



Contents lists available at ScienceDirect

China Economic Review

journal homepage: www.elsevier.com/locate/chieco

Tracing value added in gross exports of China: Comparison with the USA, Japan, Korea, and India based on generalized LMDI

Yuhuan Zhao^{a,b}, Ya Liu^{a,*}, Xiaoyong Qiao^c, Song Wang^a, Zhonghua Zhang^a, Yongfeng Zhang^a, Hao Li^a

^a School of Management and Economics, Beijing Institute of Technology, Beijing 100081, China

^b Sustainable Development Research Institute for Economy and Society of Beijing, Beijing 100081, China

^c College of Economics and Management, Beijing University of Technology, Beijing 100124, China

ARTICLE INFO

JEL classification:

F140

F150

F620

F630

O11

O5

Keywords:

Value added

Exports

Generalized LMDI

China

ABSTRACT

This study first traces value added in gross exports of China during 2000–2014 to four components, namely domestic value added absorbed abroad (DVA), domestic value added return home (RDV), foreign value added (FVA), and pure double-counted terms (PDC), then compares these four components in China's exports with those in exports of the USA, Japan, Korea, and India. Second, this paper proposes a generalized logarithmic mean Divisia index (GLMDI) method and combines additive and multiplicative decomposition to decompose DVA gaps between China and the other four countries into value added coefficient effect, input-output structure effect, domestic scale effect and foreign scale effect. The aggregate value added coefficient effect is then attributed to sectoral level. Results show that DVA always occupied the largest share in the gross exports of China, which ranged from 74.60–82.84% during 2000–2014. Before 2011, DVA share of China's exports was generally the second smallest among five countries; since 2011, DVA share of China's exports increased, and China had the largest DVA share in 2014 (81.39%). Sectors having a large FVA share in China's exports usually had a large DVA share, such as “Mining” (MIN), “Computers, Electronic and Optical” (CEO), and “Basic Metals” (BAS). Additive and multiplicative decomposition analyses indicate that value added coefficients had a negative and increased effect on DVA gaps between China and the other four countries. Attribution analysis revealed that CEO sector had the largest negative value added coefficient effect in comparison between China and the USA, Japan, and Korea and its effect increased in comparison between China and the other four countries. Policy implications derived are finally discussed.

1. Introduction

Fragmentation of production across countries has been a dominant feature of the world economy (Antras, Chor, Fally, & Hillberry, 2012). At each production stage, producers purchase intermediate inputs and add values, which are exported and then subsequently included in the cost of the next stage of production. Thus, gross exports of a country usually encompass value added from various countries, making gross exports less reliable to gauge economic benefits obtained by a particular country through exports (Koopman, Wang, & Wei, 2014). Hence, value added in trade has attracted the attention of scholars.

Studies on value added in trade are first motivated by case studies of high-tech products such as iPod (Linden, Kraemer, & Dedrick, 2009; Varian, 2007), iPhone (Dedrick, Kraemer, & Linden, 2009; Xing & Detert, 2010), and laptop PCs (Xing, 2014). These

* Corresponding author.

E-mail address: lybjlggy@bit.edu.cn (Y. Liu).

<https://doi.org/10.1016/j.chieco.2017.12.010>

Received 12 February 2017; Received in revised form 30 November 2017; Accepted 18 December 2017

1043-951X/ © 2017 Elsevier Inc. All rights reserved.

case studies enhance our intuitive understanding of the value added embodied in exports of particular products. However, such case study approaches face some limitations as the particular components of a product are themselves made of other (maybe imported) components, which makes it difficult to trace a product back to the ultimate producers (Stehrer, 2012).

Later on, more systematic studies based on input-output analysis have been conducted. Some studies investigated the foreign value added in countries' exports (De Backer & Miroudot, 2013; Hummels, Ishii, & Yi, 2001), in which indicators such as vertical specialization (VS) is adopted. Some studies focused on the domestic value added in countries' exports, and various measurements such as VS1 (Hummels et al., 2001), VS1* (Daudin, Riffart, & Schweisguth, 2011),¹ and the ratio of value added to gross exports (VAX ratio) (Johnson & Noguera, 2012) are proposed. Koopman et al. (2014) provided a unified and transparent framework that completely decomposes a country's gross exports into domestic and foreign value added terms and additional double-counted terms. This framework integrates all previous measures (e.g. VS, VS1, VS1*, and VAX ratio) of value added in trade.

China has been the largest exporter in the world since 2012, and its gross exports reached 2560 billion US\$ in 2015 (WTO, 2017). However, China specializes in assembly function within the production chains of products, and foreign content occupies a relatively large share of China's gross exports (De Backer & Yamano, 2011; Koopman, Wang, & Wei, 2012). Value added has challenged conventional wisdom on the competitiveness of China (Xing & Detert, 2010). Hence, it is of great significance to explore China's gross exports from the perspective of global value chains (GVCs) and disentangle the sources of value added in China's gross exports. By doing so, we can reveal why gross exports is different from value added trade, and clarify the actual benefits that China obtained from its exports. Besides, comparing China with other countries and exploring the driving factors of gaps between China and other countries (for example, the driving factors of gaps in domestic value added in exports) can reveal why China are different from other countries, and provide implications about how to increase the domestic economic benefits of China's exports.

Existing studies have investigated exports of China from the perspective of value added (Dietzenbacher, Pei, & Yang, 2012; Francois, Manchin, & Tomberger, 2015; Jiang & Liu, 2015; Xia et al., 2015). However, most studies only focus on the domestic value added in exports of China, and only a few studies trace both the domestic and foreign value added in China's gross exports (Foster-McGregor & Stehrer, 2013; Koopman et al., 2014; Liou, Lin, Chang, & Hsu, 2016). Hence, the first objective of this paper is to trace China's gross exports to domestic value added (both absorbed abroad and domestically), foreign value added, and double-counted terms.

Besides, although existing studies have compared value added in exports of China with those in exports of other countries (Foster-McGregor & Stehrer, 2013; Jiang & Liu, 2015; Koopman et al., 2014), these studies pay little attention to factors that drive different performances of countries. Hence, the second objective of this paper is to investigate the driving factors of gaps between China and other countries in value added in trade. Further, in such an investigation, decomposition analysis, which has been widely used in energy and environmental issues (energy consumption and emission), is applied to economic issues (value added).

Decomposition analysis has been widely used to identify driving factors of changes of an indicator over time (Su, Ang, & Low, 2013; Zhao, Wang, Yang, Zhang, & Liu, 2016; Zhao, Wang, Zhang, Liu, & Ahmad, 2016). Such studies are temporal decomposition analysis. Besides temporal decomposition analysis, there is another decomposition analysis named spatial decomposition analysis, which investigates variations/gaps of an indicator between countries or regions. Spatial decomposition analysis compares the performances of different countries or regions, and is conducive to policy making (Su & Ang, 2016). Because this paper focuses on gaps between China and other countries in value added in trade, spatial decomposition analysis is conducted.

Both additive and multiplicative decomposition forms can be used in decomposition analysis (Su & Ang, 2015). Additive decomposition analysis decomposes the absolute (or arithmetic) change of an indicator (Ang, 2015), thus specifically reflecting how much an indicator increases or decreases. However, additive decomposition analysis can't reflect how important the change of an indicator is, since changes of same size usually indicate different change rates. Multiplicative decomposition analysis decomposes the relative (or ratio) change of an indicator, thus can reveal the significance of an indicator's change, but it can't show the specific value of an indicator's change. Additive decomposition analysis and multiplicative decomposition analysis conduct the decomposition analysis from different perspectives (absolute and relative perspective respectively), the combination of these two decomposition forms can provide a more comprehensive understanding of the changes of an indicator. However, most existing studies only adopt one decomposition form to investigate the changes of an indicator (Su et al., 2013; Su & Ang, 2015; Zhao, Wang, Zhang, et al., 2016). Hence, the third objective of this paper is to combine additive and multiplicative decompositions, and analyze the changes of an indicator from the perspective of both absolute and relative terms. This will also complements existing studies on structural decomposition analysis (SDA), as the multiplicative decomposition form is used in only a few SDA studies because of its complexity in method development (Su & Ang, 2015).

In all existing decomposition studies, to our best knowledge, the decomposed indicator usually consists of only one term, which is the summation of subcategories at the sectoral level. However, when the decomposed indicator is a sum of several terms, existing multiplicative decomposition methods cannot be directly adopted. Hence, the fourth objective of this paper is to propose a generalized LMDI (GLMDI) method, which facilitates the multiplicative decomposition of an indicator that is the sum of several terms.

Using data from WIOD 2016 Release, this paper traces value added in gross exports of China during 2000–2014 to domestic value added absorbed abroad (DVA), domestic value added return home (RDV), foreign value added (FVA), and pure double-counted terms (PDC), and compares these components in China's exports with those in exports of the USA, Japan, Korea, and India. The USA is the largest developed country in the world, and as the second largest exporter worldwide, it exported 2195 billion US\$ in 2015. Japan

¹ VS1 refers to a country's exports that are embodied in other countries' export; VS1* refers to a country's exports embodied in other countries' exports shipped back to home.

Download English Version:

<https://daneshyari.com/en/article/7342291>

Download Persian Version:

<https://daneshyari.com/article/7342291>

[Daneshyari.com](https://daneshyari.com)