Beyond the iceberg hypothesis : Opening the black box of transport costs

Trade costs remain central in international economic analysis. Defined as the costs associated with the exchange of goods across national borders, they are a major obstacle to international economic integration. Trade costs are usually split into transaction costs, policy costs, time costs, and transport costs. Many believe that overall trade costs have dramatically decreased with technological advance in transportation, infrastructure development and new communication technologies (Levinson, 2006, Lafourcade and Thisse, 2011). However Hummels (2007) shows transport costs *per se* remain large and deserve attention.

Following Samuelson (1954), standard models of international trade have usually relied on modelling trade costs as an *ad valorem* tax equivalent. However, many common empirical facts support the existence of additive costs. As documented by Irarrazabal et al. (2015), pricing structure in shipping, tariffs, distribution costs often exhibit (at least partly) an additive component. This must be taken into account to understand several key features of international trade, including the welfare effects of trade liberalization (Sorensen, 2014; Irarrazabal et al., 2015).

This paper provides results on the size and composition of transport costs over time, explicitly distinguishing between its multiplicative and additive components. It uses an updated version of the detailed US customs, sector-level data from the US Imports of Merchandise used by Hummels (2007). Using sectorial data over 1974-2013, it provides a fairly simple framework for assessing both multiplicative and additive parts of transportation costs, directly inferred from price data. To our best knowledge, this paper is the first to provide such an extensive quantitative assessment of the sizes of multiplicative and additive components of transport costs.

We contribute to the literature in three main dimensions. First, we provide an empirical assessment of what standard international trade models lose by skipping additive transport costs, through standard measures of “goodness-of-fit”. Quantitatively, the omission of the additive term leads to overestimate the iceberg component by roughly a factor 2. On average over the whole period, biased estimate for iceberg is 5% for Air and 6% for Vessel, while unbiased estimate is respectively 2.5% and 3.2%.

Second, the time dimension of our data allows us to characterize the evolution of transport costs. We show that multiplicative and additive components of transport cost do not evolve similarly over time and across transport modes. For air, multiplicative costs decreased by 12%, and additive costs, by 40% between 1974-1979 and 2008-2013.

Third, we relate the previous measures to determinants of transport costs (like e. g., distance, insurance costs…), in order to understand how they impact differently the multiplicative and additive costs.