for devaluation of silver-based currency relative to the pound using information on currency regimes of each polity and the series of price of silver by Jastram (1981).

The next step is to adjust these current prices, current borders, series to 1913 boundaries and to 1913 prices. The two adjustments are independent – i.e. we use the same deflation procedure for series at current and 1913 borders and the same boundary adjustment for series at current and 1913 prices. The general methodology for boundary adjustment is set forth in Appendix C. In a nutshell, we consider only changes affecting whole polities – i.e. the creation of new ones or the disappearance of old ones (e.g. the division of Austria-Hungary after World War One)- and while we neglect movement of territories between polities (e.g. the transfer of Alsace-Lorraine from Germany to France in 1919). We estimate the commerce at 1913 boundaries as total trade net of flows to and from polities which belonged to the same polity in 1913. For instance, the trade for Austria at its 1913 boundaries is total trade net of trade with Czechoslovakia, Hungary and (an estimate of) former Austrian Poland. We do not adjust for trade with territories transferred to Italy and Yugoslavia, as both countries existed in 1913.

Whenever possible, we deflate current price series with price indexes from polity-specific sources, such as the collection by Birnberg and Resnick (1975). If such indexes are not available, either for the whole period or for part of it, we compute polity-specific Fisher or Laspeyeres indexes (cf. for details Appendix D). To this aim, we weight "world" prices with data on composition of imports and exports, taken from international compilation of foreign trade statistics (e.g. the American Statistical Abstract 1909) or from national sources. We proxy "world" prices with London prices (Sauerbeck 1846 and ff.) or unit value of goods from British trade statistics (Annual statement…). Using London

[5] defined if substantial net exports in 1928– South Africa EX 215 IM 7 Gold Coast (=Ghana) EX 4 IM 0, Canada EX 115 IM 28 Colombia [1938] EX 11 M 0 Australia EX 10 M 4 New Guinea New Zealand

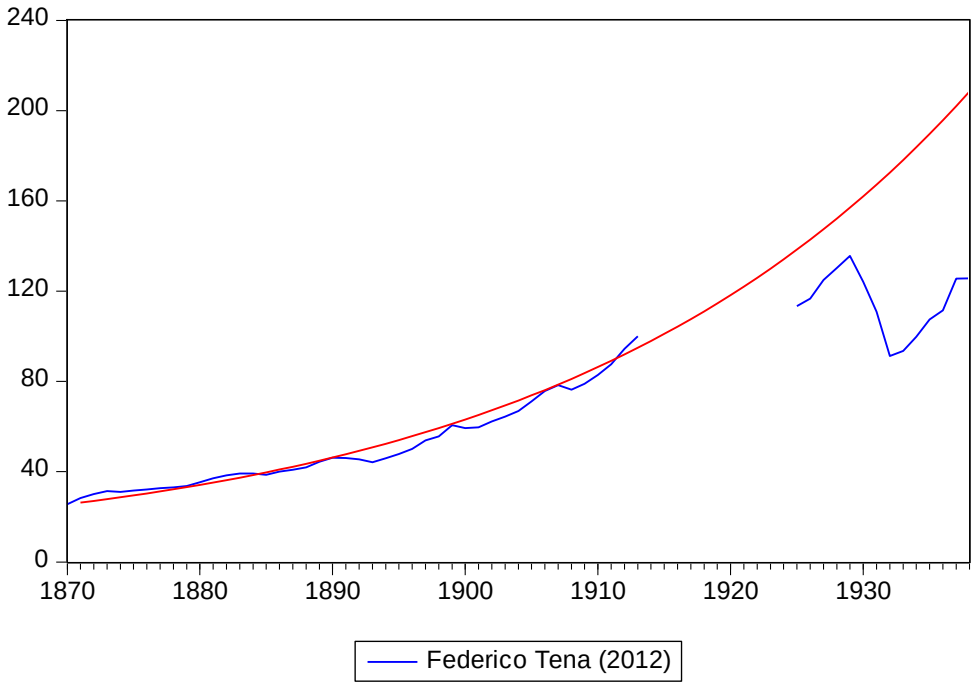
prices, however, would yield biased results if prices converge, it would undervalue world imports and overvalue world exports relative to its "true" level, with country-specific prices (and vice-versa). To avoid this, we adjust them for changes in transaction costs with route-specific freights from Shah and Williamson (2004) and Jacks-Pendakur (2010), with a correction for insurance and other costs. For a number of countries, the data on composition of trade are not sufficient to follow this procedure. In this case, we use as a proxy indexes of countries similar for geographical location and factor endowment or, as a very last resort, we use price indexes of trading partners.

The construction of the data-base is still on-going. Thus the present paper relies on a restricted sample of 38 polities, for the period 1870-1938 only, which includes Austria-Hungary (substituted Austria, Czechoslovakia and Hungary after the war), Belgium, Denmark, Finland, France, Germany, Iceland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom in Europe, China (and Manchukuo after 1932), India, Indonesia, Japan, the Philippines, the Ottoman Empire, Sri Lanka and Thailand in Asia, Argentina, Brazil, Canada, Chile, Colombia, Mexico, Uruguay, Venezuela, United States in the Americas, South Africa and Egypt in Africa and Australia. In 1929, these polities accounted for 85.6% of world exports according to the League of Nations (1939), so we can be confident that this series, although provisional and incomplete relative to the final data-base, is representative enough. In the following, for brevity, we will call this sample of countries "world".

4) The growth of world trade: aggregate analysis

Figure 3 reports our series of world exports at constant prices and 1913 borders, which we deem the most reliable measure of long-run changes.

Figure 2
The growth of world trade: the new series (1913=100)



During the first globalization, world trade grew more than three-fold: the linear interpolation (red line) suggests a quite steady growth at a rate slightly below 3%[6]. The growth seems to have been slower until the mid-1890s (the series starts above the interpolation line and ends 10% below), and faster in the period before the war. Indeed, a battery of Chow tests shows a clear break around 1895, and the rate of growth increased from 2.0% to 3.8%. It is quite difficult to measure the short-term impact of the war, because, as said, our series can re-start only in 1925, for the lack of suitable data for Germany. In that year, world exports were about 35% higher than before the war, and in the next four years they increased by a further fifth. Yet, world exports even at their 1929 peak were 13.5% below the pre-war growth path, and the gap widened in 1933 at 47%. In that year, they were 7% lower than in 1913 rather than 78% higher.

Although the series at 1913 borders arguably captures better long-term trends, border changes did affect actual trade. As a general rule, one would expect, ceteris paribus, that unification of several polities into a new one (e.g. Italy in 1861) would reduce foreign trade, and that the division of an existing polity (e.g. Austria-Hungary in 1918) would increase it, unless the new polities impose prohibitive duties on all goods coming from polities formerly belonging to the disappeared one. All changes in the political landscape before 1913 reduced the number of polities and thus, ceteris paribus, also world trade. However none of them was really relevant: the biggest political event was the Italian unification, which reduced Italian commerce by about a sixth, but Italy in 1870 accounted for less than 3% of world trade[7]. The effect of boundary changes after the end of World War One was obviously much greater. In 1925, world-wide exports were 2.6% higher at current borders than at constant, but European ones 5-6% higher [8]. The differences declined progressively, as trade flow re-adjusted to new boundaries, and by 1938 they were 0.2% and 1.4%. Note that all these figures are likely to be biased downward as the current sample does not include Poland and Russia, two countries massively affected by post-war boundary changes.

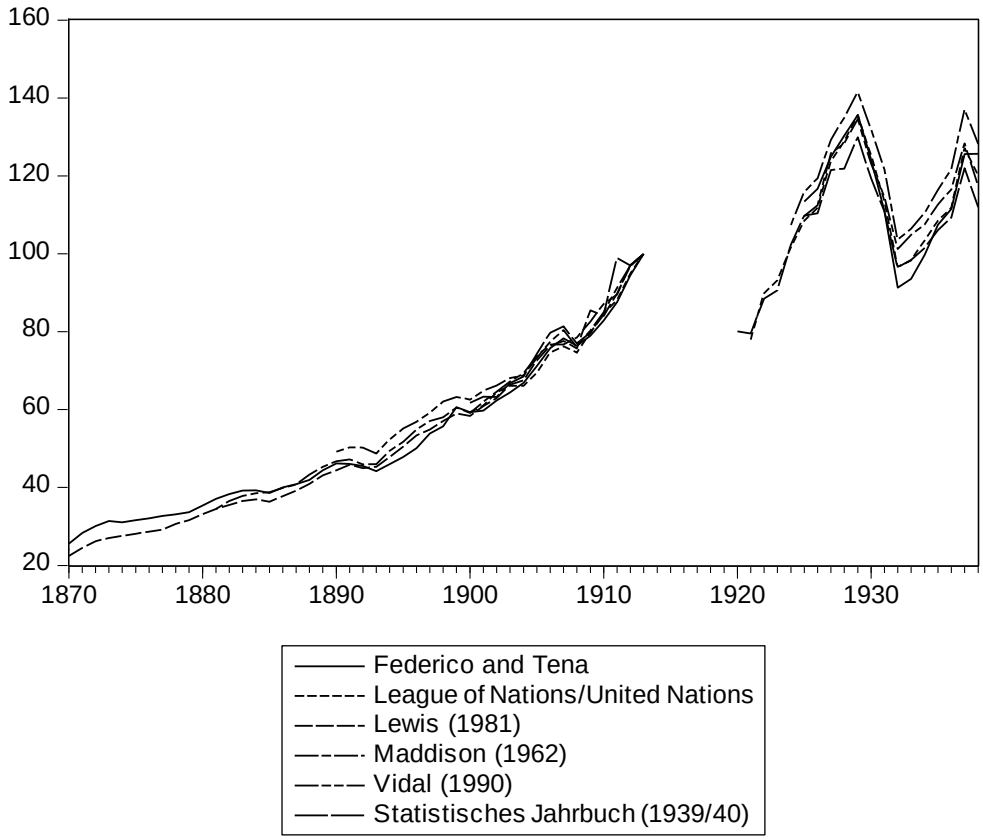
Summing up, our analysis confirms by and large the conventional wisdom. Indeed, the differences in long-run growth between our series and the existing estimates are fairly small (Figure 3)

[6] More sophisticated specification (Razzaque et al 2007) Δ Ln RP=α+β TIME+ψ lnRP_{t-1}+ φln Δ Ln RP_{t-1} +u and b=- β/ ψ yields a slightly higher growth rate (3.07% p.a., significant at 1%), with an half-life of shocks around 4 years and a half.

[7] The effect of German unification was much smaller, as most of the states belonged to the Zollverein, which is registered as a trading polity.

[8] Some recent work (Heinemeyer 2007, Wolf et al 2011) deals with the effect of border changes in Germany and close-by sates from a different perspective and with different data. They measure how much borders reduced railways shipments of selected products relative to their counterfactual no-border levels and find that the effect was sizeable but not huge. They argue that the net effect was not as large as it could have been because trade among these areas was fairly small – i.e. that new borders followed to some extent pre-existing ethno-linguistic divisions.

Figure 3
The growth of world trade: all series (1913=100)



However, there are sizeable differences in the short term.

Table 1
Correlation among series, fist differences

	FT	Lewis	UN	Maddison
FT				
Lewis	0.50*			
UN	0.80***	0.59**		
Maddison	0.51*	0.48*	0.69***	
StatJahr	0.47	0.32	0.27	-0.08

Significant at * 10%, ** 5% *** 1%

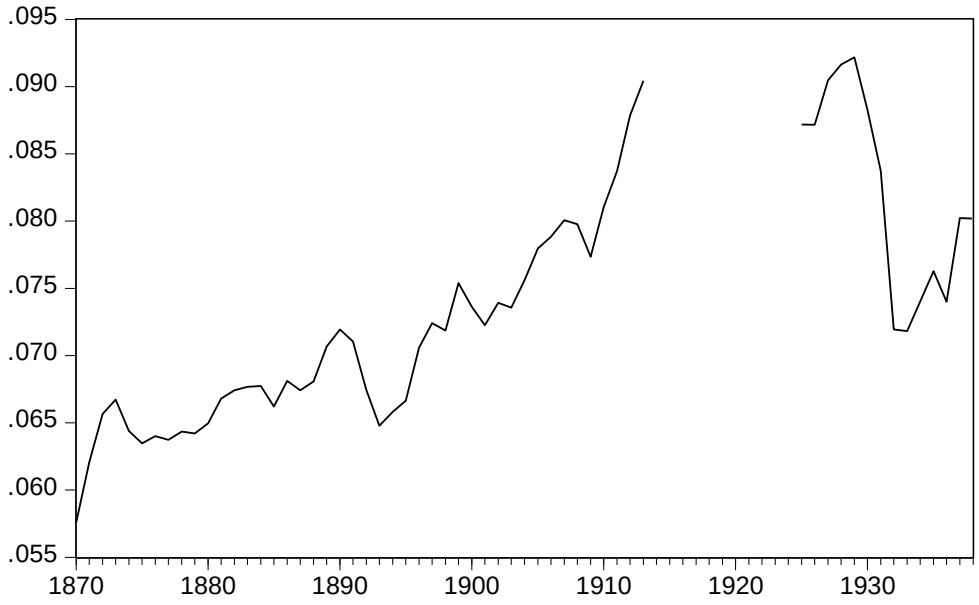
The coefficients of correlation among first differences are not very high (Tab.1) and the average absolute difference ranges from a minimum of 2.1% if our series is compared with the UN series (1900-1938) to 5.1% if the yardstick is the Lewis one (1870-1913). As expected, this difference widens after World War One: on average from 1925 to 1938, it is 10% higher than in 1900-1913 if our series is compared with the Statistisches Jahrbuch (1939/40), 56% higher if compared with the UN series and 143% higher if compared with Maddison (1960). This increase reflects only partially the difference between series at 1913 and current borders, but this cannot be the only cause. In fact, the coefficients of correlation between (the first differences of) series at current prices differ only at the second digit from those in Table 1.

The conventional wisdom holds that the growth of trade during the first globalization caused a massive increase in openness. Figure 4 measures this latter with the aggregate export/GDP ratio for 34 polities, using Maddison's estimates of GDP [9]. We convert these latter, originally in PPP-adjusted Geary-Khamis 1990 dollars, into 1913 dollars with the ratio of estimates of world exports in 1913 at current and 1990 prices by Maddison himself (1995 tabs I.3 and I.4)[10].

[9] Missing GDP data have been obtained with linear interpolation. We have omitted Egypt and South Africa, as Maddison does not provide enough data for interpolation, and Austria-Hungary and successor states, as Maddison data refer to very different boundaries

[10] The coefficient is 12.84. As an alternative, we have also considered to convert with the index of US consumer prices (Sutch et al 2006), which yields a coefficient 9.7. Thus, the ratio is correspondingly lower throughout the whole curve, but trends are obviously identical.

Figure 4
Export/GDP ratio

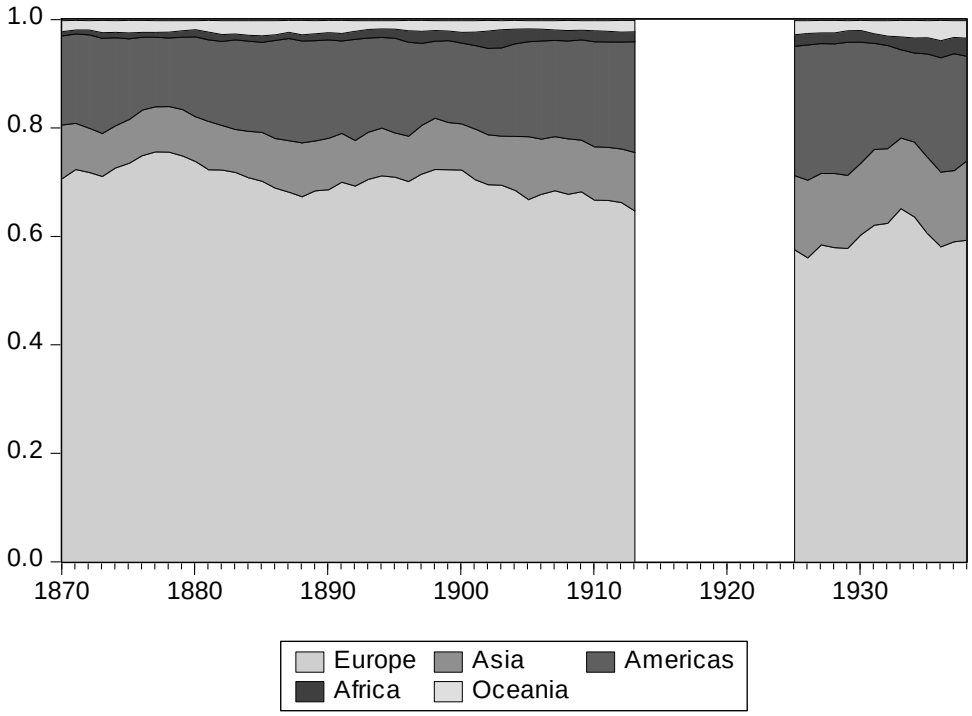


The ratio did increase, but only by 2.5 percentage points, from about 6.2% in 1870-1872 to 8.7 in 1911-1913 –i.e. somewhat less than expected from the conventional wisdom. Furthermore, the world economy was more open than expected in interwar years. On the eve of the Great Depression, the ratio was (marginally) higher than in 1911-1913, and the following collapse of trade brought it back to the level of the turn of the century. Yet, it is striking that openness has been increasing during the recovery of the late 1930s and that in 1936-1938 the ratio was as high as in 1904-1906. Of course, these movements are smaller than expected because dampened by parallel changes in GDP. Anyway, our estimate suggests that the impact of the first globalization and the difference between the two periods might be smaller than the conventional wisdom implies. Actually, our estimate might even overvalue the increase in openness. In fact, the numerator and the denominator are expressed in different "currencies" and, given the Balassa–Samuelson effect, the ratio undervalues openness relative to its "true" value (i.e. with numerator and denominator expressed in the same currency). Economic growth reduced the gap between the two currencies, causing our openness ratio to grow spuriously [11].

Last but not least, Figure 5 reports the distribution of world exports by continent. In this case, one can use current price data, which are not subject to distortion in relative prices from deflation, because there is no need for inter-temporal comparison.

[11] Let's write the "true" export/GDP ratio (at current prices, market rates) of the i-th polity at time 0 as $O^0 = M^0_M/GDP^0_M$. Maddison's PPP-adjusted GDP is equivalent to GDP at market rates times an unknown polity- and time-specific factor of adjustment α^0, which is positive for all polities less developed than the United State. Thus, our ratio can be written as $R^0= M^0_M/GDP^0_M*(1+\alpha^0)$, and the ratio of the two ones as $R^0/O^0=1/(1+\alpha^0)<1$. The same reasoning holds true at time 1, when $R^1/O^1=1/(1+\alpha^1)<1$. Assuming for simplicity no change in exports and GDP at current prices and thus in the "true" ratio ($M^0_M= M^1_M$ and $GDP^0_M=GDP^1_M$), the change in the ratio between the two measures is $\Delta R/O=R^1/O^1 - R^0/O^0 =1/(1+\alpha^1)- 1/(1+\alpha^0)=(\alpha^0- \alpha^1)/(1+\alpha^1+\alpha^0+\alpha^1\alpha^0)$. The denominator is positive by definition. The numerator is usually positive as well. In fact modern economic growth caused prices to converge towards the American level and the gap between PPP-adjusted and market-based GDP to shrink ($\alpha^0< \alpha^1$). However, given that $\Delta R/O=(R^1 - R^{0)}/O^0$, $\Delta R/O >0$ implies that $(R^1 - R^0)>0$ – i.e. that our ratio can grow even if the underlying "true" export/GDP ratio is constant.

Figure 5
Distribution by continent, current prices, 1913 borders



Even if ultimately changes in composition have not been dramatic, still trends are quite clear. Europe have been losing market share almost continuously during the first globalization, falling from about 70% of world exports in the early 1870s to less than 60% on the eve of World War One. All other continents have gained – most notably Africa, which in 1870 accounted for less than 1% of world exports and in 1913 for more than 3%. This is an outstanding performance, but so far Africa is underrepresented in our data-base. Egypt and South Africa jointly accounted for 2.1% of world exports in 1929, while the share of whole of Africa according to the League of Nations (1939) was more than double (4.5%)[12]. Australia's share remained stuck at 2%, while the shares of Asia, America and Oceania increased roughly in parallel, by about a sixth. The war gave a further blow to the European exports. In 1929 they hit an all-time low at 58%, while the shares of all continents (except Australia) increased. Europe's share increased somewhat in the first years of the Great Depression, as the relative prices of manufactures it exported grew relative to prices of primary products, but these gains were lost in the recovery of the late 1930s. Over the whole interwar years, thus, the distribution of world exports at current prices remained largely stable.

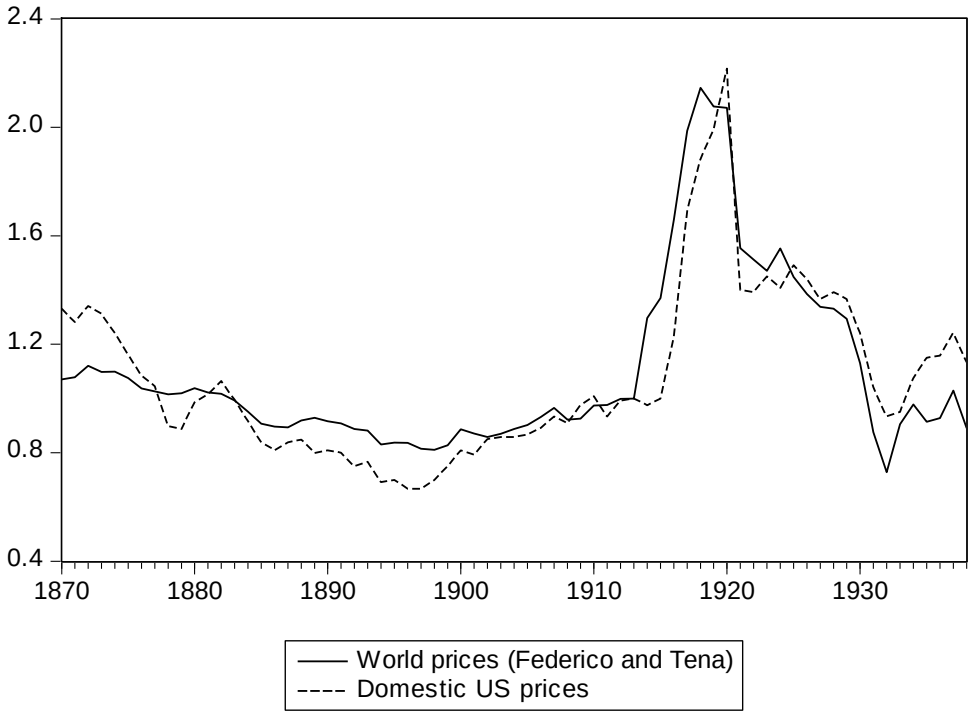
5) Additional results: prices and transaction costs

Before moving to the analysis of polity performance, it may be worth looking at two important by-products of the aggregate data, the ratio between total exports, 1913 borders, at current and constant prices and the ratio import/exports at current prices. The former is obviously a price index for traded goods, while the latter a measure of transaction costs in foreign trade. In fact, the value of French exports to the United States is reported by French statistics excluding these costs (f.o.b.) and by American ones including them (c.i.f.). This reasoning applies also to exports by sea between neighbouring countries –say- France and Belgium, but not to overland trade, because the cost of crossing the frontier is nil. Thus, the ratio is a lower bound of costs and the bias depends on the share of overland trade between neighbouring countries.

Figure 6 compares the implicit deflator computed from exports side (to avoid mixing with changes in transaction costs) with a series of domestic commodity prices in the United States (Sutch et al 2006 series Cc66 and Cc 113).

[12] All other continents, except Europe, are so far underrepresented – Oceania by a third, the Americas by a sixth (our share 24% vs 29%) and Asia by a tenth (13.5% vs 15%).

Figure 6
World prices and US domestic prices (1913=100)

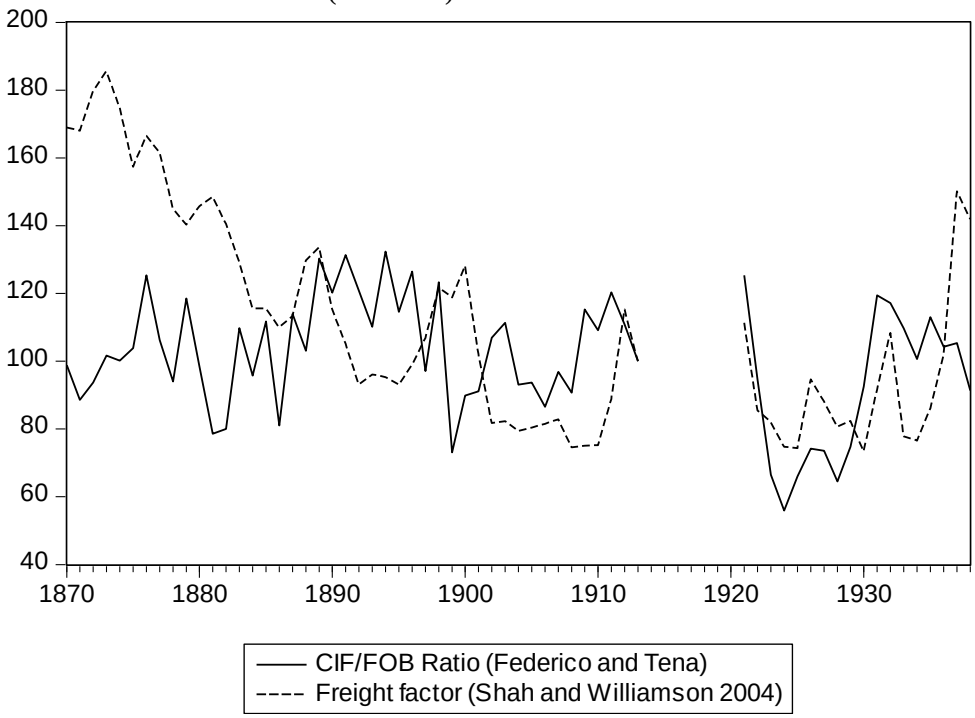


Trends are very similar and the coefficients of correlation for the whole period 1870-1938 are correspondingly high (0.89 in levels and 0.78 in first differences). Yet, a second look highlights a puzzling feature. One would expect prices of traded goods to be more volatile than domestic prices, which include services. This is indeed the case in interwar years, as from 1921 to 1938, world prices fell by 46% while US domestic prices only by 20%. In contrast, before the war world prices were less volatile than domestic ones. From 1870-2 to 1895-97, the former decreased by 22% but the latter halved, while, by definition (as both series must reach 100 in 1913), from 1896 to 1913 world prices increased more than US prices. Indeed, the two series are not co-integrated, under any set of hypotheses. The difference in the first period does not depend on a composition effect, as in the United States prices of agricultural products and of manufactures declined in parallel, while the limited evidence (Yates 1953, Lewis 1981) seems to rule out any major change in the composition of world exports. Furthermore, our export index declined less than British price index (Mitchell 1988) and even than US implicit deflators by Balke and Gordon (1989) and Romer (1989), which, including services, should be rather sticky [13].

The average CIF/FOB ratio over the whole period is a reasonable 11.6%, but, contrary to expectation, it does not show any clear trend. The series is stationary at 2%.

[13] From 1870-72 to 1895-1897, the British prices declined by 34.5%, and the two deflators of US GDP respectively by 31.5% and 33%.

Figure 7
Estimates of transaction costs (1913=100)



Our estimate of transaction costs differs substantially from the available evidence on freights, which is routinely used as proxy for transport costs. Figure 6 compares our CIF/FOB ratio, normalized with its 1913 level, with the Williamson-Shah (2004) un-weighted series of nominal series deflated with our export prices series. Differences are huge in the 1870s and 1880s, when real freights fell by 60% and sizeable also thereafter [14]. From 1890 to 1913, both series fluctuated a lot, but their correlation is as low as 0.04. In contrast, the two series are fairly similar in interwar years. In principle, it is fairly easy to reconcile a fall in freight factor (the ratio of transport costs to the export price of commodities) with a constant ratio of transaction costs to total trade (i.e. the CIF/FOB ratio). By definition this latter (c_T) is the average of ratios on cross-border overland trade (c_B), on short-distance overland trade (c_S) and on long-distance trade (c_L), weighted with the shares of these flows on world trade (s_B, s_S and s_L). The change in the total ratio can be written

$\Delta c_T = \Delta c_B * s_B + \Delta s_B * c_B + \Delta c_S * s_S + \Delta s_S * c_S + \Delta s_L * c_L + \Delta c_L * s_L$

The two first terms are nil, as by definition $c_B=0$. If $\Delta c_T=0$, re-arranging one gets

$-\Delta c_L * s_L = \Delta c_S * s_S + \Delta s_S * c_S + \Delta s_L * c_L$

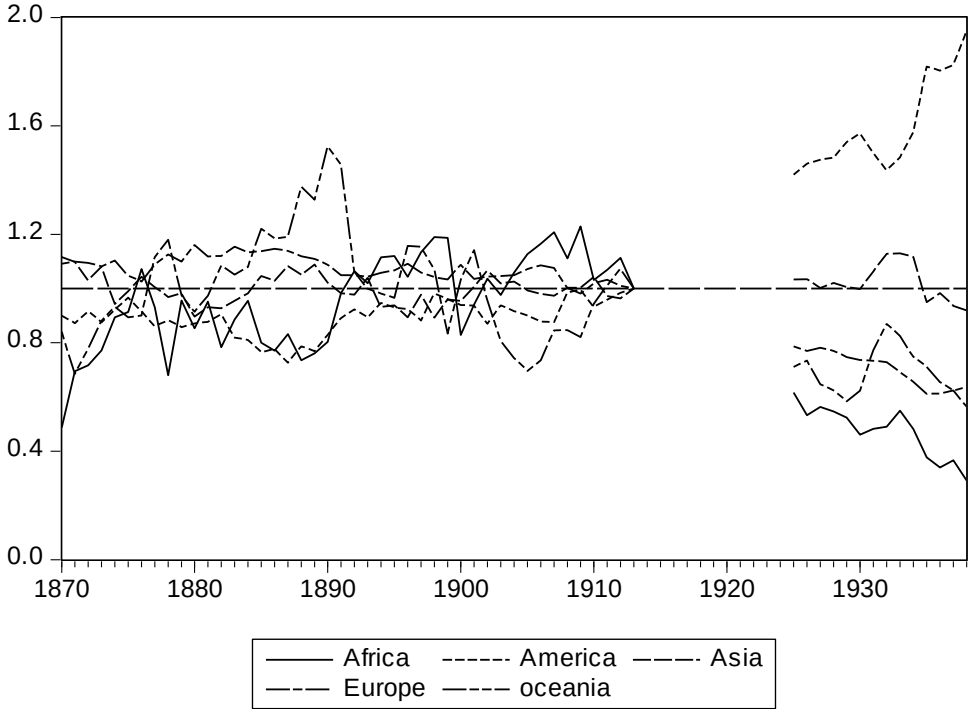
A fall in c_L ($\Delta c_L<0$) can be compensated by an (unlikely) increase in the costs of overland transport (Δc_S) and/or, more likely, by the increase in the share of short-distance overland trade (Δs_S) and above all of long-distance trade (Δs_L).

6) The growth of world trade: a polity by polity analysis

The main advantage of our data-base is the possibility of analysing the performance at polity level. The most rigorous approach implies estimating a difference-in-difference equation. The difference between rates of change of exports of the i-th polity and of world total as dependent variable is explained by the economic and political characteristics of the polity (size, level of development, political status and so on). While waiting for the full data-base to perform such an analysis, we report un-weighted averages of indexes for groups of polities, normalized with a similarly un-weighted average of all polity indexes. If the ratio exceeds one, that group performed, on average, better than the (average of) world polities. Figure 8 divides polities by continent and shows a big differences between the period before and after the war. Before the war, the relative performance fluctuated a lot, but without any clear trend. After the war, trends diverged hugely: exports of the Americas increased much more than the world average, Asian ones held their own and exports of all other continent, including Europe, decreased in relative terms.

[14] Also Jacks et al (2009) find the decline of transaction costs to have been fairly modest, but they argue that the effect of the fall in freights was compensated by the increase in tariffs. This explanation does not hold true for our series, as imports are valued before tariffs.

Figure 8
Country performance: averages by continent (1913=100)



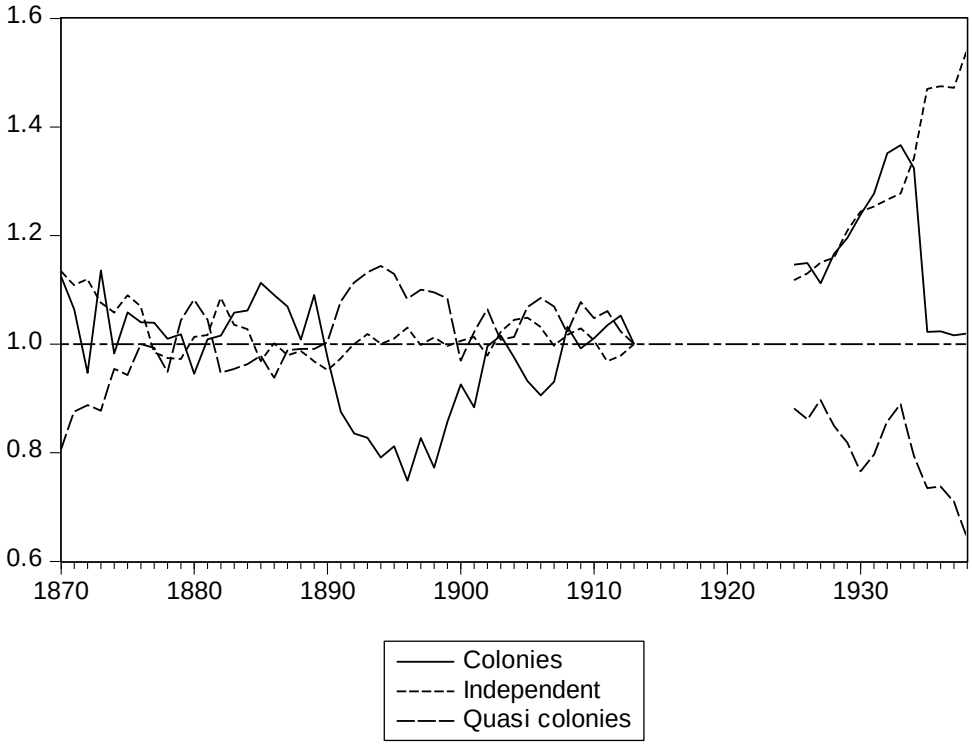
Most continents included a wide range of cases and thus Figure 9 groups polities according to two criteria, the level of development and the political status. We define "rich" all advanced countries which had income exceeding half the British per capita GDP in 1870. We distinguish independent states, colonies and we lump together in a group of "quasi-colonies" the dominions and some other countries in a similar conditions, such as Iceland [15].

Figure 9
Country performance relative to world average (1913=100)

9.a) Rich countries, by political status

[15] Rich Independent: US, Belgium, Denmark, France Germany, Netherlands, Switzerland, United Kingdom; Rich quasi colonies: Canada, Australia; Poor independent: Argentine, Brazil, Colombia, Mexico, Venezuela, Japan, Ottoman Empire, Thailand, Italy, Spain, Sweden. Poor quasi colonies: China, Egypt, South Africa, Finland, Iceland, Norway; Poor Colonies: India, Indonesia, Philippines, Sri-Lanka

9.b) Poor countries, by political status



Clearly, the export performance of the rich countries was not brilliant. Exports from Australia and Canada (the rich quasi-independent) remained below the average for most of the period. The rich independent (i.e. Western Europe and the United States) succeeded to maintain their share of world markets before the war, but not afterwards. Before the war, all groups of poor countries roughly increased exports as much as total trade, with the exception of the colonies in the late 19th century, but after the war the performance diverged. The star performers were the poor independent countries: on the eve of World War Two, on average they exported 3.5 times more than in 1913 while world average was "only" 2.3 times higher [16].

These results, however simple is the approach, suggest that the conventional wisdom need to be revised. On the other hand, the group averages are likely to conceal sizeable differences in performances. The group poor independent countries consists of eleven, from Argentina to Japan. Thus, Table 2 ranks all polities according to the ratio of growth of their exports to world exports

[16] The difference would be greater with total (weighted) exports, which, being hindered by the poor performance of major countries, in 1938 were only 26% higher than in 1913

Table 2
Country relative performance: normalized growth rates of exports

	1870-1913		1913-1929		1913-1938		1870-1938	
1	Chile	2.52	Venezuela	5.99	Mexico	9,21	Chile	3.39
2	South Africa	2.37	Brazil	4.62	Brazil	8,97	Mexico	2.74
3	Japan	2.32	Philippines	4.08	Chile	8,67	Japan	2.70
4	Mexico	1.69	Colombia	3.64	Colombia	8,57	Brazil	2.30
5	Argentina	1.66	Canada	3.57	Philippines	6,50	Philippines	2.21
6	Philippines	1.50	Chile	2.96	Venezuela	6,13	Thailand (Siam)	1.80
7	Thailand (Siam)	1.39	Sri Lanka (Ceylo	2.75	Japan	5,20	Canada	1.73
8	Canada	1.35	Iceland	2.75	Canada	4,07	Argentina	1.57
9	Indonesia	1.32	Japan	2.30	Iceland	3,96	Venezuela	1.50
10	Sweden	1.28	Argentina	2.05	Sri Lanka=Ceylor	3,28	Indonesia	1.47
11	Germany	1.26	Denmark	1.89	Finland	3,12	Iceland	1.45
12	United States	1.26	Belgium	1.63	Thailand=Siam	2,93	Denmark	1.37
13	Switzerland	1.25	Norway	1.55	Norway	2,88	Colombia	1.35
14	Brazil	1.21	United States	1.54	Denmark	2,74	Finland	1.33
15	Finland	1.20	Finland	1.53	Indonesia=Dutch	2,44	Sri Lanka (Ceylor	1.31
16	Denmark	1.18	China	1.49	Sweden	2,34	Norway	1.30
17	Egypt	1.11	Indonesia	1.45	Uruguay	1,75	United States	1.24
18	Australia	1.10	Thailand (Siam)	1.09	Australia	1,64	Uruguay	1.19
19	Uruguay	1.09	Sweden	1.07	Portugal	1,52	Sweden	1.18
20	Norway	1.06	Mexico	1.02	Belgium	1,48	Australia	1.09
21	Italy	1.05	Netherlands	0.84	United States	1,13	South Africa	1.05
22	Spain	1.04	France	0.80	Argentina	1,03	Belgium	0.98
23	Belgium	1.00	Italy	0.75	Ottoman Empire/	0,86	Italy	0.88
24	Sri Lanka (Ceylo	1.00	India	0.60	India	0,53	China	0.80
25	Iceland	0.97	Portugal	0.54	Netherlands	0,43	Netherlands	0.72
26	China	0.88	Australia	0.21	China	0,28	Germany	0.70
27	France	0.76	Germany	-0.06	Italy	0,06	Switzerland	0.69
28	Venezuela	0.74	Switzerland	-0.07	Egypt	-0,09	Ottoman Empire	0.51
29	Netherlands	0.74	Egypt	-0.08	France	-1,05	Egypt	0.49
30	United Kingdom	0.70	Uruguay	-0.14	Switzerland	-1,97	India	0.49
31	Ottoman Empire	0.60	Ottoman Empire	-0.17	United Kingdom	-2,22	Portugal	0.45
32	India	0.48	South Africa	-0.20	Germany (Prussi	-2,72	Spain	0.37
33	Portugal	0.18	United Kingdom	-0.44	Spain	-3,10	France	0.32
34	Colombia	0.17	Spain	-0.68	South Africa	-4,78	United Kingdom	0.18

No European country appears in the top quartile of the list in any period and several of them, most notably the United Kindgom, feature in the bottom one. This is not so unexpected: it is well known that Britain steadily lost the commercial predominance it had gained with the Industrial Revolution. It is less expected the identity of the winners. Contrary to the consensus view, the Western Settlement countries did not perform that well, with the partial exception of Canada and Argentina. The winners of the first globalization could be found in all continents except Europe, while the interwar years were the golden age of Southern America, with four (poor independent) countries at the top of the ranking for the period1913-1938. Chile was by far the best performer over the whole period. Here it is not possible to discuss in any detail the causes of these differences. Most exporters of primary products benefitted from the absence of duties on their exports, while differences among them depended on the commodity composition of their exports and also on trends in exchange rates. The devaluation of Latin American currencies in the 1930s helped their exports (Bulmer Thomas 1995).

7) Conclusion: a new history of globalization?

This very preliminary paper aimed at accomplishing two different tasks – to analyse trends in world trade and to explore the performance of individual polities. By and large, the results of the first exercise tally with the conventional wisdom. However, we have discovered three differences which we feel worth stressing

a) price of traded goods were more stable than domestic prices in the major countries

b) overall transaction costs did not fall

c) openness did not increase that much before the war, and it did not fall that much during the Great Depression.

These results are admittedly provisional as they are still based on an incomplete, although representative sample of countries, with the additional problem, for the export/GDP ratio, of the imperfect conversion of PPP into market dollars. Thus, one need to wait for the full-data-base. Yet, if confirmed, they would suggest a different story, which downplays the difference between the pre-war triumph of globalization and the interwar retreat. As Jacks et al (2009) put it, the 1920s show a "surprising resilience in the global economy" and the recovery of trade after the Great Depression was surprising.

The quantitative analysis of performance by polity is totally new, as none of the available series provides consistent data at polity level. The conventional wisdom relies on an unsystematic comparison of country series, focusing on the main countries, and on anecdotal evidence. Our analysis highlights several interesting facts – such as the relatively poor performance of Western Settlement countries or the very good one of Latin American countries. Adding further polities might change these first results, but surely not modify the main message: generalizations based on reputation are not a substitute for actual historical data.

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