



ELSEVIER

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: [www.journals.elsevier.com/economic-modelling](http://www.journals.elsevier.com/economic-modelling)

## Productivity, financial constraints, and firms' global value chain participation: Evidence from China<sup>☆</sup>

Yue Lu<sup>a</sup>, Huimin Shi<sup>b,\*</sup>, Wei Luo<sup>c</sup>, Bin Liu<sup>a</sup>

<sup>a</sup> University of International Business and Economics, China

<sup>b</sup> Renmin University of China, China

<sup>c</sup> Nankai University, China

### ARTICLE INFO

JEL:  
F14  
F15  
L25  
G31

#### Keywords:

Global value chain  
Productivity  
Financial constraints

### ABSTRACT

We calculate the foreign value-added ratio (FVAR) to measure the global value chain (GVC) participation of Chinese exporting firms from 2000 to 2006. Motivated by the heterogeneous firm model of trade, we empirically explore the effects of firm productivity and financial constraints on firms' GVC participation. We find that (1) productivity increases and financial constraints reduce FVAR; (2) productivity affects FVAR for both first-time and continuous exporters, while financial constraints only significantly affect first-time exporters; and (3) financial constraints dampen the positive effect of productivity on FVAR. Our findings thus suggest that productivity and financial constraints play important roles in determining firms' GVC participation.

### 1. Introduction

In this paper, we investigate the relationship between Chinese firms' characteristics and their participation in the global value chain (GVC). Motivated by the heterogeneous firm model of trade, we empirically focus on two firm-level features, productivity and financial constraints, exploring their effects on the ratio of foreign value-added to total exports (foreign value-added ratio, FVAR) for China.

As globalization continues, traditional trade statistics, such as the gross value of exports and imports, are increasingly inadequate. Due to the development of new production and trade modes, such as trade in tasks (Grossman and Rossi-Hansberg, 2009) and outsourcing (Gereffi, 1999; Humphrey and Schmitz, 2002), it is difficult to find a product that is entirely made in a single country. Under this scenario, a single firm provides parts or takes responsibility for only a portion of a given product in the GVC (Escaith and Inomata, 2011). Thus, the export value includes both foreign and domestic value-added and traditional trade statistics, which focus on gross value terms, do not give a clear picture of the actual contributions of one country or one firm.

These concerns are especially important for China, which is at the center of the debate on international trade patterns and policies. From

1990 to 2012, China experienced a massive expansion in exports, with an annual growth rate of 16.2%, and it is currently the world's largest exporting country. This has led to political accusations from trading partners, who appeal for trade protection against China. However, these judgments are based on gross export values and are misleading. China participates intensively in the GVC, and its export value includes much foreign value-added. Therefore, careful calculations of actual value-added terms could help to resolve conflicts about international trade positions (Johnson and Noguera, 2012).

Accurate separation of foreign and domestic value-added components embodied in the gross export value is challenging and requires consideration of many factors. For example, imported foreign intermediate goods may not all be used for the production of export goods, and domestic intermediate goods may contain foreign value-added components. Empirical efforts have been made to avoid double-accounting and to obtain accurate calculations. Our paper's first contribution is to provide detailed, comprehensive firm-level measures of FVAR for Chinese firms. We follow the pioneering work of Upward et al. (2013), Zhang et al. (2013), Koopman et al. (2014), and Kee and Tang (2016) to construct four measures of FVAR, which provide a good starting point for the analysis.

<sup>☆</sup> We are very grateful to the editor, Sushanta Mallick, and two anonymous referees for their constructive comments and valuable suggestions, which significantly improved this paper.

\* Corresponding author.

E-mail address: [huiminshi@ruc.edu.cn](mailto:huiminshi@ruc.edu.cn) (H. Shi).

<https://doi.org/10.1016/j.econmod.2018.03.015>

Received 15 May 2017; Received in revised form 24 February 2018; Accepted 17 March 2018

Available online xxx

0264-9993/© 2018 Elsevier B.V. All rights reserved.

Then, we investigate firm-level features that could affect participation in GVC, represented by FVAR, in an effort to provide empirical evidence for future theoretical studies. Other papers have focused on the foreign value-added ratio or on its complement, the domestic value-added ratio. For example, Kee and Tang (2016) explored the effects of FDI and input tariffs on domestic value-added ratios for Chinese firms. However, to the best of our knowledge, the existing literature has not connected firm-level variation in FVAR with firm heterogeneity. We believe that studying this relationship would improve the understanding of participation in the GVC. As the dependent variable, FVAR—the ratio of foreign value-added to export value—is closely related to firm-level exports and imports (through imported intermediate goods). We thus choose the explanatory variables of FVAR from firm-level features emphasized by the heterogeneous firm model of trade. The two key factors on which we focus are firm-level productivity and financial constraints. These variables have been intensively studied in the literature on firm export and import (e.g., Melitz, 2003; Bernard et al., 2003; Manova, 2013; Chaney, 2016).

Although GVC participation is related to export and import activity, they are different concepts in principle. Exporting and importing are firms' decision to participate in the global market, which does not emphasize its value-added allocation in production chains, while GVC focuses directly on the actual value-added allocation behind transactions. Moreover, examining exports and imports separately may not lead to a clear representation of firms' overall involvement in global production. This is especially true for China. According to Feng et al. (2016), many of China's imports are not consumed domestically or used for the production of domestic goods. Instead, they serve as intermediate goods used for exports. In other words, the main purpose of the imports (so-called “export-induced imports”) is to generate exports. China's high rate of export growth relies on the import of foreign intermediate goods. However, GVC, represented by FVAR in our analysis, embodies both imports and exports within a unified framework, rather than examining them separately.

The data used in this paper are merged from a detailed Chinese transaction-level customs dataset and a Chinese industrial firm-level survey dataset from 2000 to 2006, which represent the most disaggregated data for Chinese trade and firm-level research. For the key explanatory variables, we construct the measure of productivity using the method of Levinsohn and Petrin (2003) and the measure of financial constraints used by Cleary (1999) and Musso and Schiavo (2008). With these carefully constructed variables, we find that (1) firms' productivity is positively related to GVC participation while firms' financial constraints are negatively related to GVC participation for Chinese firms. When we separate our samples into two groups, continuous exporters and first-time exporters, we find that (2) productivity affects firms' GVC participation in both groups, but financial constraints only significantly affect first-time exporters. Moreover, we find that (3) productive firms are unlikely to increase their GVC participation if they experience financial constraints. Thus, our paper's final contribution is to establish firm-level empirical evidence for theoretical modeling of GVC. Our findings suggest that productivity and financial constraints play important roles in determining firms' GVC participation.

The rest of the paper is organized as follows. Section 2 outlines the methods used to calculate FVAR, which is the dependent variable in the regression analysis. Section 3 describes the key explanatory variables (firm productivity and financial constraints) and other control variables. Section 4 presents our main results, Section 5 provides robustness checks, and Section 6 provides conclusions.

## 2. Domestic and foreign value-added at the firm level

The challenge for our investigation is to divide a firm's export value into its domestic and foreign value-added components. Upward et al. (2013), Zhang et al. (2013), Koopman et al. (2014), and Kee and Tang (2016) used the micro method to calculate firm-level domestic and

foreign value-added. We follow their methods to construct these measures as the basis for our analysis.

Our two primary datasets are Chinese transaction-level customs data and industrial manufacturing firm-level survey data from 2000 to 2006. These datasets cannot readily be merged since they have distinct firm-coding systems. First, we clean the datasets as follows: (1) we delete firms with missing values for total industrial output and net fixed-assets value, (2) we delete firms whose balance sheets do not follow basic accounting rules, and (3) we delete firms whose scales do not satisfy the standards of the industrial firm survey dataset. These standards include a minimum employee number of 30 and a minimum total revenue above 0.5 million RMB. Second, we use the original Chinese firm names and the year of opening to merge the two datasets.<sup>1</sup> Third, firms that were not merged in the second step are merged using the zip code plus the last seven digits of the telephone number.<sup>2</sup> This process resulted in 150,425 merged firms, similar to the results of Upward et al. (2013).<sup>3</sup>

For the first method, we follow the baseline method of Upward et al. (2013), the main assumption of which is that all imports are used as intermediate inputs. Their method takes the distinction between processing trade and ordinary trade into consideration, as proposed by Hummels et al. (2001). Specifically, all imports for processing firms are used as intermediate inputs, whereas for ordinary trade, the imported goods would be applied proportionally to domestic sales and normal exports. The foreign value-added is calculated according to Equation (1):

$$FVAR = \frac{V_F}{X} = \frac{M^p + M^o[X^o/(D + X^o)]}{X} \quad (1)$$

In Equation (1), FVAR stands for the ratio of foreign value-added to total exports.  $M$ ,  $X$ , and  $D$  refer to firms' imported materials, exports, and domestic sales, respectively. The superscripts  $p$  and  $o$  stand for processing and ordinary trade, respectively. Values for  $M$  and  $X$  are taken directly from the customs data, and  $D$  is calculated from the difference between total sales and exports. The total sales are from the industrial firm-level survey data.<sup>4</sup> Because Equation (1) is derived with two assumptions in the numerator, the calculated FVAR could be greater than 1, which by definition is not allowed. Therefore, we follow Upward et al. (2013) to set a firm's FVAR to 1 if its calculated FVAR is greater than 1.<sup>5</sup>

Method 1 assumes that all imported goods could be used as intermediates for exports. This assumption is plausible for China's processing trade. However, it is unrealistic for ordinary trade, in which imports could also be used for domestic consumption. To address this issue, Upward et al. (2013) proposed Method 2 for FVAR, based on Method 1. They changed the HS code to the Broad Economic Categories (BEC) code to identify which imported products are used as intermediate inputs ( $M$ ) and which are used as consumption goods ( $C$ ) and capital goods ( $K$ ).<sup>6</sup> The foreign value-added ratio can then be calculated using Equation (2):

<sup>1</sup> Firm names may change across years. Thus, we used the combination of firm name and year of incorporation information to ensure a reasonable merging process.

<sup>2</sup> Different cities have telephone numbers with different numbers of digits. Most cities have at least seven numbers.

<sup>3</sup> The merged firm number in Upward et al. (2013) is 11,965. This number is smaller than ours because they deleted some industries from their sample.

<sup>4</sup> Since exports and total sales are obtained from customs data and industrial firm-level survey data, respectively, we find 12 observations with export values larger than total sales, which is not possible according to basic accounting rules. Therefore, we drop these observations from the analysis.

<sup>5</sup> There are 33,488 observations that satisfy this condition, which represents 16.5% of the matched sample. In the following regression analysis, we have kept all of these observations. However, the results of dropping them are very similar.

<sup>6</sup> The United Nations provides the concordance between BEC and HS at <http://unstats.un.org/unsd/cr/registry/regdnd.asp?Lg=1>.

Download English Version:

<https://daneshyari.com/en/article/7346770>

Download Persian Version:

<https://daneshyari.com/article/7346770>

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