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Implications of China's on-going dependence on foreign technology

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ABSTRACT

This paper examines the on-going high level of dependency of China's economy on foreign sources of technology during the period since accession to the World Trade Organisation (WTO). Because this dependency is a major cause of concern for China's leaders and policymakers, they have sought to shift the direction of the economy particularly since 2006 towards a greater focus on indigenous innovation. Achieving such a major transformation, however, in an era when much of China's economic activity has become integrated within the global value chains of major corporations, is very challenging, and the evidence to date suggests only a modest level of success on the part of Chinese companies to substitute for the on-going dominant position of foreign companies particularly in China's high technology sectors. Some progress has been made, however, in the private sector's share of economic activity in contrast to the declining share of State Owned Enterprises (SOEs).

Introduction

Despite its impressive growth rate in the past 30 years, China's economy is still transitioning towards some hybrid form of mixed ownership economy. Among the major developments that have marked this transition have been China's accession to the World Trade Organization (WTO) in December 2001, and its more recent adjustment to the global downturn, helped by a state stimulus package of USD 586 bn. Some would also argue the significance of 2006 which marked the end of the five-year schedule of market opening measures as the price of admission to the WTO and which also saw a significant policy reorientation towards 'indigenous innovation' (*zizhu chuangxin*). This major policy shift has sought re-focus the economy from being a low-cost manufacturing model based on export processing to one based on higher value added activity. Among some of the interrelated features associated with China's recent economic transformation is the dominant role of foreign direct investment (FDI), particularly in export processing and in high tech sectors, the rapid ageing and decline in the labour force associated with China's very low fertility rate, partly influenced by its one-child policy, and the huge environmental challenges resulting from the rapid pace of economic growth.

The main thrust of this paper will focus on the implications of China's on-going high level of dependence on foreign sources of technology, as reflected in the significant role of foreign investors in China's high technology exports, despite the determination of China's policymakers to reduce this dependence by promoting indigenous innovation. In the context of this policy concern, the paper will examine the extent to which Chinese companies have progressed particularly in relation to their involvement in China's high technology trade, while some reference will be made to the growing competition between Chinese and foreign companies.

The paper will seek to evaluate the extent to which local companies have benefitted from the overall industrial upgrading that has characterised China's evolving role in the global value chains of leading technology corporations.

Methodological issues

While much of the analysis to date on China's evolving economic development has focused on trade theory, making use of trade statistics, to examine the relationship between trade patterns and economic development, such an analysis within an era of increasingly globalised economic activity has limitations (Karabell, 2009; Sturgeon and Gereffi, 2009). With the increasing fragmentation of production across production networks and value chains, it is necessary to develop more effective conceptual frameworks such as global production networks and global value chains to determine the particular roles of different regions within production networks as well as providing a better indication of the added value accruing to those regions (Sturgeon, 2008; Coe et al.,

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2008). Increased fragmentation of production associated with globalisation has resulted in 80% of trade occurring within global value chains, which are typically coordinated by transnational corporations (TNCs), with the cross-border trade of inputs and outputs taking place within their networks of affiliates, contractual partners and arm's-length suppliers (UNCTAD, 2013).

The global value chain is increasingly used by researchers and policymakers as an effective conceptual framework in which to analyse the implications of fragmented production for particular regions. This can help to avoid the exaggerated evaluation of gains to a particular economy by an uncritical examination of trade data, which is particularly relevant in the case of China whose key role in many value chains is a somewhat subordinate one as a low cost assembly location of components imported from other regions. Xing and Detert (2010) note that conventional trade statistics are not consistent with trade where global production networks and production fragmentation determine cross-country flows of parts, components and final production. Using the 'direct value added exports' indicator, which quantifies the added value to particular countries of their exports, Horn et al. (2010) found that China's export sector contributed 19–33% of total GDP growth between 2002 and 2008, which was only half of the export contribution indicated by traditional total export measures.

In seeking to determine the extent to which Chinese companies have evolved technologically during China's recent period of rapid economic growth the approach taken in this paper is to exploit both trade data and also company interviews, which provide the opportunity to consider the evolving role of different company types in trade and also the domestic market. The need to consider both the trade activity and the domestic economy relates to how economic activity has evolved during recent decades with a greater focus on export-led growth initially and the more recent involvement of both foreign and Chinese companies in the domestic economy. For Yu (2008, 2354) the success of Chinese companies in the domestic market is 'the synchronisation of China's export upgrading and domestic market growth, rather than export alone'. An unusual feature of China's development has been the rare combination of a very large domestic market with a high level of FDI that is focused on this domestic market (Brandt and Thun, 2010). The tendency in many studies of China's economic development to date has been to adopt an either/or approach: to either focus on trade or on the domestic economy, rather than on interactions between both; to focus on either foreign or Chinese companies while not paying attention to the many interactions between them. Recent reality in China is more complex, with a range of interactions between different sectors of the economy and between different types of companies.

Two limitations apply to Chinese data relating to foreign investment. Although China was the primary global exporter of high-tech products in 2012, most of these exports were derived from FIE rather than Chinese firms. The second issue is that perhaps up to 50% of FIE investment relates to 'round tripping' investment by Chinese companies who are seeking benefits awarded to foreign investors in China or are seeking overseas stock market listing, and which is not reflected in official statistics (Sharman, 2012; Vlcek, 2010; Xiao, 2004). Although it is essential to distinguish firm ownership as clearly as possible in order to evaluate the success or otherwise of the new indigenous innovation policy, the complexity of clarifying investment relationships between firms within a globalised economy has become very challenging (Breslin, 2003). The two main shareholders of the highly successful Chinese e-commerce firm, Alibaba, for example, are Softbank with 35% and Yahoo with 24% of shares. Ever since the Chinese company Geely bought Volvo from Ford Motor Company in 2010, Volvo is officially a foreign company under Swedish law and is treated as a foreign company in China (Dongmei and Haili, 2012). In order to overcome the round tripping issue associated with China's FDI aggregate data, use will be made of an annually published database of China's top 200 exporting companies, with a more detailed analysis of top 20 exporting firms in 2001 and 2012. This source allows us to distinguish between different company types in terms of ownership, sector and volume of exports.

In order to delve further into the relationship between foreign companies and the Chinese state within the context of the relatively new indigenous innovation policy around 50 hours of interviewing were completed with the senior management of foreign multinationals in Shanghai during a number of visits between 2009 and 2011. In a few cases the same companies were interviewed more than once, which allowed some insights into developments and views over time. While a wide range of sectors were involved in keeping with the multinational company profile in Shanghai, the main focus of the case studies used in this paper is on US and European technology companies, who play a dominant role as innovators in technology sectors. In some cases the companies are involved in a range of sectors, including ICT, energy, medical equipment, and transport equipment. Most of the companies are major global corporations and many have R&D centres in China.

China's subordinate role in GVCs

Since a large part of GVC value added in developing countries is generated by affiliates of TNCs the contribution to local GDP can be limited because of low 'value capture'. This is the case in a country like China which has attracted significant offshored production FDI but acts mainly in a low position within global value chains as an assembler of increasingly sophisticated products. China's low value capture in manufacturing the iPhone4 is a stark example of such value capture: after importing key components from various countries including Korea and the US, China adds only USD 6.54 of the USD 194.04 factory gate price of the product it exports (Xing and Detert, 2010). While China's participation in GVCs has played a significant role in developing its huge processing sector in recent decades, the low value added accruing to China, together with issues such as technology dissemination, skill building and overall industrial upgrading have been major factors in driving China's more recent development in industrial policy towards indigenous innovation.

In the early stages of China's integration into the world economy, it had little choice but to rely heavily on attracting FDI, at which it became hugely successful, becoming one of the most significant locations for such investment in recent years, a role which it partly took over from neighbouring countries as they moved further up the value chain. Initially much of the investment came to develop the export processing sector in what was a low cost location with a plentiful labour supply. Because its opening up coincided with the increased internationalisation of supply chains, China rapidly became interconnected with assembly activity in Asia and grow at an impressive rate. This was facilitated by the offshoring of production by large multinational companies seeking lower cost locations, together with Chinese state policy promoting export processing by generous tax breaks.

Associated with this role has been its significant dependence on foreign technology sources and on foreign markets, as multinational corporations offshored their mainly low value-added assembly activities to China while retaining the higher value added functions in more developed regions. Neighbouring Asian countries, including Japan, Korea, Hong Kong and Taiwan exploited the low cost advantages of China to which they offshored assembly functions. All of these Asian neighbouring countries have become major sources of foreign investment in China, developing strong value chain linkages with the mainland. The integration of