China and the international fragmentation of automotive:

A network analysis

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ABSTRACT

Purpose

The paper addresses the question of to what extent has the rise of new supplying countries changed the structure of the international organisation of auto-production, by looking particularly at the role of China.

Rationale

Over the last decade, the international organization of automotive production has undergone major changes, with firms moving across borders with the aim to find more efficient organizational forms to serve final markets and with production processes split into different phases carried out in different countries. Geographic fragmentation of production (outsourcing and delocalization) has also seen emerging economies' (e.g. China, India, Brazil, etc.) increased participation to international division of labor. Fragmentation results in cross border trade flows of parts and components ('network trade' or 'triangular trade'), and this is why it has been claimed that trade data is a good proxy for production data, thus revealing who does what in the international division of labour.

Design/Methodology/Approach

We apply network analysis to trade data. Following the empirical literature on production fragmentation, pioneered by Yeats (2001) and pursued in a number of recent studies we use bilateral trade statistics on components trade from the UN trade data reporting system (UNComtrade database). We select disaggregated trade data (at 5 digits level, representing detailed product categories) for each of the components used in production, using the Standard International Trade Classification (SITC, Rev. 3). Network analysis is applied to highly disaggregated international (components) trade data for the 1998 and the 2008. We use network visualizations tools to immediately grasp the changes occurred in the components

trade networks over time. In addition, we calculate some network measures (e.g. reciprocity, centralization, out-degree strength and centrality, core-periphery and regionalisation) to describe and contrast the characteristics of the trade networks. Finally, we analyse the position and role of China by performing brokerage analysis and analysis of structural equivalence (Wassermann and Faust, 1994). All this is done using UCINET (Borgatti & al., 2002).

Findings

Our analysis has shown that China and a number of other emerging countries have not simply increased their weight as suppliers to the world's leading auto manufacturers, but have caused a switch in the international division of labour in the sector. In fact, the world's leading producers now act as the core of a more hierarchical production structure than a decade ago, that is they source from a number of individual suppliers – mainly within their regions – but these are disconnected from each other. Among the two contrasting tendencies towards globalisation or regionalisation of production, the latter seems to be still dominating in the auto industry. This suggests that the rise of China as major producer, given the possibility of low production costs and economies of scale, has not overcome the importance of transportation and diversification costs to final markets.

Originality/value

From a theoretical perspective, this paper contributes to the extant literature by disentangling the globalisation vs. regionalisation debate. From a methodological perspective the paper shows that the use of network analysis allows overcoming some limitations of traditional analytical techniques. Also, it improves on previous studies that apply network analysis to trade data by using highly disaggregated, directed and valued data.

References

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