Contents lists available at ScienceDirect

China Economic Review

Extensive margin, quantity and price in China's export growth ☆

Shi BINGZHAN *

School of Economics, Tianjin University of Finance and Economics, Tianjin 300222, PR China

A B S T R A C T

We developed a methodology to decompose export growth into three margins: extensive margin, price and quantity. We then decomposed data on China's export trade with 140 partners in 2001 and 2007 into the three margins. We arrive at the following conclusions: China's export growth is mainly driven by quantity growth, which accounts for about 70% of overall export growth. This conclusion is robust for different partners, different industries and different techniques. To convert export quantity-driven growth into extensively margin- and quality-driven growth is a major challenge for the Chinese government and China's enterprises in the long term.

© 2011 Elsevier Inc. All rights reserved.

1. Introduction

Since 2001, China has experienced a remarkable export growth. In 2009, China overtook Germany to occupy first place in the world export-market rankings. This paper poses an important question regarding the nature of China's export growth. Is China's export growth mainly driven by rapid price growth, quantity growth or extensive margin growth? These are the three margins of China's export expansion: price, quantity and extensive margin.

For example, take a simple numerical calculation to explain the three margins of export growth. Suppose that China exports one kilogram of a product to one partner, priced at one dollar per kilogram. This represents one dollar of exports. Over time, exports grow, and the total sum of exports is two dollars. There are at least three different channels for achieving this export growth. Case one, the export quantity and price are still the same, one kilogram and one dollar per kilogram. However, China exports two types of products to the original partner or the original product to two partners. This channel of export growth can be classified as the extensive margin growth, which entails a numerical increase of partners or products. Using similar logic, we can define price growth and quantity growth. Our main task in this paper is to decompose China's export growth into the three margins to account for the growth of China's exports.

Discussions of the three margins of export growth can be found in different trade theories. In traditional trade theory, products are homogeneous. There are neither horizontal nor vertical differences in products, and export growth is due to the quantity growth alone. In horizontal intra-industry trade theory, as found in Krugman (1979), there are many kinds of products with horizontal differences but the same price. Thus, from a growth perspective, exports can grow with the expansion of product variety. In vertical intra-industry trade theory, as found in Falm and Helpman (1987), products are differentiated by different qualities and different prices, so exports

---

* Tel.: +86 13920262839 (mobile).
  E-mail address: stonenk@163.com.

can also grow with upgrades in quality and subsequent price increases. In the New–New trade theory, such as Melitz (2003), trade can grow because of the acquisition of new exporting firms or new partners. This is termed as the extensive margin. To summarize, exports can grow at three different margins—extensive margin, quantity and price—with extensive margin in this paper referring to the number of trading partners and the variety of products.

We start by discussing our research in relation to the empirical work of New–New trade theory. Melitz (2003) develops a model to account for the empirical styled facts at the firm level that have been generated since the middle of the 1990s. From Melitz (2003), we know that not all firms engage in export; therefore, one source of extensive margin is the number of exporting firms that exist empirically. Helpman et al. (2008) extended the Melitz model and found that not all countries trade with each other; there are many zeros between countries. Therefore, another source of extensive margin is the number of trade partners that exist empirically. Bernard et al. (2006) found that multi-product firms do not export all of their products; therefore, the number of exporting products is the third source of extensive margin. Therefore, from the New–New trade theory perspective, the number of exporting firms, the number of trade partners and the number of exporting products comprise the extensive margin. In his empirical work, Helpman et al. (2008) decomposes world trade growth since World War Two into extensive margin and intensive margin at the country level, the former denoting the trade growth of new trade relationship, the later denoting the growth of trade in existing trade relationships. Helpman et al. (2008) found that trade growth at the intensive margin is more important for overall trade growth. Bernard et al. (2009) also decomposed US trade growth into extensive margin and intensive margin. However, at the firm level, they found that new exporting firms and new exporting products accounted for much export growth, which signals the importance of extensive margin. Similar research can be found in Amiti and Freund (2008), Eaton et al.(2008), Lawless (2007), Evenett and Venables (2002), Brenton and Nerfarmer (2007), and Besedes and Prusa (2008), among others.

The main task of our paper is to decompose the two margins of export growth into three margins. We further decompose intensive margin into price and quantity. It is obvious that our decomposition is more understandable and fruitful than the analysis found in the existing New–New trade theory empirical work. Intensive margin is not a basic conception in trade theory. Thus, the two-margin decomposition method lacks firm foundations. Furthermore, from a policy perspective, whether trade growth is mainly driven by extensive margin or intensive margin does not have a fruitful meaning. However, whether trade growth is driven by quantity or price does have much significance. If trade growth is mainly quantitative, it means that this country must use large amounts of capital, labor and natural resources to produce a lot of products, which is not good for sustainable growth. However, if trade growth is mainly driven by price growth and if price reflects product quality, then this kind of export growth may need more human capital and more technological innovation, which are helpful to the sustainable economic growth. Therefore, our three-margin decomposition of trade growth is much more meaningful than the two-margin decomposition; this is the primary contribution of our paper.

The work that is most closely related to our research is Hummels and Klenow (2005). They decomposed the world market ratio of a country's exports into three margins: extensive margin, quantity and quality, with extensive margin being expressed by product variety, and quality being expressed by price. They found that big exporting countries also export more varieties and a higher quality of goods than do small exporting countries, which means variety and quality are important for explaining trade volume. Our paper is similar to that work, in that we also decompose trade volumes into three margins: extensive margin, quantity and price, with price standing for quality. What is different is that our decomposition implicates trade growth, whereas their decomposition implicates trade volume ratio. In short, we analyze a new problem with techniques similar to that of Hummels and Klenow. It should be noted that the definition and calculation methods of extensive margin are different in Hummels and Klenow (2005) and New–New trade theory empirical work. In Hummels and Klenow (2005), to calculate the three margins, one must define and calculate the extensive margin as a weighted count of the number of products, with the weight measured by export values. In the New–New trade theory empirical work, scholars only focus on the two margins; thus, they merely define and calculate the extensive margin as the count of products, firms or partners. To check the robustness of our conclusion, we will calculate the extensive margin under these two different definitions, a process that will be explained in detail in Section 2 of this paper.

The key findings are as follows. China's export growth is mainly driven by quantity growth, which accounts for nearly 70% of China's overall export growth. This conclusion is robust for different markets, different products and different methods. Because China's export growth is mainly quantity growth, this means that China is using a lot of capital, labor, natural resources and cheap resources to achieve its remarkable export growth. This conclusion means, in the long term, that China's export growth is not sustainable. Therefore, a large challenge for the Chinese government and for Chinese enterprises is to change the current quantity-driven export growth into a quality-driven export growth.

The remainder of this paper is organized as follows. Section 2 presents the empirical methodology used throughout the paper. It discusses two methods, the differences between which are found in the definitions and calculating methods of extensive margin, price and quantity. Because the first method is simple, it is used as a descriptive method. However, this method cannot generate an accurate calculation of the contributing ratio of each margin. The second method is more complex and accurate, as it can decompose trade growth exclusively into the three margins: extensive margin growth, quantity growth and price growth. Using these two methods, we derive similar conclusions; therefore, our results are robust for different methods. Section 3 presents the data and a descriptive analysis of China's export growth using the first method. This section focuses on extensive margin growth, quantity growth and price growth. Section 4 reports the results of disaggregating China's export growth using the second method, first by reporting the whole world market results, then by reporting results in reference to different markets and different kinds of products, and lastly, by using a kernel distribution graph to simulate China's export growth. Section 5 presents our conclusions.