What are China's real gains within global value chains? Measuring domestic value added in China's exports of manufactures☆

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ABSTRACT

This paper aims to investigate China's gains of participating in global value chains (GVCs) in terms of GDP in exports (DVA - domestic value added) and the factors affecting China's gains. The paper decomposes the gross exports of China so as to get the components that make up total GDP in the exports of the country, namely the value-added exports and DVA that are returned from abroad. Then the two components are measured to obtain the scale of GDP in China's exports both on country and sector level. The results show that, firstly, both value-added exports and the GDP in China's exports are less than the traditional gross trade statistics, indicating that there is a gap of real trade gains under GVCs. Secondly, comparing whether the proportion of DVA in total exports, the proportion of DVA in exports of manufactures or the proportion of RDV in total DVA, the gaps between China and the developed countries such as the United States, Germany and Japan do exist. Especially, considering the RDV of China, the proportion is significantly lower than that of major developed countries such as the United States and Germany, indicating that China lags far behind developed countries in the capabilities of supplying high value-added intermediate goods. Lastly, the empirical results suggest that DVA in China's exports has progressively increased in response to the productivity enhancement; research and development (R & D) inputs and capital formation, and the synergies between R & D and vertical specialization affect China's DVA growth in exports positively.

1. Introduction

With the deepening division of labor in the global value chains (GVCs) in the past decades, the division of labor across countries has gradually shifted from inter-industry division and intra-industry division to intra-product division and "task" division. International trade of finished products has also gradually fragmented into "task" trade or network trade, which makes the trade-driven economic development increasingly complex. As revealed by a study of existing literature, the international economists have come to a consensus that the traditional trade statistics can neither accurately depict the essential characteristics of trade patterns, nor objectively measure the real trade performance of different countries within global value chains (Banga, 2014; Suder et al., 2014). The traditional trade statistics measuring the gross exports attribute all the value added of exported products to the last link and country within the value chain, hence result in double counting and statistical biases (Powers, 2012; Jara & Escaith, 2012), i.e. "what you see is not what you get" (Maurer & Degain, 2010). Therefore, the trade in value-added, which can better measure and

reflect the new characteristics of global trade, is considered as a better way to avoid "double counting" in the statistics of gross trade with the division of labor under GVCs (Powers, 2012).

In the past 20 years, China has increasingly participated in GVCs and has become an important manufacturing center and export platform in the global production networks of many multinationals. Driven by the boosting role of GVCs in network trade, China has gained its reputation as a "world factory" to become the largest exporter in the world[1] with the labels of "Made in China" are spread all over global markets. This has even triggered a wave of "China threat theory". However, just as Banga (2014) pointed out, "linking into global value chains is not enough for taking gains." How should we objectively depict the real landscape of China's exports and thereby China's real gains within GVCs? What are China's domestic value added (GDP) in exports determined by? These are precisely the questions this paper seeks to answer.

We will seek to depict the real landscape of China's exports and China's real gains within GVCs in terms of total domestic value added created by the exports. We then use an empirical model to verify the factors affecting China's domestic value-added growth in exports.

2. Literature review

In recent years, the studies of trade gains within GVCs represent a new trend in the research of international trade theories and policies. Those by scholars at home and abroad are generally divided into the following three groups: a) studies on value-added trade statistics; b) studies about decomposition or measurement of value-added trade; and c) studies related to the factors affecting the value-added trade.

One strand of studies is about value-added trade statistics issues. Scholars believe that with the deepening of division of labor in GVCs, the traditional system of trade statistics can no longer accurately reflect the essential characteristics of today's global trade, and there is urgent for a new system of trade statistics (Grossman & Rossi-Hansberg, 2008). The traditional trade statistics, even after repeated revisions and additions, still cannot accurately reflect the real trade situation of intermediate inputs (Daudin, Rifflart, & Schweisguth, 2011). Therefore, with the expansion of trade under GVCs, it is necessary to build a value-added trade statistics system (Mattoo, Wang, & Wei, 2013). The value-added trade statistics system is not found as substitution of traditional gross trade statistics but a useful supplement and innovation for the latter (Sheng & Wei, 2013), and it has many implications on global governance and trade policy making though it is still too aggregative to map global value chains (Jara & Escaith, 2012; Escaith, 2014).

Another strand of studies is about decomposition or measurement of value-added trade. The representative studies on the decomposition of value-added trade are mainly as follows: Johnson (2011) decomposed the value-added exports of a country into the value added of a country that is directly absorbed by another country (exports of final produces and intermediate products) and the value added that is indirectly absorbed by a third country (exports of intermediate products). Based on global Inter-Country Input-Output Tables, Koopman, Wang, & Wei (2008), Koopman, Powers, Wang, & Wei (2011), and Koopman, Wang, & Wei (2014) decomposed the domestic content of a country's exports into direct value-added, indirect value-added (the value-added generated by the intermediate products in a country's exports that are processed abroad before flowing back into the country), and foreign value-added, and built a unified counting framework to measure the value-added trade in GVCs. Daudin et al. (2011) did a similar decomposition by taking into account the domestic value added of re-imported products.

The studies on measurement of value-added trade can be classified into macro-measurement and micro-measurement. Macro-measurement studies are as follows: Johnson and Noguera (Johnson, 2011; Johnson & Noguera, 2012) used international input-output data to obtain the ratio of value-added exports to gross exports (the "VAX" ratio) of different countries and measure and decompose their value added from different sources; the domestic content of China's exports, and China's exports to the United States were calculated by Xing (2014) and Tong & Zhang (2013) respectively. Other related studies include that by Xu & Fang (2013), and Zhang (2013). Examples of micro-measurement studies are as follows: Kee, Hiau, & Tang (2016) used the customs transaction-level data merged with manufacturing firm survey data to measure the ratio of domestic value added in China's gross exports. Zhang, Chen, & Liu (2013), Upward, Wang, & Zheng (2013), Zheng & Yu (2014) used some firm level data to calculate the DVA of China's exports.

The third strand of studies is about factors affecting the growth of value-added trade. It is concluded by Johnson & Noguera (2012) that more manufactured products in a country's export goods will reduce the value-added in its exports, while more service products will raise the value added in its exports. Kee et al. (2016) found that average domestic value added rate (DVAR) of China's exports rose because of the import substitution of raw materials. Couture, Tang, & Yan (2015) and Zhang et al. (2013) found that the inflow of FDI is important factor that leads to the rise of domestic value added ratio of exports by foreign-funded enterprises.

On the whole, the gains within GVCs in terms of total domestic value added (GDP) in exports are a relatively new field in the international economic community. In particular, the studies in China started later and related studies are rare whether on the measurement of the gains within GVCs or on its influencing factors. The contribution of this paper lies in the two aspects:

Firstly, the paper focuses on China - a large economy's gains within GVCs in terms of total domestic value-added (GDP in exports). Different from the studies on the micro-measurement of China's value-added trade based on the enterprise production data, this paper focuses on estimating total domestic value-added (GDP) in exports of China from a macro perspective by using the inter-country input-output data from the World Input-Output Database (WIOD). And the inter-country input-output tables of the WIOD database well captures the sequential nature of international production within GVCs. Though we use the similar methodology of Koopman et al. (2014) to decompose the gross exports of China so as to get the components that make up GDP in the exports, we mainly focuses on calculating total domestic value-added

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[1] China has already been the world's largest exporter as early as in 2009, when its exports amounted to USD 1.2 trillion. Since 2013, China has not just remained the largest exporter but registered exports of USD 2.2 trillion, outperforming the United States by 40% and surpassing the combined exports of Germany and Japan by USD 40 billion. See Xu Qiyuan, Is China really the world's biggest exporter? http://www.thepaper.cn/newsDetail_forward_1286289, December 14, 2014.