Export and Aggregate Productivity Growth:
Evidence from China over 1998-2007

Jun Du\textsuperscript{a,b} and Ying Zhou\textsuperscript{a}

\textsuperscript{a} Aston Business School, Aston University
\textsuperscript{b} Stockholm China Economic Research Institute, Stockholm School of Economics

(This version: August 2013)

Keywords: Reallocation, decomposition, aggregate productivity, exporting, China

JEL Classification numbers: O14 D24 C10 O47 P3

Extended abstract

The outcomes of export-oriented policies in economic growth are widely assumed. This partly explains why the last few decades have seen a fast movement of globalisation where developing countries embraced much more outward-oriented economic policies and become increasingly dependent on the global market demand, particularly that of developed economies. The United Nations Conference on Trade and Development (UNCTD) reports that the export to GDP ratio among low- and middle-income countries increased from 27\% in 1984 to 44\% in 2012. In these exports, the percentage of manufacturing goods in total increased from 20\% in 1980 to 86\% in 2012. The proportion of the trade partners with developed economies is also large. Even though the south-north trade is falling, still nearly half of the exported goods were sold to developed economies in 2012.

There are many theories developed and evidence collected to demonstrate the beneficial effects of export. At the firm level they address the impact of export participation on firm level productivity improvement (see for example Keller 2004, De Loecker 2007 and 2012, Wagner 2007 and Aw et al. 2011), even though the theoretical foundation of establishing firms learning by exporting is still being debated (Loecker, 2013) and the empirical evidence that qualifies the theories is mixed and inconclusive (Wagner 2007). At
the macro level, the inquiry is about how export may spur growth and improve welfare. The theoretical literature (Balassa, 1978, 1985) and recent empirical studies disagree with regard to the precise relationship between exports and growth (Bhagwati and Srinivasan, 2002; Rodriguez and Rodrik, 2001). There are still heated debates on if export-oriented policies have the ability to spur economic growth given the evidence remains mixed and inconclusive (Xu et al., 2009).

The research examining the resource allocation effects between firms, industries, and countries advocates that the export-led policies can have adverse effects. For example, Razmi (2007) discusses how developing countries crowd each other out in competing the limited demand in manufacturing goods, and questions the widely adopted outward-oriented policy among these countries. The recent enquiry of how globalisation facilitates structural change and productivity growth across countries identifies that large labour productivity gaps between countries are driven by growth-reducing structural change between sectors (McMillan and Rodrik, 2011). The authors contend that the resource misallocation due to resource allocation directed to certain sectors, such as from manufacturing to informality, or clinging to resource-reliant sectors, explains the lack of productivity performance of Latin America and African countries. Yet the direct evidence on the resource allocation effects of export is limited, and that based on firm level data and examining between-firms allocation effects is even sparser.

This paper is intended to fill this gap by comparing the heterogeneous contributions of firms with different level of participation in exporting to aggregate productivity growth via both within-firm technical efficiency change (i.e. TFP change) and between-firms resource allocation using China as a case study.

China is a particularly interesting case to study the link between export and growth. It benefited greatly from international trade and investment and perhaps gained the most compared to other developing economies (Tingvall et. al., 2012). Some argue that since the early 1990s, the impressive growth performance of China has largely been driven by exports (Zhu 1998, Wang 1998, and Zhu and Kotz 2010; Tingvall et. al., 2012). Indeed, there is a plethora of evidence to support this view. However, export-led economic growth is not without concerns. Much dependence on the global market means negative shocks during the financial crisis (Park et al., 2010). The actual problems associated with export-led policies may go beyond the demand shocks in crisis circumstances. The serious structural imbalance
China faces now has much to do with the over-investment in productivity-enhancing infrastructure and technologies, the massive subsidies and incentives to promote export, intertwined with factor cost distortion problems (Huang and Wang, 2010). Lang (2008) argues that Chinese manufacturing has been geared to foreign market demand and forced to stay at the very low end of the global production value chain. Most industries, not limited to export-intensive processing trade sectors, appear trapped in this situation and face the difficulty of technology upgrading and structural transformation. As such, Lang describes the current division of global value chain as an imperial conspiracy.

The conspiracy theory may be fiction, but the fact of China’s economic slowdown (Zheng et al., 2009; Du et al., 2013) and the tendency of joining the middle-income trap (Wu, 2013) is palpable. Seeking sustainable economic growth is the focal point. It is now well understood that Total Factor Productivity (TFP) is the engine of long-run economic growth (Hall and Jones, 1999; Bartelsman and Doms, 2000), and the main driver of global inequality (Klenow and Rodriguez-Clare 1997, Hall and Jones 1999, Bartelsman and Doms 2000, Caselli 2005 and Hesih and Klenow 2009). In fact, studies suggest that in order to jump out of middle-income trap, a country needs to hold a stead growth of TFP over 3% (Eichengreen et al., 2011). In this light, assessing if a policy being effective to economic growth boils down to the understanding if such a policy is effective in promoting the aggregate productivity.

In the volume research into the possible determinates of aggregate productivity, Rodrik (1995), Hall and Jones (1999), and Frankel and Romer (1999) show the participation in international trade can be a key factor in improving a country's TFP. What is less clear is how export affects between-firm resource allocation factors in determining aggregate productivity and if that depends on the level of export participation. Given resource allocation between firms are highly affected by industrial organizational and institutional factors that are heterogeneous across countries, such questions may be empirical ones.

In this paper, we examine the role of export participation in associating with the components of aggregate TFP by applying the recently proposed aggregate productivity growth decomposition method by Petrin and Levinsohn (2012). This allows us to complement the existing studies in the literature and draw useful conclusions on the importance of exporting sector to aggregate productivity growth not only through within firm technical efficiency improvements but also through resource allocation between firms. Our empirical analysis is based on the experience of China between 1998 and 2007, covering the
period of the WTO entry around 2001. The post-entry period saw a fast growth in export volume and exported product sophistication, and before the disturbance of global financial crisis where international trade was depressed. Hence it is an excellent time period for investigating the role of export in determining aggregate productivity.

Furthermore, although empirically it is well tested that exporters tend to be more productive than the non-exporters (i.e. the self-select to export), little is known regarding the TFP performance of exporters with different levels of export intensity nor their growth overtime. We provide the first insight into the different evolution patterns of non-exporter, minority and majority exporters, in terms of their relative technical efficiency growth (i.e TFP increase) and aggregate demand based resource allocation.

In particular, the results show resource allocation contributes to around half of all the aggregate productivity growth in Chinese manufacturing sector over the past decade. This implies in order to gain new insights into the possible ways to ensure sustainable growth in China, it would be crucial to understand the heterogeneous pattern in both technical efficiency (i.e. within TFP growth) and resource allocative efficiency between firms. Moreover, the results show despite noticeable growth in technical efficiency (i.e. average TFP level), the improvement in aggregate productivity is rather limited for the exporters over the last decade. The poor performance in aggregate productivity growth of exporters with both relatively low and high export intensity is a result of inefficient allocation of capital and materials. On the other hand, the non-exporting firms have been the driver of Chinese aggregate productivity growth in manufacturing industries, with both a higher technical efficiency growth and resource allocation. Furthermore, the results highlight the differences in resource allocation across different ownerships. Consistent with previous literature, it shows to simulate aggregate productivity growth it is important to continue reform in the state owned firms and to distinguish between Hong Kong, Taiwan and Macao and the other foreign firms. Also, our study shows the aggregate productivity growth driven effect of the non-exporters is not unique to any specific industry, but rather wide spread across most of the manufacturing industries.