



# Decomposing China's export growth into extensive margin, export quality and quantity effects <sup>☆</sup>



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## ABSTRACT

This paper decomposes the growth of China's export into three parts: growth in extensive margin, increased quantity and increased prices; we perform a series of empirical analyses using China's export data at the HS-6 digit level to analyze the characteristics of China's export growth. China's export growth depends more and more on price increases, less and less on quantity expansion. Compared with the rest of world, China's export price is in the process of improving, not at an increasing speed but at a declining pace. China's export performance is better than the rest of the world after the financial crisis and in 2008–2010. This reflects a strategy of lowering price and promoting sales in 2009 when facing a slump in export markets; and resuming price increases and increasing sales moderately in reaction to improving export conditions in 2010.

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## 1. Introduction

Recent research in international trade has focused on the sources of trade growth. Many authors divide export growth into two parts. One is extensive margin which generally means a nation exports commodities that it had not exported before or ceases to export goods that it had exported before. The extensive margin is often defined as the growth of exports due to change in varieties. The other form of export growth is on the intensive margin which usually means exporting goods that have been previously exported. The intensive margin generally describes to what extent trade increases or decreases due to changes in existing traded commodities. There are some extensions of the definition of extensive margin and intensive margin. For example, some define intensive and extensive margin at the country-product level, taking both new products exported and new trade partners as extensive margin; and some look at new exporting firms as the extensive margin.

This paper decomposes the growth of China's export into three parts: extensive margin, quantity and price (the latter two are components of the intensive margin) and aims to study the characteristics of China's export growth in these three parts. Shi (2011) is a related paper, but this paper is different from Shi (2011) in at least two respects: one is that this paper focuses on the dynamic roles of extensive margin, quantity and price with the increase of exports, while Shi (2011) only obtains a static result. The second one is that in some analyses this paper uses a decomposition method different from Shi's to assess China's performance relative to the rest of the world (ROW). In Shi (2011), the measurement only reflects China's own change. This paper is complementary to Shi's earlier study. It generates some additional results while analyzing a similar problem.

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The remainder of the paper is organized as follows. First is the literature review; Second, we present the theoretical background and the calculation methods for the three parts of export growth; and then perform a series of empirical analyses using China's export data at HS-6 digit; Finally, we offer a conclusion. The empirical analyses are in three parts. In the first we analyze the general characteristics of China's export from 1995 to 2010; Then we divide the time period from 1995 to 2010 into five equal phases, and study the dynamic roles of extensive margin, quantity and price. The financial crisis in 2008 generated some special changes in the three parts, so, this paper studies China's export performance in the period following the crisis.

The key findings are as follows. In dynamics, China's export growth depends more and more on price increases, and less on quantity expansion. Compared with ROW, China's export prices are improving, not at an increasing but at a declining pace. The main characteristic of China's first reaction to the financial crisis is that of lowering prices and promoting sales, and China's reaction to improving export conditions is resuming price rises and increasing sales moderately.

## 2. Literatures review

In traditional trade theory, such as the Ricardian model and the standard Heckscher–Ohlin model, products are homogeneous, so there are neither horizontal nor vertical differences in products, and export growth can only be caused by the quantity growth alone.

In new trade theory, [Krugman \(1979, 1980\)](#) considered scale economies and consumers' taste for a diversity of products as an explanation for the intra-industry trade. Thus an economy that increases its size will produce and export more range of goods. So the new trade theory stresses the importance of the extensive margin in export growth.

In more recent theories of heterogeneous firms, such as [Melitz \(2003\)](#), [Bernard, Eaton, Jensen, and Kortum \(2003\)](#) and [Helpman, Melitz, and Yeaple \(2004\)](#), trade grows from two sources. One is that a decrease in trade cost increases export sales by existing exporters and thus increases export quantity; the other is the acquisition of new exporting firms or new partners, which is termed as the extensive margin.

The prices of products are often used as proxies for quality, for example in [Schott \(2008\)](#), [Xu \(2010\)](#) and [Shi \(2011\)](#). In vertical intra-industry trade theory, as in [Flam and Helpman \(1987\)](#), products are differentiated by different qualities and different prices, so exports can also grow with upgrades in quality and subsequent price increases.

There have been many studies about the roles of the extensive and intensive margins in trade growth. Some conclude that the extensive margin plays a relatively more important role, while others find that the intensive margin plays the dominant role. [Yi \(2003\)](#) considered vertical specialization and trade in intermediates. He believed that a decline in the variable trade cost can lead to large increases in the trade of intermediates which is on the extensive margin; [Hummels and Klenow \(2005\)](#), using a cross-sectional approach, examined cross-country differences in exports among a large sample of countries and found that the extensive margin accounts for 60% of the export increase of larger economies; [Foster, Poeschl, and Stehrer \(2011\)](#) considered the trade creating effects of preferential trade agreements (PTAs) for a large sample of countries, and found that exports increase after the formation of PTAs, and that much of this increase occurs in the extensive margin.

On the contrary, [Amiti and Freund \(2010\)](#) analyzed China's export growth patterns between 1992 and 2005, and found that the intensive margin plays a dominant role in the growth of China's exports; [Helpman, Melitz, and Rubinstein \(2008\)](#) decomposed world trade growth after World War Two into extensive margin and intensive margin effects at the country level, and found that trade growth at the intensive margin is more important. Similar research can be found in [Felbermayr and Kohler \(2006\)](#), [Eaton, Eslava, Kugler, and James \(2008\)](#).

There are several factors that lead to the differing results of the above papers. The first one is that different papers analyze exports at different levels of aggregation and the definitions of extensive and intensive margin are accordingly different. For example, [Hummels and Klenow \(2005\)](#) used a definition at a country-product level; [Amiti and Freund \(2010\)](#) used a product level; [Helpman et al. \(2008\)](#), [Felbermayr and Kohler \(2006\)](#) used a country level; [Eaton et al. \(2008\)](#) is at firm level. Even papers that analyze exports at the same level may give different definitions of extensive and intensive margin. Exports classified as one margin may be classified as the other margin by another paper. These different levels of exports and the conceptual differences partly explain the different results regarding the relative importance of intensive margin and extensive margin.

The second one is that different papers analyze different countries, or the same country at a different time, or the same country at the same time but at different time lengths; Different countries and the same country at the different time may have different results regarding the relative roles of extensive and intensive margin. For the same country at the same time, if we consider different time lengths, we may get different results. For example, [Bernard, Jensen, Redding, and Schott \(2009\)](#) decomposed US trade growth into extensive and intensive margin effects and found that the variation in imports and exports across trading partners is primarily due to the extensive margin, while variation in trade across one-year intervals is dominated by the intensive margin.

A few papers decompose the export growth into three parts: extensive margin, quantity and price. The expansion of the quantities of the same products is likely to cause a deterioration of the terms of trade. This negative effect can be offset in two ways: one is the growth of the extensive margin; the other is improving quality. It is widely believed that export diversification is important. According to [Pham and Martin \(2007\)](#), part of the reason is that wide export diversification can lead to a stable economy; another part is that new products provide new opportunities for learning and productivity growth; another possible benefit of export diversification is that it can simulate demand because of the purchasers' preference for varieties. The other way to relieve the bad effect of expansion of quantities is to raise the quality of the export goods and that increases the unit prices of export goods.

[Hummels and Klenow \(2005\)](#) decomposed export growth into three parts and used data on shipments by 126 exporting countries to 59 importing countries in 5000 product categories to analyze whether big economies export larger quantities of each

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