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FOREIGN INVESTMENT AND VERTICAL SPECIALISATION: AN ANALYSIS OF EMERGING TRENDS IN CHINESE EXPORTS

Abstract:

This paper contributes to the literature on the role of foreign direct investment and vertical specialisation in China's growth trajectory. Globalisation of the world economy, together with well-developed physical infrastructure, and falling costs of transport and communications, has led to a significant increase in foreign investment into China to take advantage of its comparative advantage in labour intensive activities. Initially foreign investment came to simple assembly line (such as textile, clothing, electronic goods), but gradually China attracted FDI to sophisticated manufacturing industries (such as, ICT products, office and medical equipments etc), giving rise to vertical specialisation in its exports. Over one quarter of Chinese exports appears to be due to the expansion of back-and–forth transactions in vertically fragmented cross-border production process. Our analysis suggests that foreign input content in Chinese exports is high and rising. When the share of 'foreign value-added' in Chinese exports is taken into account the 'actual trade balance' is much lower than what 'raw trade balance' would indicate.

As expected, share of foreign input content (vertical specialization) is high in Chinese exports of high-tech industries (such as, communications equipment, computers and other electronic equipment manufacturing etc) and low in labor-intensive industries such as (food and tobacco, textile, leather products, footwear etc).

China's increased involvement in global production network as an assembly centre has created an opportunity for other countries and countries in the region to benefit from its rapid integration with the world economy as its imports of parts and components have grown dramatically and most of these imports come from advanced economies such as US, Europe and newly industrialised economy. Clearly, China's success story has led to win-win situation, improving welfare globally. As China is committed to continue to integrate with the world economy, its involvement in processing trade will continue. However, China will require to upgrade skills of its workforce through appropriate human capital development policy, otherwise higher wages (for semi-skilled workers) can wipe out its comparative advantage in low-end assembly trade brought about by globalisation. Policy makers in China should also need to think carefully how to embark on industrial upgrading to sustain growth.

Keywords:

Foreign Investment, Vertical Specialisation, China, Exports

JEL Classification: F19

1. Introduction

Since opening its economy in the late 1970s China has experienced a dramatic increase in foreign direct investment (FDI) inflows and exports. FDI inflows, which were just under US$ 1 billion in the mid 1980s, reached US$114.7 billion by 2010. With the increase in FDI inflows, there has been a rise in its exports, growing from US$50 billion in mid 1980s to US$1,577 billion by 2010. By now China has attracted over one third of the world FDI and it is now the second largest recipient of FDI in the world after the USA. China's accession to the World Trade Organisation (WTO) further attracted FDI by enhancing its image as a reliable country for investment.

Liberalisation of the Chinese economy, together with excellent physical infrastructure, well-disciplined and cheap labour force, has attracted foreign firms in several assembly-line industries. Initially China attracted foreign firms in simple assembly line (such as, textile, garments, electric and electronics), but gradually moved into the assembly of high-tech (including, information, communication and technology (ICT) products, and medical and office equipments). These products which are assembled in China mainly from imported inputs are sold globally as if they are 'fully made in China'.[1] This phenomenon even prompted some researchers to argue that China's comparative advantage has shifted from simple labour intensive manufacturing to high-tech ICT products (Rodrick, 2006). However, as Athukorala (2009) asserts the rising share of ICT products in Chinese exports is largely due to its growing involvement in assembly trade facilitated by multinational corporations (MNCs). These MNCs imports parts and components from all over the world which are put together using semi-skilled Chinese workforce and then re-exported globally, giving the impression that the entire production process had taken place in China. This phenomenon has been tagged 'intra-product specialisation' (Arndt, 1997 and 1998), 'vertical specialisation' (Hummels et. al, 2001 and Yi, 2003), 'slicing the value chain' (Krugman, 1995), 'international product sharing' (Ng and Yeats, 2003, Yeats, 2001 and Athukorala and Yamashita, 2006) and 'outsourcing' (Grossman and Helpman, 2005).

In this paper we shed light on this issue by analysing the trends in foreign investment and exports in China, with an emphasis on vertical specialisation. As the costs of connecting various geographic markets fall, globally it has become increasingly attractive to host fragmented production blocks involving sequential, vertical trading

[1] There is growing evidence that China is increasingly involved not only in final assembly of high-tech products but also producing parts and components for assembly elsewhere in the region (namely Indonesia, Vietnam and Cambodia) as wages and rental cost are rising in China.

chains in various locations, with each country specialising in particular stages of a good's production process. Differences in factor prices and factor productivities between countries, together with falling costs of service links, have made it increasingly attractive to move unskilled labour-intensive fragments to countries with an abundant supply of such labour, and capital-intensive fragments to capital abundant nations (Jones and Kierzkowski, 2001).

The disintegration of the production process, which initially began in apparel and electronics goods, now covers a wide range of manufacturing goods, including automotive, office equipment, power and machine tools, cameras, watches and pharmaceuticals. Nowadays, consumers even have choice to design their own computers and have them delivered in a matter of days (for example, Dell computers).[2] This phenomenon has significant implications for trade policy analysis, income distribution and welfare. Cost competitiveness and economies of scale achieved through global production sharing enable product innovation and can result in welfare gains (Arndt and Kierzkowski, 2001). Deardorff (2001) convincingly demonstrated that global production sharing lowers adjustment costs by allowing workers to reemploy in other stages in the same sector, while Dean, Fung and Wang (2011) argue that intra-product trade simulates trade between developed countries and enlarges gains from trade by allocating the production of various stages of a final product to the most efficient countries.

The rest of the paper is organised as follows: Section II discusses foreign investment policy in China and trends in FDI inflows, while emerging foreign trade patterns is analysed in section III. Section IV investigates the nature and extent of vertical specialisation in Chinese exports. The paper concludes in Section V with policy remarks.

II. Foreign Investment Policy in China and Trends in FDI Inflows

(a) Foreign Investment Policy

China had an inward-oriented Soviet style economic and political regime until the mid 1970s. Under the Soviet-style planned economy foreign-owned firms did not exist on Chinese soil until the mid 1970s and foreign trade was regulated by government-owned enterprises. It was only after 1978 that foreign firms began to

[2] This phenomenon has now crossed the manufacturing boundary and spread into services such as software design, banking, telecommunications, hotel and airlines bookings etc.

invest in China when Deng Xiaoping opened up the economy for export-oriented firms, a response following the shortage of foreign currency brought about by the relaxation of import restrictions for domestic firms. To facilitate the development of export-oriented foreign firms, four special economic zones (SEZs) were created along the southeast coast - Shenzhen, Zhuhai, Xiamen and Shantou—in 1980. In 1984, another fourteen SEZs were established as they became increasingly attractive for export-oriented foreign firms[3]. The 1982 Constitution committed to protect property rights of foreign firms. By the mid 1980s, export subsidies were introduced and the Chinese currency (RMB) was significantly devalued—from RMB 1.7 to the US dollar in 1981 to RMB 2.9 to the dollar in 1985(Dwight, 1994)[4]. In the early 1980s and early 1990s, SEZs were extended to three deltas—the Pearl River Delta, the Minnan Delta and Yangzi River Delta—and the Hainan province and the Pudong New Area in Shanghai. Foreign firms located in SEZs were granted preferential tax treatment (income tax-holiday for two years and thereafter 50 per cent discount on income tax for another three years). In addition to this, a number of provinces offered additional tax incentives and lower land-use fees for foreign firms. By the early 1990s, the central government permitted 100 per cent ownership for foreign enterprises and amended the joint venture (JV) law which permitted a JV agreement beyond 50 years. Furthermore, foreign firms were allowed to operate in more sectors than domestic private firms.[5]

In 1992 the government relaxed a number of sectoral and regional barriers relating to foreign investment, decentralized approval authority from the central government to local governments and entered into agreements with the United States to open up its market and protect intellectual property rights vigorously (Lardy, 1992 &1994). These, together with gradual reduction in tariffs, removal of non-tariff barriers and privatization of state-owned enterprises (SOEs), enabled China to gain the WTO membership in November 2001.[6] Accession to the WTO membership was a major development in sending correct signals to investors that China is committed to integrate its economy with the rest of the world. It not only provided opportunities to China to enjoy the

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[3] These include Dailian, Qinhuandao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guanghou, Zhanjiang, and Beijing. In 1990, the concept of SEZ was extended to Shanghai Pudong New area (Chen et. al 1995).

[4] Reforms undertaken until the early 1990s is well documented in Dwight (1994).

[5] It has been said by the vice chairman of National People Congress in 2002 that about 60 sectors were open for foreign investment enterprises as against only 40 for domestic private sector firms (Huang and Di, 2004).

[6] By 2010, an average manufacturing tariff in China was about 5% which is the same as many advanced countries' tariff rates. China does not apply non-tariff measures, except in few areas of national security.

most-favoured nation (MFN) status in the world markets, but also helped attract export-oriented investment by reducing the country's risk for foreign investors.

It should be noted that while the foreign investment climate has been significantly liberalised over the years, domestic private sector firms face several problems including credit constraint, which limits their ability to grow.[7] On the other hand, there is excess investment in the state-owned enterprises mainly due to an easy access to subsidized finance. This, in the presence of political intervention, has resulted in an excessive investment in technology and capital in inefficient SOEs, making acquisition an attractive target for foreign firms (Huang, 2003). The SOEs remain dominant in many sectors—including banking, automobiles, energy, steel, transportation and telecommunications[8]—and they are protected from competition from foreign firms and private sector enterprises through exclusive market access, subsidies and bank credit as mentioned earlier (Siebert, 2007). Discrimination against private firms and favourable incentives for foreign investment have led to huge FDI inflows, despite high corruption and a poor legal system—factors that deter inflows of foreign firms in other developing countries (Wei, 1996).

(b) Trends and patterns of FDI

Although China formally opened up its economy in December 1978, it did not attract much foreign investment until the mid 1980s, which appears to be largely due to a bias inherited in the Soviet-style planned economy. However, as China liberalized its FDI policy in the early 1990 FDI inflows gradually increased—from just over U$3.2 billion in 1990 to U$45.2.5 billion in 2000 to US$ 114.7 billion by 2010 (Table 1), making it the largest recipient of FDI among developing countries, and the second largest in the world after the USA. More than 100 per cent increase in FDI during 2000 to 2010 appears to be partly due to China's accession to the WTO accession in 2001 and partly due to its ongoing commitments to improve physical infrastructure to attract investment in globally integrated production network. The membership to the WTO provided opportunities to China to enjoy the most-favoured nation (MFN) status in the world markets and further attract export-oriented foreign investment especially in the

[7] Inability to grow prevents private sector firms to exploit the benefits of scale economies and new business opportunities.

[8] It has been argued that about one-third of China's GDP is produced by the SOEs (The Economist, 2006). While three of the four state-owned commercial banks have been privatized, the State still holds about 70-80% ownership (Siebert 2007, pp. 900).

assembly of electric and electronic goods whose shares in China export basket rose to about 80 percent by 2010 from just under 30 percent in the mid 1990s.

As shown in Table 1 foreign investment has been heavily concentrated in the Eastern (Coastal) region which provides an excellent infrastructure for export-oriented FDI. By 2010, Eastern region attracted 78 percent of the total foreign investment and, as expected, they were export-oriented, engaged in the assembly of imported parts and components into final products for re-exports. As discussed latter about 26 percent of Chinese exports involve assembly of imported inputs—a phenomenon brought about by the globalisation of the world economy and falling service link costs (such as transportation and communication costs). Gungdong—which is located in Eastern region—remains the largest host of FDI.[9] Although a vast majority of foreign firms are located in the coastal area (ie, Eastern region) to take advantage of export opportunities, foreign firms are also increasingly located in inland regions. The attractiveness of inland regions for FDI is largely due to a large and growing internal market, and FDI located in these regions are mainly engaged in producing goods for domestic market. The share of central region in attracting FDI has increased from 5 percent in the mid 1980s to about 15 percent by 2006 but then fell sharply from 2010 largely due falling domestic demand caused by the 2007 global financial crises (see, table 1). The Western region attracts only about 8 percent of total inward FDI (in 2010). It should be noted that, over the years, the share of Eastern region in attracting FDI has gradually declined (from 91% in the early 1990s to less than 80% in 2006 and then to 78% by 2010).[10]

A large proportion of FDI to China has come from Hong Kong, Macao and Taiwan and they are mainly engaged in small-scale labour-intensive industries, namely textiles and clothing sectors. However, rising labour cost and increasing competition in international market from new suppliers of textiles and clothing from India, Sri Lanka and Bangladesh, China is increasingly losing its competitiveness in textile and clothing products, leading to a fall in FDI inflows from these neighbouring countries. The combined shares of FDI from Hong Kong, Macao and Taiwan fell from 60 percent in 1990 to 47 percent by 2010. In the meantime, the shares of FDI flows from Japan, US and EU rose from 31 percent to about 40 percent in the same period (Jiang et al., 2013). The shares of ASEAN countries (namely Thailand, Indonesia, Malaysia and

[9] The attractiveness of Gungdong as a major destination for FDI appears to be due to its proximity to Hong Kong, both geographically and culturally.

[10] The share of Easter region in attracting FDI has further declined to 76 percent by 2012.

Singapore) and South Korea in the total FDI flows to China have risen from 9 percent in 1990s to about 15 percent by 2010.

Most foreign investment in China has come in the form of equity joint ventures, contractual joint ventures and fully-owned foreign-owned enterprises. As noted in Jiang et al., (2013) FDI realization rate has improved significantly since 1986 in response to the liberalization of the investment climate for foreign firms. The realization rate reached as high as 98 percent in 1999, but fell to about 70 percent by 2010 largely due to increased competition in attracting FDI from other emerging economies.

Insert Table 1 about here

China's ability to attract FDI flows in such a massive scale has led to a dramatic rise in its exports as these MNCs have well-established marketing network globally. As its share in world exports rises (reaching around 12% of world exports by 2010) there is a growing fear that growth in China will completely wipe out manufacturing-base not just in developed countries but also in newly industrialised countries (NIEs) of Asia and Latin America.[11] However, the proponents of this view—which tends of come mainly from trade unions in advanced countries—ignore the fact that as China's exports expand its reliance on imported intermediate inputs (including parts and components) will continue to grow (as shown in the next section below), benefitting both developed and newly industrialised economies (Athukorala, 2009).

[11] China's trade surplus has increased rapidly since 2000, resulting in its overall current account surplus reaching US$359 billion by 2007, which is equivalent to approximately 10 percent of GDP. This covers almost half of the US current account deficit of US$750 billion in 2007 or 6.1 percent of GDP of that year (see, Mckinnon, 2009).

III. Emerging Trends in Chinese Foreign Trade

China's ongoing transformation, from planning to market-oriented economy and from agriculture to manufacturing and service-based economy, has led to a rapid growth in its GDP and foreign trade. During 1990 to 2010 periods, its GDP grew 15 times, from US$390 billion to US$5878 billion, while exports expanded 25 fold from US$62 billion in 1990 to US$1578 billion by 2010. Export growth was even rapid since the mid 2005 when it became a member of the World Trade Organisation (WTO), although growth rates of both exports and imports declined in 2009 mainly due to the global financial crisis (figure 1). Since the mid 2000, export growth has been far greater than imports, resulting in a net trade surplus which reached about 3 percent of China's GDP by 2010. As discussed earlier China's impressive export performance appears to been have been linked with a rise in foreign invested enterprises (FDI) which are increasingly involved in assembly trade utilising China's abundant labour. As the costs of service links (such as transportation and communication costs) continue to fall it has become attractive for foreign firms to set up final assembly centres in China, which involves imports of parts and components for re-export after processing and value adding.

Insert Figure 2 about Here

Over the years, the composition of Chinese exports and imports has changed dramatically. For instance, its exports of primary products have fallen while that of manufactured goods has increased rapidly (Table 2). The decline in exports of primary products is compensated by high value-added manufactured goods whose share rose to 95% by 2010. One noticeable development within manufacturing exports is a rise in exports of machinery and transport equipment (SITC 7 group), which surged from about 10% in 1991 to 49% by 2010 mainly due to China's growing involvement in assembly trade (Athukorala, 2008 and Dean et. al, 2009) and its bilateral trade with both developed and developing countries involves a significant amount of such trade. For instance, in 2007 over 62% of China's exports to the US and 57% of those to Japan were assembly exports. Similarly, about 20% of its imports from newly industrialised countries of Asia (South Korea, Taiwan and Hong Kong) and ASEAN (mainly from Malaysia, Singapore, Thailand and Indonesia) involve parts and components for processing into the final products. It also imports significant amount of parts and components from US, Japan and EU countries for domestic processing (Athukorala 2008 and 2009). By now China has surpassed US to become the world's largest exporter of IT goods. This has even prompted some researchers to conclude that its comparative advantage has shifted from simple labour-intensive products to high-tech items (see, for example, Rodrik, 2006). However, as Athukorala (2009) argues the bulk of the ICT products that China exports are simply mass-market

commodities assembled in China for re-export as final products using imported parts and components; they are not leading-edge-technology products.

Insert Table 2 about Here

The composition of Chinese imports has also witnessed significant structural change over the last two decades. Significant changes have been observed in both imports of primary products and manufactured goods. The shares of primary goods in total imports rose from 17% in the early 1990s to 31% by 2010, while that of manufactured goods fell from 83% to 69% during this period (Table 3). The rise in the share of primary goods in total imports is largely due to a significant increase in imports of (i) crude materials, inedible, except fuels, and (ii) mineral fuels, lubricants and related crude materials to support China's ambition to achieve rapid industrialisation and urbanisation in the country. The combined shares of these primary commodity groups (ie, crude materials, inedible, except fuels, and mineral fuels, lubricants and related crude materials) in total imports rose from 11% in 1991 to 29% by 2010.

Insert Table 3 about Here

It is interesting to note that despite a drop in overall manufacturing imports, shares of machinery and transport equipment in total imports rose from 31% in 1991 to 44% by 2005 but fell to 39% in 2010 due to the global financial crisis (Table 3). The rising shares of machinery and transport equipment imports in total import reflect the fact that imports under this commodity group (SITC 7) is dominated by parts and components for domestic processing and assembly. When import data is disentangle between parts and components and final products it become evident that the share of parts and components in total machinery and transport equipment imports rose from 32 percent in the early 1990s to about 70 percent by 2010. It is this growing import of parts and components which are assembled in China for re-export that has led to a change in the structure of Chinese exports in recent years —a phenomenon increasingly known as vertical specialisation.

IV. Vertical Specialisation in Chinese Exports

(a) Measurement issues

There are at least three methods used in the literature in estimating the degree of vertical specialisation. The choice methodology is largely guided purpose of the study and by data availability. First group of studies, using input-output tables, obtain imported input coefficients and estimate foreign input content in the exports of final goods at the industry and country level (e.g. Feenstra and Hanson, 1996 and Hummels et. al., 2001). The rise (fall) in the imported–input dependence between two time points is then interpreted as an indicator of the growth (decline) in vertical

specialisation. We deploy this approach in the present study. The main advantage of using the input-output table is that it avoids the need to make arbitrary judgment as to what inputs are imported or not. The second group of studies relies on outward and inward processing trade statistics of European Union countries to identify the extent of fragmentation based trade (see for example, Egger and Egger, 2005). However, outward and inward processing trade statistics is available only for a limited number of countries. The last group of studies use a disaggregated international trade statistics compiled by the UN and segregates international trade in parts and components. This technique, which was pioneer by Yeats (2001) has been widely used including by Athukorala and Yamashita (2006) and others.[12] As Yi (2003) argues, ideally the estimates of production fragmentation should be at the level of individual goods and then aggregated up.

Following the methodology developed by Hummels et al. (2001) we estimate the degree of vertical specialisation (VS) as follows:

$$VSS^t = VS^t / EX^t = uA^M [I - A^D]^{-1} X / EX^t$$

where $VS^t = \sum VS_i^t$, the sum of all industrial sectors VS of year t;

$EX^t = \sum EX_i^t$, the sum of all industrial sectors export of year t; and

VSS^t = the VS share of total export of year t.

Vertical specialisation (VS) for each industry sector is determined by:

$$VS^t = (II_i^t / GO_i^t) \times EX_i^t$$

where II_i^t = imported intermediate good used by sector i for year t (including direct and indirect imported intermediate good);

[12] In a study of production sharing in the Australian automotive industry Sharma (2012) uses imported input data compiled in the Key Automotive Statistics.

GO_i^t, = Gross output of sector i in year t; and

EX_i^t = Total export of sector i in year t.

Measures of VS examine both the economy as a whole and each industry sector:

Where u = the summation unit vector $1 \times n$;

$A^M = [m_{ij}]_{n \times n}$, a $n \times n$ matrix of direct inputs of imported goods;

m_{ij} = imported intermediate good i used by sector j for unit output;

I = the identity matrix;

$A^D = [d_{ij}]_{n \times n}$, a $n \times n$ matrix of direct inputs of domestic goods;

d_{ij} = domestic intermediate good i used by sector j for unit output;

$(I - A)^{-1}$ represents the Leontief inverse matrix which captures the intermediate inputs used at any stage of the production process;

X = a vector $n \times 1$ of exports;

EX_i^t = export of sector i in year t.

(b) The extent of vertical specialisation in Chinese exports

In this section we present an analysis of vertical specialization in Chinese exports for 2002 and 2007 period. Our motivation for using 2002 and 2007 is to capture the extent of vertical specialization before and after China's accession to WTO. Data for the analysis (both trade data and the China I-O tables for 2000 and 2007) are compiled from the National Bureau of Statistics of China (NBS).[13] While trade data is available

[13] Every 5 years, i.e., in the year ending with 2 or 7, the National Bureau of Statistics (NBS) of China conducts the national input-output survey and compiles the benchmark input-output tables of the corresponding year. In

for very recent years, the latest I-O table was available only for 2007. Table 4 presents vertical specialization in Chinese total merchandise exports as well as raw and adjusted trade balance (after making allowance for cross border trade in intermediate inputs).

There is evidence that vertical specialization in Chinese exports is high and growing. It rose from 20% of total merchandise exports in 2002 to 26% in 2007, implying that the share of foreign value-added in China's total merchandise exports grew from 20% to 26% during this period. In other words, it implies that domestic value-added share fell from 80% in 2002 to 74% by 2007.[14] So, when imported intermediate inputs are deduced from China's standard trade balance it becomes obvious that its 'actual trade balance' is much lower than what 'raw trade balance' would indicate. For instance, China's raw trade balance was about US$6,201 billion in 2002 and US$21,737 billion in 2007. When the value shares of imported inputs are deduced the actual trade balance is less by 20% and 26% ie, US$4,966 billion in 2002 and US$16, 086 billion in 2007.

Insert Table 4 about Here

As shown in table 5, share of foreign content is high in the Chinese exports of high-tech industries (such as, communications equipment, computers and other electronic equipment manufacturing etc) and low in labor-intensive industries such as (food and tobacco, textile, footwear etc). Chinese exports of communications equipment, computers and other electronic equipment manufacturing sector have the highest share of foreign content and it has been rising. The share of foreign content in its exports of these products group rose from 37% in 2002 to 45% by 2007. As Athukorala (2009) and Dean et. al (2011) note China imports parts and components from the rest of the world for assembly, which are put together and then re-exported as final products.

The next important sector in terms of vertical specialization is measuring instruments and office machinery sector, recording an increase in imported input contents in its exports from 30% in 2002 to 38% in 2007. When Chinese exports are disaggregated into components and final products, it is not difficult to observe that its exports are heavily concentrated in labor intensive final assembly mainly ICT products. The bulk of

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addition, in the year ending with 0 and 5, it also compiles the annual tables. So far, the NBS has compiled the 1987, 1992, 1997, 2002 and 2007 benchmark input-output tables, together with the 1990, 1995, 2000, 2005 annual tables.

[14] This finding is similar to Koopman et. al (2008).

these ICT products (such as, DVD, CD, notebook computers, mobile phones, portable music devices) are simply 'mass-market commodities' priced in large scale at lower costs using imported parts and components. Just because its exports are increasingly dominated by ICT products, which are mainly produced from imported parts and components, does not necessarily mean that China is rapidly gaining maturity as a sophisticated high-tech exporting countries (Athukorala, 2009).

As expected, the shares of imported inputs in the exports of textile; textile, leather and feather products industry are low and declining (see table 5). Food manufacturing and tobacco processing, and handicraft and other manufacturing also have lower shares of imported inputs. In food and tobacco processing, vertical specialization rose marginally in 2007 compared to 2002, from 9% to 12%, while in handicraft and other manufacturing it rose from 15% in 2002 and 17% in 2007.

Growth in processing trade in China coincides with a rise in foreign direct investment, which increased from US$45 billion in 2000 to US$114.7 billion by 2010 (see figure 2).

Insert Figure 2 about Here

This seems to suggest that foreign invested enterprises have contributed significantly to a rise in vertical specialisation in Chinese exports. As shown in figure 2, processing trade percentage of total exports and imports has been rising, although some decline was observed since 2007 mainly due to the global financial crisis which severely impacted China's major trading partners in Europe and America. Processing trade percentage of exports remains as high as 50%, while its share in imports is just under 40%.

IV. Conclusion

This paper contributes to the literature on the role of foreign direct investment and vertical specialisation in China's growth trajectory. Globalisation of the world economy, together with well-developed physical infrastructure, and falling costs of transport and communications, has led to a significant increase in foreign investment into China to take advantage of its comparative advantage in labour intensive activities. Initially foreign investment came to simple assembly line (such as textile, clothing, electronic goods), but gradually China attracted FDI to sophisticated manufacturing industries (such as, ICT products, office and medical equipments etc), giving rise to vertical specialisation in its exports. Over one quarter of Chinese exports appears to be due to the expansion of back-and–forth transactions in vertically fragmented cross-border production process. Our analysis suggests that foreign input content in Chinese

exports is high and rising. When the share of ‘foreign value-added’ in Chinese exports is taken into account the ‘actual trade balance’ is much lower than what ‘raw trade balance’ would indicate.

As expected, share of foreign input content (vertical specialization) is high in Chinese exports of high-tech industries (such as, communications equipment, computers and other electronic equipment manufacturing etc) and low in labor-intensive industries such as (food and tobacco, textile, leather products, footwear etc).

China’s increased involvement in global production network as an assembly centre has created an opportunity for other countries and countries in the region to benefit from its rapid integration with the world economy as its imports of parts and components have grown dramatically and most of these imports come from advanced economies such as US, Europe and newly industrialised economy. Clearly, China’s success story has led to win-win situation, improving welfare globally. As China is committed to continue to integrate with the world economy, its involvement in processing trade will continue. However, China will require to upgrade skills of its workforce through appropriate human capital development policy, otherwise higher wages (for semi-skilled workers) can wipe out its comparative advantage in low-end assembly trade brought about by globalisation. Policy makers in China should also need to think carefully how to embark on industrial upgrading to sustain growth.

Table 1: FDI inflows to China by Region (in Constant US$ million):1985-2010

Year	Eastern Region		Central Region		Western Region		Total FDI
	Volume	Proportion	Volume	Proportion	Volume	Proportion	
1985	867.2	90.4	49.2	5.1	43.3	4.5	959.7
1986	1028.6	84.7	65.4	5.4	120.5	9.9	1214.5
1987	1177.7	84.2	47.2	3.4	173.4	12.4	1398.3
1988	2316.5	85.4	172.9	6.4	223.6	8.2	2713.0
1989	2800.9	89.4	144.8	4.6	187.0	6.0	3132.7
1990	2976.4	91.6	151.5	4.7	122.1	3.8	3250.0
1991	3975.3	91.0	253.6	5.8	140.4	3.2	4369.3
1992	10369.0	87.3	986.9	8.3	518.5	4.4	11874.4
1993	22044.2	82.3	2666.9	10.0	2085.3	7.8	26796.3
1994	28954.8	83.3	3199.3	9.2	2588.7	7.5	34742.7
1995	31497.0	83.3	4053.0	10.7	2259.2	6.0	37809.2
1996	35620.7	83.6	5099.7	12.0	1896.2	4.4	42616.5
1997	37542.1	81.2	6165.9	13.3	2532.4	5.5	46240.3
1998	37366.7	81.5	5962.5	13.0	2492.1	5.4	45821.3
1999	36986.7	82.8	5700.2	12.8	2005.7	4.5	44692.7
2000	38210.3	84.5	5122.0	11.3	1906.0	4.2	45238.2
2001	42805.0	85.5	5300.9	10.6	1985.9	4.0	50091.8
2002	51528.7	85.0	6682.7	11.0	2405.0	4.0	60616.5
2003	64659.5	85.5	8294.2	11.0	2687.3	3.6	75641.0
2004	60996.5	81.9	10364.6	13.9	3136.2	4.2	74497.3
2005	66311.3	79.4	12893.5	15.4	4293.2	5.1	83498.0
2006	80541.4	78.6	16042.2	15.7	5881.7	5.7	102465.3
2007	90325	70.3	30080.0	23.4	8140.0	6.3	128545.8
2008	100875.8	67.0	37082.7	24.6	12646.7	8.4	150605.3
2009	98579.9	64.1	40396.8	26.2	14872.2	9.7	154029.1
2010	89855.0	78.32	6858.0	6.0.	9022	7.86	114734.0

Source: Compiled from China Statistical Yearbook, various issues.

Table 2: Composition of exports by SITC, China: 1991-2010 (value in billion US$)

Category	1991	1995	2001	2005	2008	2009	2010
Total Value of Export (USD)	71.91	148.78	266.1	761.95	1430.69	1201.61	1577.93
Total (% share)	100	100	100	100	100	100	100
Primary Goods (% share)	**22.57**	**14.44**	**9.9**	**5.46**	**5.45**	**5.25**	**5.18**
Food and Live Animals Chiefly for Food	10.06	6.69	4.8	2.65	2.29	2.71	2.51
Beverages and Tobacco	0.73	0.92	0.33	0.12	0.11	0.13	0.12
Crude Materials, Inedible, Except Fuels	4.85	2.94	1.57	0.81	0.79	0.68	0.73
Mineral Fuels, Lubricants and Related Materials	6.62	3.59	3.16	1.83	2.22	1.7	1.8
Animal and Vegetable Oils, Fats and Waxes	0.21	0.3	0.04	0.04	0.04	0.03	0.02
Manufactured Goods(% share)	**77.53**	**85.56**	**90.1**	**94.54**	**94.55**	**94.75**	**94.82**
Chemicals and Related Products	5.32	6.11	5.02	4.6	5.55	5.16	5.57
Manufactured Goods Classified Chiefly by material	20.12	21.67	16.46	18.04	18.34	15.38	16.13
Machinery and Transport Equipment	9.95	21.11	35.66	47.1	47.06	49.12	49.03
Miscellaneous Manufactured Articles	23.13	36.66	32.74	24.56	23.48	24.95	24.01
Products not Classified Elsewhere	19.01	0.01	0.22	0.24	0.12	0.14	0.08

Source: Based on China Trade and External Economic Statistical Yearbook, China Statistics Press, Various Years. Data for 2010 is estimated.

Table 3: Composition of imports by SITC, China: 1991-2010 (value in billion US$)

Category	1991	1995	2001	2005	2008	2009	2010
Total Value of Import	63.79	132.08	243.55	659.95	1132.56	1005.92	1394.83
Total (% share)	100	100	100	100	100	100	100
Primary Goods (% share)	**16.98**	**18.49**	**18.78**	**22.38**	**32**	**28.81**	**30.94**
Food and Live Animals Chiefly for Food	4.39	4.65	2.04	1.42	1.24	1.48	1.56
Beverages and Tobacco	0.31	0.3	0.17	0.12	0.17	0.19	0.15
Crude Materials, Inedible, Except Fuels	7.84	7.69	9.09	10.64	14.72	14.05	14.88
Mineral Fuels, Lubricants and Related Materials	3.31	3.88	7.17	9.69	14.94	12.33	13.76
Animal and Vegetable Oils, Fats and Waxes	1.13	1.97	0.31	0.51	0.93	0.76	0.59
Manufactured Goods (% share)	**83.02**	**81.51**	**81.22**	**77.64**	**68**	**71.19**	**69.06**
Chemicals and Related Products	14.54	13.1	13.18	11.78	10.52	11.14	10.78
Manufactured Goods Classified Chiefly by Material	16.45	21.78	17.22	12.3	9.46	10.71	9.51
Machinery and Transport Equipment	30.73	39.85	43.94	44.01	39.01	40.54	39.48
Miscellaneous Manufactured Articles	3.82	6.25	6.19	9.22	8.62	8.47	8.23
Products not Classified Elsewhere	17.48	0.53	0.69	0.3	0.39	0.33	1.06

Source: Based on China Trade and External Economic Statistical Yearbook, China Statistics Press, Various Years. Note data for 2010 is estimated.

Table 4: The share of vertical specialisation in Chinese merchandise exports, and raw and adjusted trade balance, 2002 and 2007

Year	Share of VS in Chinese merchandise exports	Raw trade balance (US$ billions)	Adjusted trade balance (US$ billions)
2002	0.20	6,208	4,966
2007	0.26	21,737	16,086

NOTE: value in nominal U.S. dollars. Details may not equal totals due to rounding.

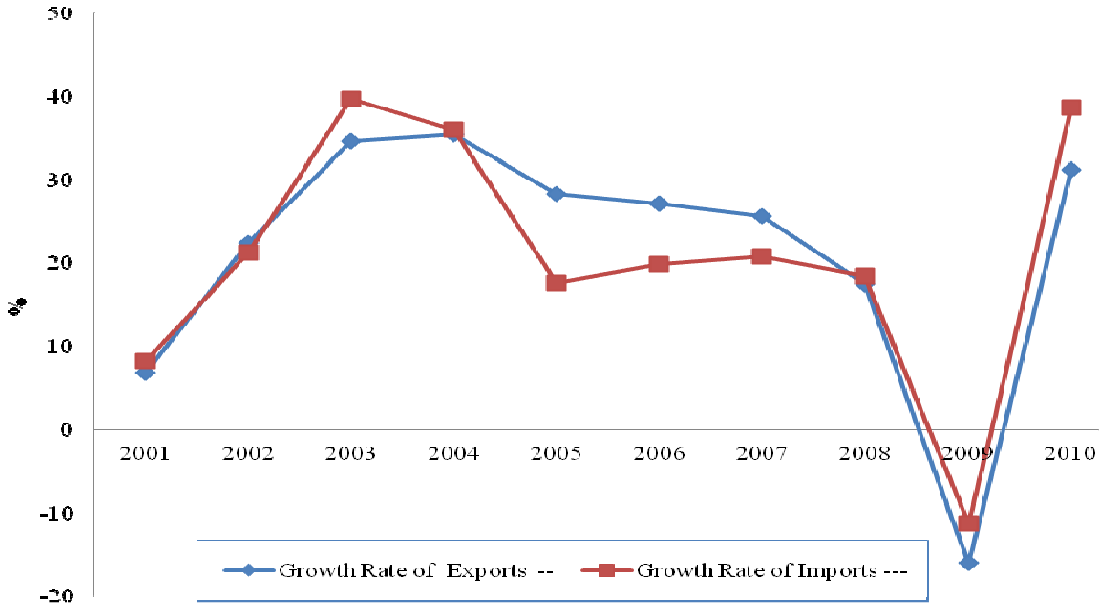
Source: Based on the China Statistical Yearbook (2000-2011) and input-output tables

Table 5: Vertical specialization in key manufacturing industries, China: 2002 & 2007

Manufacturing industries	2002	2007
Food manufacturing and tobacco processing industry	0.09	0.12
Textile	0.18	0.17
Textile, leather and feather products industry	0.19	0.16
Wood processing and furniture manufacturing	0.14	0.15
Paper printing and educational and sports goods	0.14	0.19
Chemical industry	0.18	0.24
Non-metallic mineral products	0.14	0.16
Metal smelting and rolling processing industry	0.17	0.26
Fabricated metal products	0.18	0.22
General, special equipment manufacturing	0.2	0.25
Transportation equipment manufacturing	0.2	0.26
Electrical machinery and equipment manufacturing	0.22	0.28
Communications equipment, computers and other electronic equipment manufacturing	0.37	0.45
Measuring instruments and office machinery	0.3	0.38
Handicrafts and other manufacturing	0.15	0.17

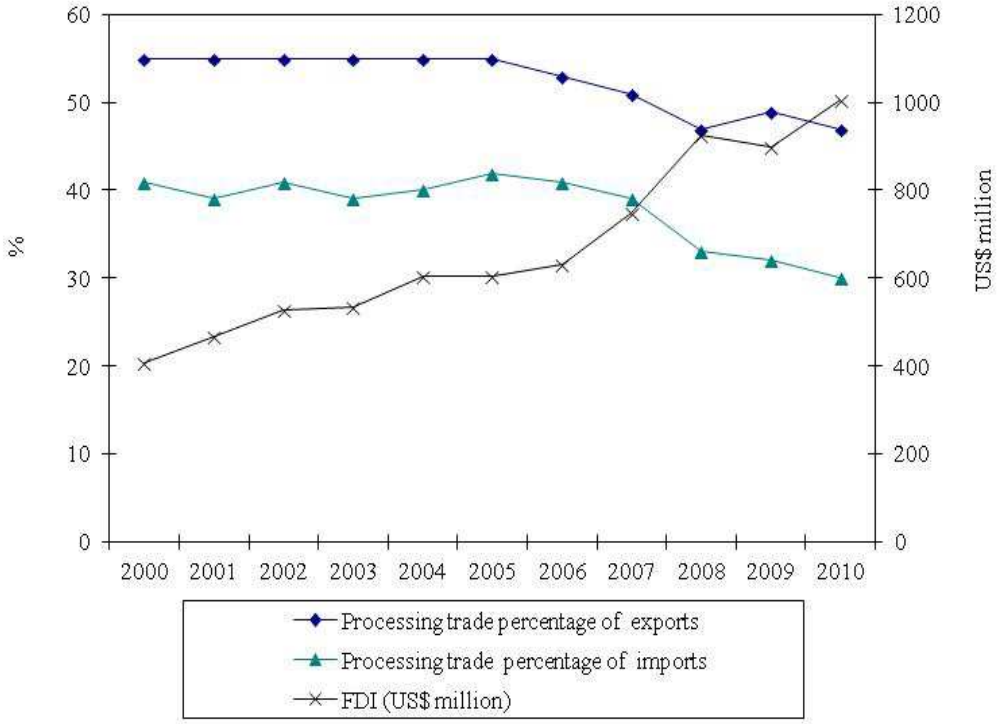
Source: As per table 4.

Figure 1: Growth rates of exports and imports, China: 2000-2010



Source: Chinese Statistical Yearbook, various issues

Figure 2: FDI (US$ million) and processing trade, China: 2002-2010



Sources: Based on China Statistical Yearbook (2011).

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