

Comparing Globalizations

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Abstract

This paper tries to shed new light in the debate about the intensity of exports in the two waves of globalization. Although a measure of the importance of trade is simply its share in GDP however, the comparison between historical periods should consider the change in the nature of any variable involve in the analysis rather than linear comparisons. In order to assess the importance of the changes in the nature of trade and the GDP's composition (which consequences are the multiple counting in the official exports statistics and heterogeneous GDPs), we compare the growth intensity of the merchandise exports/GDP ratios to those obtain when changes in the nature of the variables are considered. By using a new synthetic measure, the outcomes show that the intensity of the globalization process was considerably superior in the second era of globalization. Consequently, it can be signed as a new feature of international trade in this era.

Key words: intensity of growth, globalization, multiple accounting, service sector.

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I. Introduction

One of most recurrent topic in the recent literature is the large increase of international trade in the previous decades to the recent crisis. Right now, the global crisis and the trade collapse have marked a pause in the globalization process started after World War II [World Trade Organization (2008)]. However, interruptions are not new in the history of globalization since it has not been a monotonic phenomenon. In 1914, the World War I and the following crack of 1929 meant the first break in the liberal economic order called first era of globalization.

Proxying globalization as the growth of international trade over the GDP, the world has experienced two waves of globalization in the last two centuries. It is agreed that the first wave dates from 1870 to 1913 and second wave from 1965 to 2007. For some time, certain authors claimed that the levels of the ratio X/GDP were comparable in both waves of globalization [Krugman (1995), Findlay and O'Rourke (2003)]. They maintained that the 1913 levels of openness (on merchandise exports over GDP) had not been reached until sometime in the mid-1970. However, Feenstra (1998) claims that the modest shares of exports over GDP, observed in the second wave of globalization, hide the fact that merchandise trade as a share of merchandise value-added is quite high and has been growing dramatically¹. He also warned about the upward bias introduced in the same ratio by vertically specialized trade in the second era of globalization sine the numerator is double-counting trade in components and finished products. In the same vein, Bordo *et al.* (1999) point out that while merchandise trade to GDP ratio a century

¹ Feenstra (1998) points out that focusing on merchandise trade relative to its added value, the world is much more integrated today than any time during the past century.

ago was roughly comparable to what it is today, trade is now much larger as a share of tradable goods production and then, the relative constant ratio masks the increasingly importance of trade within the traded-goods sector. Also, Baldwin and Martin (1999) sustained that the second wave of globalization surpassed for long the pre-WWI levels if considering the change in the GDP's composition².

As is well known, the change in the nature of international trade is one of the most remarkable features of the second wave of globalization. In the first era of globalization, differences in factor endowments and technology led the international trade to an overwhelming interindustry trading pattern. By contrast, in the second wave, scale economies and an important downward trend in trade costs have led an intraindustry trading pattern characterized by fragmentation and product differentiation. The result has been the spectacular advance of vertically specialized trade. Thus, although the ratio of trade over GDP has been widely used as a simple measure to illustrate the importance of trade in a large number of works [Krugman (1995), Baldwin and Martin (1999), Findlay and O'Rourke (2003) among others], considerable little attention has been paid to examine quantitatively how the change in the sectoral composition of GDP and in the nature of trade could bias the outcomes when we use the trade over GDP ratio in historical comparisons. From our point of view, it is essential to take these potential biases into account to obtain an accurate comparison of the globalization process intensity between the two waves³.

The aim of this paper is to offer a better comparison of the globalization processes intensity through a new synthetic measure by correcting these sources of bias (service sector downward bias and vertical specialization upward bias). We consider ten OECD

² Lindbeck (1973) developed that idea noted that GDP in the XIXth century consisted primarily in private economic activity however, in modern times, governments account for more 30-50% in of GDP.

³ As Krugman (1995) claimed, *while the overall volume of trade has not increased as much as might be expected, the aggregates conceal several novel features of modern international trade that we must not obviate.*

economies for which we have scattered information on the percentage of vertically specialised trade (i.e. foreign added value content in domestic exports) that we interpolate in order to get yearly series, for the second globalization. Then we relate these exports free from the vertically specialised trade to the merchandise VAT to avoid the other bias introduced by the growth of service sector. Therefore, once the two biases are corrected, we assess the intensity of globalization in the two waves by using a new (more precise or exact) measure that synthesizes the growth of the merchandise exports over GDP ratio. In other words, we obtain a more accurate and homogeneous comparison of the openness series for the two waves of globalization. Our analysis reveals that concerning to trade facts, the second wave of globalization shows an unprecedented intensity of the globalization process. It is highly reinforced when the services sector and the multiple-accounting from the relevant process of vertical specialization are allowed for.

The rest of the paper is organised as follows. Section 2 includes data sources and explain the construction the new ratios. Section 3 presents a new approach to measure the growth intensity of the globalization processes. And Section 4 discusses the important implications.

II. The Paths of Globalizations. Data and measures

In order to correct the biases aforementioned (multiple-accounting and service sector), we focus on ten OECD countries for which we have data for the first and second waves of globalization. We construct the ratios of merchandise exports over GDP for: Australia, Canada, Denmark, France, Germany, Japan, Netherlands, Spain, United Kingdom and United States. They account for more than 55% of world trade and

about two-thirds of world GDP. For the first era of globalization (1870-1913), exports and GDP current data come from Maddison (1995). We work with the annual volume indexes of exports and GDP (all of them are 1913 based) and we transform them into current values of 1990 dollars applying them on the current values available for that year in Madisson (1998). As regard the second era of globalization, we consider the period 1965-2007 since much of the growth in trade since the end of the World War II represents simply a recovery to the levels before wars [Krugman (1995)]. For this second period, merchandise exports, GDP and exchange rates have been taken from the International Monetary Found (*International Financial Statistics*, 2009). The data on vertical specialization, necessary to construct the adjusted ratio have been interpolated from those provided by Chen et al. (2005), according to Sabate *et al.* (2009)⁴.

We propose two substantial changes in the ratios of exports over GDP traditionally used (calculated or analysed) in order to capture two features that clearly demarcate the present era from the period before World War I. Firstly, we deal with the fact that the sectoral composition of GDP has transformed in the last century. The service sector accounts for a great weight in the GDP's countries in our sample, the expansion of this sector, in the last fifty years, means around 60% of the GDP for the ten developed countries in our sample⁵, however, in the first era of globalization that sector was minuscule⁶. It denotes an aspect truly new in the second era of globalization. In order to carry out a homogeneous comparison, we subtract from the total GDP the part of services sector and only consider the agricultural and industrial added value. Taken it

⁴ We have interpolated to create yearly series from 1968 to 2007. We have used cubic spline polynomials, which are the approximating functions of choice when a smooth function is to be approximated locally and are a preferable to the method of truncated Taylor series. The general idea of any interpolation method is to compute the values of $f(x)$ in the interval $[a,b]$ knowing $f(a)$ and $f(b)$.

⁵ This figure is the average of service sector over GDP during the period 1965-2007. Although the share of merchandise in the GDP is appreciably lower than services and services become increasingly tradable, merchandise exports still having an overwhelming presence in trade. They meant nearly 80% in average of the total exports (1965-2007) in the high income countries.

⁶ England is an exception of this fact since it had a significant services sector at the end of nineteenth century.

into account, it seems sensible to relate the merchandise exports in the numerator to its corresponding term of added value in the denominator. Thus, dividing exports by the merchandise GDP in the second era of globalization, we avoid the distortion of the ratio provoked by the dramatic growth of the services sector that might play down the advance of the globalization process. Secondly, the change in the nature of the international trade, cited by Feenstra (1998), Hummels *et al.* (1998, 2001) and Grossman and Rossi-Hansberg (2006) among others, from horizontally to vertically specialised, also introduced a distortion, now in the numerator of our series, when we compare it to the first wave of globalization. Vertical specialization, which boom dates from 1970 [Feenstra (1998)], originates the multiple-border-crossing of goods which consequence is the multiple accounting introduced in the official statistics due to the back and forth aspect of trade. The numerator of our ratios not only reflect the domestic added-value exported, but also the foreign added-valued embodied in the domestic exports. This has led an overvaluation of the exports in the second era of globalization accompanied by a change in the stochastic properties of the trade series, as was proved in Sabaté *et al.* (2009), which makes comparisons difficult⁷. According the vertical specialization measure defined by Hummels *et al.* (2001), the amount of foreign added value embodied in the domestic exports represents more than 21% of the merchandise exports in the countries of our sample⁸. Thus, since we are removing the multiple accounting from the official exports we compare in both periods (first and second wave of globalization) the domestic added value exported by each country.

Analytically our unbiased ratio is constructed as follows:

⁷ However, in the first wave of globalization, the numerators registered mainly domestic added value since fragmentation was uneconomic.

⁸ According these authors vertical specialization growth accounts for one-third or more of overall export growth.

The first adjust that we carry out consist on removing the value of services sector from the GDP:

$$GDP_{MERCHANDISE_k} = GDP_k - GDP_{SERVICES_k}$$

In the second adjust, when we remove the foreign added value from the domestic exports, we use the measure of vertical specialization provided by Hummels et al. (2001). This measure of vertical specialization (*VS*) is defined for sector *i* as:

$$VS_i = \left(\frac{IIM}{\text{gross output}} \right) * X$$

where *IIM* denotes the value of Imported Intermediate Inputs in sector *i*, and *X* represents the merchandise exports. Thus, the *VS* trade for country *k* is the sum of *VS_i* across all sectors:

$$VS_k = \sum_i VS_{ki} = \sum_i \left(\frac{IIM_{ki}}{\text{gross output}_{ki}} \right) * X_k$$

From this information the unbiased ratio of exports over GDP for country *k* in defined as:

$$\frac{X \text{ ADJUSTED}}{GDP_k} = \frac{X_k - VS_k}{GDP_{MERCHANDISE_k}}$$

It represents de domestic added value exported by a particular country over its merchandise GDP.

III. Trade and Trends

Once we have a new unbiased ratio, we propose one step ahead rather than the simple comparison of the volume of merchandise exports over GDP between the two waves of globalization. We check for the growth intensity in the two eras of globalization by calculating a synthetic measure that we call globalization's intensity. This measure assesses the strength of growth trade (i.e. merchandise x/GDP).

Firstly, we look for the best trend model. Starting from the following expression:

$$Y_t = f(t) = \alpha + \beta_1 t + \beta_2 t^2 + \dots + \beta_p t^p + \varepsilon_t$$

where Y_t is the trade rate and t a deterministic trend. The optimal value of p is selected by using the information criterion of Akaike. Finally, the global intensity (GI) is calculated as follows:

$$GI = \frac{1}{T} \sum_{t=1}^T \frac{\partial f(t)}{\partial t} \varepsilon_t$$

This measure is the average of the derivatives of the trend function, evaluated in each point of the trend trade series and captures the growth intensity over time. Notice that GI adjusts a more suitable trend than those of the naive deterministic linear trend model because it considers periods of growth and periods of decrease in the trade rate series. Since our ratios are far from adjusting to a linear trend function, as it is demonstrated with the information criterion of Akaike, the GI is more accurate than a simple growth rate average because it evaluates the function's slope at every point by taking the instantaneous growth rate into account, instead of the average variation between two

points. Differences appear clearly if we observe the figures 1 and 2. The average growth rate, graphed in Figure 1, show how the average growth rate of the ratio in the second wave of globalization is lower than those of the first wave in Australia, Denmark, Japan and United Kingdom. We can conclude that the growth on this ratio in the second wave of globalization has not reached a spectacular push when compared to the first wave, even when the biases have been considered. Also the unbiased ratio is lower than those of the second wave in Canada, France, Netherlands and Spain. According to this growth rate average, the unbiased ratio has been only greater in Germany and United States.

Figure 1

Conversely, as we can observe in Figure 2 where we use the growth intensity, this appears greater in the second wave of globalization than in the first for all countries except Australia and United Kingdom. Moreover, if we compare the global intensity in the first era of globalization with that of the unbiased ratios it clearly describes that the intensity of trade in the second era of globalization has been unprecedented and considerable greater than that of the first era for all countries in our sample.

In short, while in the former figure the growth rate of the ratios exhibits heterogeneous behaviour in both globalizations, the *GI* clearly shows the most aggressive growth in the second wave of globalization, as we expect. We have also represented a linear adjustment of the series and although the most intense globalization is illustrated by the unbiased ratio, the information criterion displays a poorer adjustment compare to the polynomial adjustment chosen by *GI* measure⁹. Also the

⁹ Calculations are available under request.

explanatory power of the p-polynomial model is considerably bigger than the linear model approach and an exponential model.

Consequently, we could add a new aspect of international trade, apart from the three mentions in Krugman (1995) -the rise of intra-trade, the ability of producers to slice up the value chain and the emergence of *supertraders*- to characterize the second era of globalization. This aspect is the growth intensity of the ratio of exports over GDP.

Figure 2

IV. Conclusions

A usual proxy for globalization processes is the ratio of merchandise exports over GDP. To date, this has been the variable most frequently used when tracing evolution of international trade in the last 150 years, and comparing the so-called first (1870-1913) and second (1965-2007) waves of globalization. So far, it remains to be considered the change in the nature of international trade aggregate and the change in the composition of GDPs throughout the history, and how these changes might have distorted the comparison of the ratio between both processes.

In this paper, firstly, we deal with the multiple-counting problem associated with the vertical specialization, which overvalues the official statistics of international trade and, secondly, we allow for the different weight of the services sector in the two eras of globalization. Thus, we obtain a ratio of merchandise trade free from the biases for the second globalization whose evolution is susceptible of been compared to that of the first globalization. Moreover, the new measure of growth used in this paper, contrary to the results of calculating simple growth averages or lineal trend approaches of the volumes

of merchandise exports over GDP, shows a much greater intensity in the second wave of globalization than in the first, especially with the unbiased ratio.

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Figure 1.

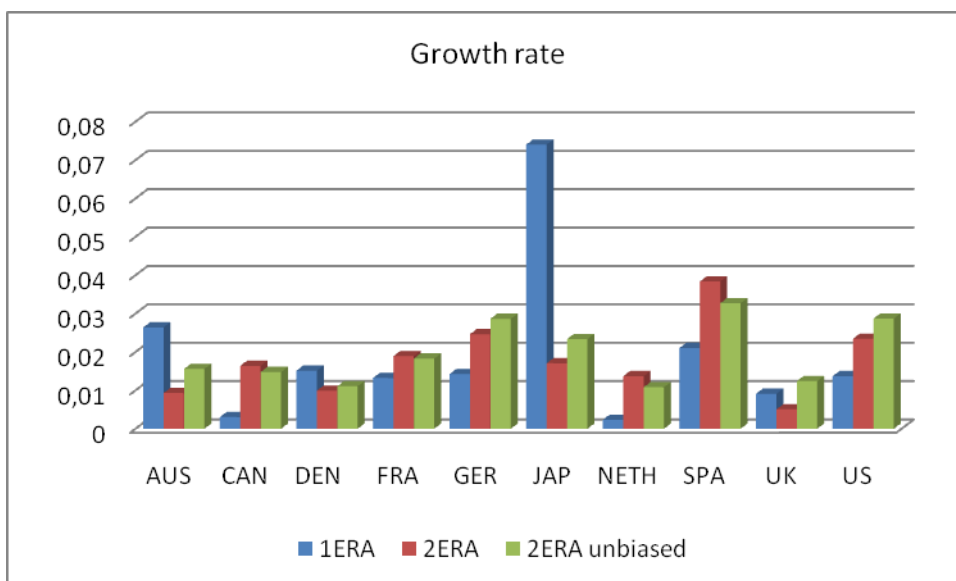


Figure 2.

