

The re-location and trends of industrial agglomeration in China

Robert J R Elliott, Nicholas Horsewood and Meng Tong

Abstract

In this chapter, we show the geographic distribution of manufacturing industries in China from 1998 to 2007. To trace the trends of industrial agglomeration over time, we select year 1998, 2002, 2003 and 2007 as the target time point and study characteristics of manufacturing geographic distribution in China. We compare the difference of industrial agglomeration in China with US, France and the UK. In order to find out if there is geographic concentration across related industries in China, we also study the co-agglomeration following previous works on the developed countries. The Ellison-Glaeser index (γ), Geographic concentration index (G) and Herfindahl index (H) are main indices applied to make these comparison studies. The comparisons based on the EG index are mainly at 2-digit industry and 4-digit industry level in our study. We also compare the estimation results at different region level. In general, we find manufacturing industries are most likely to be agglomerated in the east coastal regions in China during the time period. There are two core of manufacturing industry in the coast provinces, one in north and another in the south. We find a steadily increase of industrial agglomeration at province level but a U shape trends at county level. There are more and more industries with high value-added appears in the top twenty most agglomerated industries over time. In the international comparisons, we find China has high industrial agglomeration as in US and France but more agglomerated than the UK which is less agglomerated on manufacturing geographic distribution. At last, since we found many textile industries at 4-digit industry level in the top twenty most agglomerated industries in all four target years, the estimation show the textile industry has the highest

co-agglomeration in China.

Key Words: Industrial agglomeration, Trends, International comparisons, Co-agglomeration

1. Introduction

In the three decades since 1978, China has experienced an average growth rate of around 10%. In particular, the performance of manufacturing industries is remarkable and China has become known as the "World Factory". But between 1949 to 1978, China's GDP growth rate was fairly unstable with fluctuations due to political instability. During this early period, central government played a very important role in maintaining and boosting economic growth. However, the collapse of planned economy system in Russia who Chinese government learned from released the inefficiency and lag of macroeconomic adjustment by administration orders. Therefore, part of the economic liberalization and introduction of market economy system was to increase previously low productivity caused by local protectionism and national monopolies. The bundle of policies for FDI attracted investment from many developed countries and countries close to China in distance such as the Four Asian Tigers and Japan.

Another good stimulation to boost economic growth is export. Over the last decades, the growth rate of export is even higher than GDP growth rate in China. By offering natural resources and low cost labour, China joined in the world manufacturing industry chain. The "Open Door" policy applied since 1978 release the production activity constrain to private sectors. However, as only the SOEs is allowed to export products to foreign countries at that time and private cannot export their product directly even they have high quality products. The SOEs either plays as the trading agent through buying products from private enterprises or make production themselves and then export to

foreign market. As the unrestricting of export for private sectors, there are more competitive heterogeneous firms enter the foreign market. Through competition with other East Asia countries, China has gained more foreign market in low-technology products and keep climbing up the value-added chain (Lall *et al.* (2004)). On the contrary, Mary *et al.* (2008) demonstrate the structure of export in China from 1997 to 2005. They find although the export product has shifted from agriculture and apparel to electronics and machinery, the skill content of export manufacturing products remains in relatively low level exclude processing trade. Berger *et al.* (2011) analysis the determinants of rapid growth on China export from 200 to 2007. They find the effective policy application and fortuitous timing lead to the higher growth rate of export in China. By looking at the import products of US from China, they conclude Chinese products are more competitive in US and domestic market. The job loss on manufacturing industries for US is due to lack of competition, lack of investment and slow GDP growth rate. Regardless if China has upgrading their technology level, export-led growth has also been the pattern of economic growth in China in the last decades. Therefore, export could be an vital factor to affect industrial location choice.

On the other hand, the central government also attract FDI to the Special Economic Zones and other coastal regions. Free Trade Zone and Technological Development Area are two types of special zones enjoy tax free and preferential policies from government to encourage trade activity in the coastal regions. The motivation for the establishment Free Trade Zones and Economic and Technological Development Areas is to attract foreign investment by cheaper labour force, lower corporation taxes and easier access to consumer market in Mainland China. The idea was that knowledge spillovers from foreign firms would then help domestic firms to increase productivity. This is the so called "Market for Technology" strategy forward by Chinese central government since 1980s. Taking Shenzhen Special Economic Zone as an example, the establishment of Shenzhen Special Economic Zones has turned the area from a small village into the top

cities in China within 30 years¹. Furthermore, the entry of FDI in the coastal regions and their advantage of close to export destination boost development of labour-intensive industries. TEDA (Tianjin Economic and Technological Development Area) is another good example of such trade zones. There are 76 Fortune 500 companies has been located in TEDA including Motorola and Samsung.

These changes leads to regional development and the re-location of manufacturing industries in China. In the early period, FDI were restricted to locate within Free Trade Zones and Economic and Technology development areas. As more employees required from these exporting foreign enterprise or SOEs, millions of labours who were lived in the county areas in the inner land moved to the coastal regions works for toys, cloth and food company. The demographic dividends has turned 1 billion USD of inward FDI in 1979 into 327 billion USD at the end of 2007(Fetscherin, Voss and Gugler, 2010; UNCTAD, 2009a; UNCTAD, 2009b). Meanwhile, there was still another 83 billion USD of FDI into China in 2007. With annual growth rate of 23.6%, FDI is one of the most important combination of trade engine in China economic growth. The local governments are able to attract the entry of FDI help to boost local economy by offering various benefits. These policies lead to a quick urbanization and industrialization of coastal regions in China. Gao (2004) finds that local competition has a positive effect on regional industrial growth. In those regions with fewer SOEs, capital has a higher growth rate. Better transportation systems is also positive for growth. FDI and exports are also positively correlated with growth. Au and Herderson (2006) use Chinese city level data to examine the inverted U shape between the real income per worker and the number of employees within the city from 1990 to 1997. They find China's real income increased sharply together with city size to reach peak and then to decline very slowly. In the recent studies, Lu *et al.* (2012) use markup, defines as the ratio of price over marginal cost, to capture the impact of industrial agglomeration. They find industrial

¹ Shenzhen was the combination of five county areas in 1979 to establish the first Special Economic Zones(SEZs) in China. The population of Shenzhen has grown from 0.314 million to 10.467 people from 1979 to 2011. Real GDP value has increased from 0.196 billion RMB to 129.5 billion RMB in2012. The establishment of Shenzhen Stock Exchange and Shenzhen Port has made Shenzhen one of the largest financial and trade centres in China.

agglomeration has a negative impact on the markup suggesting that the competition effect dominates the benefits spillovers. There are also some other analysis can be examined in China, Henderson (2003) examines the impact of the scale economies on high-tech and machinery industries in the US and conclude that local information spillovers have a positive impact on high-tech industries but not machinery industries in productivity. Single firms are more eager to gain and contribute externalities rather than corporate firms.

Mainland China is large in geographic regions and population. The implementation of these strategy and the response can lead to different consequences for the economic performance of different regions. After 20 years fast growth of manufacturing industries in the coastal regions, Chinese government has consider to develop manufacturing industries in the inner land. Together with the gradually release of FDI location restriction after China the WTO and other preferential policies and finding support to inner land, it is interesting to examine if manufacturing industries, exclude natural resource extractions, appear to be agglomerated in the inner land after the application of China's Western Development Program in 2005.

In this paper, we use data for two-five-years-periods to examine the pattern of productive activity in China before and after China joined the WTO and before the financial crisis (1998-2002 and 2003-2007)². Our empirical study examines the pattern of industrial agglomeration in China at the 2-digit and 4-digit SIC and present the most and least agglomerated industries at the 4-digit SIC level. The change in industrial agglomeration is also analyzed within each five year period. Examining agglomeration at 4-digit industry level represents the most detailed study for China so far and makes

² There are two reasons to separate the research period into two-five years period: The restructuring of Standard Industry Code (SIC) in 2002 in China leads to mismatch of 4-digit industries between 2002 and 2003 together with years after. Moreover, there is a big jump in the number of observations for 2003 compare with 2002 in our dataset. The firm number is even larger in 2004 because it is the year of economic census in China and the annual firm number stays steadily in a higher level in the following years. To match our data at 4-digit industry level in the whole time period will leads to big drops on the numbers of observation. It may also leads to ignorance of new trends in the second time period.

comparisons between China and other developed countries possible. We compare patterns of industrial agglomeration between China and US, France and the UK. We finally investigate the role of co-agglomeration among related industries at the 4-digit industry level.