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Comment: Inferring trade costs from trade booms and trade busts

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A B S T R A C T

Jacks et al. (2011) offer a method to measure trade costs that relies exclusively on bilateral exports and GDP statistics. They argue that the reduction in trade costs was the main driving force of trade growth during the first globalization (1870–1913), whereas economic expansion was the main driving force during the second globalization (1950–2000). This potentially major result is driven by the use of an *ad hoc* aggregation method of bilateral trade costs at the country and at the global levels. What Jacks et al. (2011) capture is that some pairs of countries experienced faster trade growth in the first globalization than in the second globalization. More generally, we cast doubts on the possibility to reach conclusions on aggregate costs with a method that excludes *a priori* changes in non-trade costs determinants of openness rates and hence can only rephrase the information contained in them.

1. Introduction

Jacks and his coauthors offer in several papers an innovative method to measure trade costs.[2] Using the general equilibrium model of Anderson and Wincoop (2003), they calculate trade costs (defined as all barriers to trade, notably transportation and transaction costs) and their evolution during the first and second waves of globalization (1870–1913 and 1950–2000) as well as the interwar period (1921–1939) thanks to the impressive set of data they collected on trade flows and GDP between 27 countries.[3] They provide a decomposition of the growth of trade caused by the reduction in trade costs and economic expansion. They use their computations to underline a difference of nature between the two globalizations:

> "*Our results assign an overarching role for our trade cost measure in the nineteenth century and the interwar trade bust. In contrast, when explaining the post-World War II trade boom, we identify a more muted role for the trade cost measure.*" *(p. 196).*

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[2] The method is developed in Jacks et al. (2008), Jacks et al. (2010), Novy (2013) and Jacks et al. (2011). We will use this latter paper as a reference.

[3] Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, France, Germany, Greece, India, Indonesia, Italy, Japan, Mexico, the Netherlands, New Zealand, Norway, the Philippines, Portugal, Spain, Sri Lanka, Sweden, Switzerland, the United Kingdom, the United States, and Uruguay. The data contain 130 country pairs.

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This is potentially an important result that sheds light on the globalization processes. However, this result is actually driven by an *ad hoc* method of aggregation that captures structure effects. The authors use a weighted arithmetic average of their measure of trade costs between country pairs (dyads) to compute country-specific trade costs. This is equivalent to computing a power mean with exponent $1/(1-\sigma)$ of the values of dyadic trade flows ($\sigma > 1$ is the elasticity of substitution). In contrast, we show that an aggregation method theoretically rooted in Anderson and Wincoop (2003)'s model would use a simple arithmetic mean of the values of the dyadic trade flows. Because $1/(1-\sigma) < 0$, the importance of small dyadic trade flows in the computation of country-specific trade costs is too large in the authors' computations. This is not compensated by the weight they use (end-of-period GDP). The authors' conclusion on the difference between the two globalization periods comes from the fact that the dyads with the fastest growing trade in the first wave of globalization start with very small trade; this is not the case in the second wave of globalization. Indeed, we show that using our theory-based aggregation method, there is no difference in nature between the two globalizations.

More generally, we cast doubts on the possibility to distinguish between the impact of aggregate trade costs and the impact of aggregate economic expansion through an approach that relies solely on the study of trade flows and excludes *a priori* other possible causes for the evolution of openness rates, like the evolution of vertical specialization and changes in the elasticity of substitution between domestic and foreign goods. Once trade costs are assumed to be the only possible drivers of trade flows (relative to GDP), deducing trade costs from trade flows, and then using trade costs to explain trade flows is essentially a circular reasoning. Therefore, Jacks et al.'s approach cannot be an alternative to traditional investigations of impediments to trade at the global level, such as commodity price gaps. It is much more useful to study bilateral trade costs, even though its usefulness is limited by the amount of structure that must be imposed on the data to use it.

We first present Jacks et al.'s approach to the measure of trade costs, and insist on its relevance at the bilateral level to control for multilateral trade barriers in gravity regressions. We then highlight that the result on the difference of nature between the two globalizations is paradoxical since it cannot be deduced from a comparison of the evolution of openness ratios (Section 2). Section 3 shows that the conclusion is only driven by the authors' *ad hoc* aggregation method. We propose a microfounded way to aggregate trade costs and the puzzle fades away. Section 4 explores the reasons why Jacks et al.'s aggregation technique ends up providing different results for the two globalizations. We argue that what Jacks et al. misleadingly attribute to unequal trade costs decreases between the two globalizations is instead a difference in the distribution of trade growth over trading dyads.

2. Deducing trade costs from trade flows

Although it is consistent with many models of international trade, Jacks, Meissner and Novy's work is primarily based on the general equilibrium model framework of Anderson and Wincoop (2003). n countries, each represented by a maximizing consumer, exchange goods over one single period. In this Armington world, production is not modelized and each country is initially endowed with a differentiated representative good. Trade occurs because of consumers' taste for diversity.[4] The preferences of all countries are assumed to be identical and modelized by a Constant Elasticity of Substitution (CES) utility function. Anderson and Wincoop (2003) use this model to microfound gravity equations and solve Callum and John (1995)'s border puzzle by highlighting that bilateral trade does not depend on bilateral trade barriers *per se*, but bilateral trade barriers relative to trade barriers with all other trading partners. Anderson and Wincoop (2003) show that the equilibrium imposes the following relation:

$$x_{ij} = \frac{y_i y_j}{y^W}\left(\frac{t_{ij}}{P_i P_j}\right)^{1-\sigma} \tag{1}$$

where x_{ij} are real exports from i to j, y_i is real output of country i, y^W is the world real output, σ is the elasticity of substitution, P_i is the price index in country i and can be interpreted as multilateral trade barrier or resistance, and t_{ij} is the trade costs factor between i and j. Trade costs factors are assumed to be symmetric, *i.e.* $t_{ij}=t_{ji}$.

Jacks et al. first depart from Anderson and Wincoop (2003) by eliminating the multilateral resistance variable (P_iP_j) from the gravity equation. As in Novy (2013), they use the Head-Ries index (Head and Ries, 2001) to express bilateral trade barriers not relatively to multilateral trade barriers modelized by the price index, but relatively to domestic trade costs. In this case, trade flows are no longer compared to outputs, but to internal trade x_{ii}.[5] The equation above becomes:

$$\left(\frac{x_{ii}x_{jj}}{x_{ij}x_{ji}}\right)^{\frac{1}{2(\sigma-1)}} = \left(\frac{t_{ij}t_{ji}}{t_{ii}t_{jj}}\right)^{\frac{1}{2}} = 1 + \tau_{ij} \tag{2}$$

The last equality defines τ_{ij}, trade costs from country i to j and j to i *relative to intra-national trade costs in countries i and j* (no assumption of symmetry of bilateral trade costs is imposed). It is the trade cost measure used by the authors.

When departing in this way from Anderson and Wincoop (2003)'s multilateral resistances, the arbitrage condition Jacks et al. base their computation on is an equality between a Marginal Rate of Substitution (MRS) and a price ratio for a CES utility function—

[4] In the working paper version of Jacks et al. (2010), the authors provide a version of the model with production. The key equation is identical to the one of the model without production.

[5] Due to data limitations, the authors use the relation $x_{ii} = GDP_i - EXPORTS_i$ to get internal trade. We follow them. Concerns about the fact that GDP is measured in value-added and exportations as gross value are addressed in appendix B of Jacks et al. (2011).