

Measuring globalization using weighted network indexes

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Abstract

A defining feature of globalization is that individuals, organizations, countries, or regions are increasingly integrated into worldwide networks of exchange. International trade is considered particularly important in determining the pace of globalization. However, most commonly used de facto measurements of international trade globalization, such as trade intensity index (exports plus imports divided by GDP) focus exclusively on the volume or intensity of trade flows, completely ignoring the network aspect of the exchange.

Recently, there is an emerging literature using network analysis to quantify the system of international trade and financial capital flows. Specifically, weighted network measurements have been applied to study globalization, economic integration and contagion. However, these measurements are largely a replica from those used in other disciplines, usually sociology, which has a long history of social network analysis. Due to the fundamental differences between economic and social networks, the adaption may not be appropriate. In this paper, we address this deficiency using the axiomatic approach. A total of seven axioms are established for the construction of a globalization index for economic networks. No existing network indexes are found to satisfy all these axioms. As a consequence, a new index to that effect has been developed. The new index is applied to international trade, financial capital, and human capital flow data in order to quantify these three dimensions of globalization. Specifically, we measure the extent to which individual countries are integrated into various economic networks (i.e. the degree of globalization) and how their degrees of integration change over time (i.e. the pace of globalization).

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