International trade and industrial dynamics: Geographical and structural dimensions of Chinese and Sino-EU merchandise trade

Li Li, Michael Dunford, Godfrey Yeung

Key Laboratory of Regional Sustainable Development Modelling, Institute of Geographical Sciences and Natural Resources Research (IGSNRR), Chinese Academy of Sciences (CAS), People’s Republic of China
School of Global Studies, University of Sussex, United Kingdom
Department of Geography, National University of Singapore, Singapore

Keywords: China, EU, Globalization, International trade, Revealed comparative advantage, Industrial upgrading

Abstract

This paper draws on trade data to examine the degree of upgrading of China’s trade structure with the world as a whole and in particular with the European Union (EU). More specifically it examines the evolution of the industrial structure of China’s trade with the world and with the EU between 1996 and 2008 and of the underlying dynamic indicators of revealed comparative advantage. This method of analysing China’s industrial structure provides clear evidence of upgrading into more advanced industries without at present losing significant competitive advantage in industries employing unskilled workers. The examination of revealed comparative advantage indices for world and Sino-EU trade also indicates an increasingly high degree of interdependence between the EU and China between 1996 and 2008. The EU (especially Germany, the UK, and France) is China’s most important export market, though it is also much more important as a market for China’s exports than the EU is as a supplier for China. China’s consequent trade surplus with the EU has gradually shifted from textiles and clothing to machinery and furniture. Further investigation reveals that the complementary Sino-EU bilateral trade is moving towards intra-industry trade at the 4-digit level of HS (Harmonization System) commodity classification. Although China is still a ‘global sweatshop’ with a strong specialization in labour-intensive commodities produced for economically developed countries (by importing machinery, raw materials and exporting processed goods), there are signs of technological upgrading in number of selected sectors in China, noticeably electronics, computers and telecommunications equipment. China’s reliance of imports of minerals indicates however that energy and resource security could be an important constraint on China’s long-term economic development.

Introduction

Although adversely affected by the global economic crisis that started in 2007, the Chinese economy has continued to grow rapidly, maintaining a strong trade performance. In 2009 China exported merchandise worth US$1202 billion, accounting for 9.6 percent of global export value. China’s imports overtook those of Germany making China the second largest importer in the world after the United States (US), importing US$1006 billion of commodities. China reported a trade surplus of US$196.1 billion in 2009, down by 33.7 percent from the US$295.5 billion recorded in 2008 (WTO, 2010).

Chinese trade along with world trade as a whole is dominated by trade between major trading blocs, such as East Asia, the North American Free Trade Area (NAFTA) and the European Union (EU) each of which includes economically advanced market economies. Of these partners Chinese trade with the EU has increased significantly in importance. In 2008, the EU imported US$378 billion of commodities from China (US$ 293.1 billion reported by China), making China the largest supplier of EU merchandise imports. These imports included merchandise from EU companies that had relocated parts of their global production systems in China. The EU27 exported US$113 billion of goods to China (US$ 132.8 billion reported by China) making the EU China’s second largest source of imports (after Japan). The result was a US$ 265 billion trade deficit for the EU27. This deficit is a major source of contention between these two major trading partners.

Generally speaking trade between developed and developing economies involves a vertical division of labour in which developed
economies produce high value-added goods and services and exchange them for low value-added goods and services from economically less-developed countries. When China embarked on a path of export-led growth, it accordingly specialized in sectors producing relatively simple, labour-intensive and mass-produced goods and services. To maintain sustainable economic growth, China’s ambition is however to upgrade its industrial structure moving into more advanced sectors and functional roles including in its trade with economically advanced countries.

The existing geographical and development studies literature on Chinese trade has paid some attention to China’s trade with her main trading partners (Chou, Chen, & Mai, 2009; Lall & Albaladejo, 2004; and Liu, Pannell, & Liu, 2009). Most attention has been paid however to the US rather than the EU. The EU is now however China’s most important export market and second-most important supplier: in 2008 the EU27 absorbed 20.5 percent of Chinese reported exports and accounted for 12.8 percent of Chinese reported imports compared with 19.2 percent and 9.1 percent in the case of the more frequently examined trade with North America. Of this literature moreover little attention is paid to the use of trade data to identify evidence of industrial upgrading. Lall and Albaladejo (2004) examined the competitive threat of Chinese exports to other East Asian economies and concluded that in the 1990s trade relationships were largely complementary at least until Chinese industries moved up the value chain. Chou et al. (2009) examined Chinese exports to 40 destination countries between 1991 and 2008 and emphasized the importance of the US and Asia. A second theme in the existing geographical trade literature is the relationship between international trade and the development of the Chinese economy. For instance, Rodriguez-Pose and Gill (2006) argued that sectoral shifts in trade composition contribute to the strong relationship between international trade and regional disparities in China and seven other countries (the US, Germany, Italy, Spain, Brazil, India and Mexico). He et al. (2008) concentrated on the geography of Chinese manufacturing contrasting the strong agglomeration in coastal areas of industries that pursue strategies of globalization and trade with the geographies of industries oriented to the domestic market. Wei, Li, and Wang (2007) and Wei (2009) showed how the Wenzhou model of economic development has been transformed to meet global challenges while counselling against overemphasizing the gains from globalization. A number of these papers have explicitly considered the upgrading issue but the conclusions are mixed. Yu and Tong (2003) demonstrated that the local firms in the information communication technology cluster in Zhongguancun in Beijing benefited from technological and organizational training as a result of their collaboration with TNCs. Lemoine and Ünal-Kesenci (2004) argued that the integration of Chinese industries into global production networks could assist technological upgrading but these export-oriented industries are largely assemblers based on imported components and technology and thus have had limited impact on the diffusion of technology in Chinese industries. Steinfeld (2004) advanced a similar argument concerning the extensive but shallow linkages between Chinese industries and global production systems, with Chinese industries largely manufacturing homogeneous low-value added commodities.

The aim of this paper is twofold. The first is to draw on trade data to examine the evolution of China’s revealed comparative advantage, pattern of specialization and trade structure. This examination of trade data is itself designed to explore the extent to which China has managed to move up the value chain into higher value-added sectors, to engage in intra-industry trade and to retain competitiveness in traditional labour-intensive industries. The second aim is to examine these issues in relation to the evolving geography of China’s trade with the world as a whole and in particular of its increasingly important trade with the EU. An examination of trade data to explore these issues enables us to show that China’s strategic state-led model of inward investment and export-led growth has indeed enabled China to achieve a degree of pre-eminence in developed country markets and to move in a large way into a number of technologically more advanced industries that make a large contribution to its export revenues. The paper develops this argument in a number of steps. In the next section we shall outline some of the underlying theoretical ideas derived mainly from theories of trade and industrial specialization and the ways in which we have operationalized them. Sec. 3 explores a number of issues concerning the measurement of Chinese trade and in particular the impact on trade data of the role of Hong Kong as an entrepôt. In Sec. 4 we explore the shift in the geography of China’s trade towards developed economies paying particular attention to the EU. Sec. 5 examines the ways in which the structure of China’s trade has evolved and in particular considers the evidence for successful upgrading. Sec. 6 concludes.

### Comparative advantage, specialization and international trade: theoretical ideas and empirical measurement

#### Comparative advantage, international trade and industrial upgrading

National and regional specialization, the international division of labour and international trade are seen as driven by comparative advantage (Ricardo, 1817) and by underlying production factor endowments (Heckscher; Ohlin; Samuelson) (Ohlin, 1933). According to the Heckscher–Ohlin theorem, a capital-abundant country exports capital-intensive goods to labour-abundant countries while importing labour-intensive commodities in return. Assuming that the production factors (labour and capital) are mobile within countries but immobile between countries, Samuelson’s factor price equalization theorem also predicts that in a perfectly competitive world prices of factors along with those of traded goods will converge. Of these arguments the idea that trade is driven by comparative advantage is widely accepted. The neoclassical trade theory prediction of regional income convergence has however not materialized.

The existing literature has also established that there is a positive relationship between trade and growth (normally measured by the trade to GDP ratio), while growth itself is seen as driven by investment of capital (subject to diminishing returns), the mobilization of human resources and exogenous time-varying technologies (Solow, 1956). The Solow model predicts conditional β-convergence (β-convergence in the presence of control variables removing the effect of structural heterogeneity in technology, savings and population growth rates) of per capita income to the long-run levels at about 2 percent per annum (Barro, Mankiw, & Sala-i-Martin, 1995). Darity and Davis (2005, pp. 144–145) however argued that conditional convergence only implies the convergence of an individual country’s income toward its own long-run steady-state level determined by its structural characteristics rather than the convergence between countries.

---

1. A referee made the interesting suggestion that the authors consider the EU’s impact on upgrading relative to other countries/blocs. This referee is raising a very interesting question that warrants investigation, although answering it is not the aim of this paper. It would require at least a detailed comparative analysis of China’s trade with several trade partners. In addition it raises difficult attribution issues: China can import machines from Germany and use them to sell to the US (maybe with indirect impacts on German exports in the machine-using sectors).
These neoclassical models of trade and growth raised a number of difficulties including a mismatch between the trade and growth theory predictions of convergence and empirical reality, and the existence of trade in goods produced with similar factor intensities and between similarly endowed countries. To deal with some of these difficulties new theories of growth and trade were developed. Krugman (1979, 1991) attributed international trade between similar countries and the geographical concentration of wealth to economies of scale and consumer preferences for diverse goods and services and also identified the potential significance of the size of the domestic market.

In growth theory Romer (1986) and Lucas (1988) incorporated increasing returns to capital arising from the accumulation of knowledge into new (endogenous) growth models. Romer (1986) argued that private investments generate knowledge spillovers that could offset diminishing returns to capital, and subsequently lead to increasing marginal social returns to capital in the economy as a whole. In addition, to account for the increasing economy-wide returns to human and physical capital, Lucas (1988) developed models in which a positive externality determined by the average level of human capital was an economy-wide phenomenon. By highlighting technological changes through learning by doing, education and human capital formation, these models could explain the polarization of income that resulted when developed countries grew at a faster pace than developing countries during the post-war period (Romer, 1994; Sala-i-Martin, 1996).

These models have a number of implications. First there is a feedback from trade and growth to the evolution of factor endowments making the development of industrial activities and of zones of industrial development path dependent and cumulative. Second, increasing returns and network externalities (conceived more widely than in the aforementioned models) give rise to monopolistic competition and oligopolistic markets. Third, increasing returns open the way to a case for strategic industrial policies (which mainstream economists generally oppose but which are widely used by nations that catch-up with more developed economies) and infant-industry protection: industrial development is path dependent in ways that the use of judicious tariff and quota protection, knowledge transfer and state development planning might support (see Frank, 1969). These measures are especially relevant in the case of agriculturally-based economies whose newly established industries are, in the absence of state intervention in the shape of tariffs or import quotas and active industrial policies, vulnerable to international competition. Initial protection and support allows local industries to achieve a sufficient level of technical capability and production capacity. Obviously, the contentious issues relate to when and how the state should withdraw these judicious interventions and require these industries to compete internationally.

These neoclassical theoretical developments, anticipated in earlier studies of cumulative causation (Myrdal, 1957), imply that an examination of trade and development requires an examination of the dynamic evolution of comparative advantage and specialization. This issue has itself already been considered in the literature to describe the industrial life-cycles sequence involving successively the import of modern manufactures, domestic production, export and finally re-exports once production was moved offshore during the pre-World War II industrial evolution of the newly industrialized economies, in particular Japan. The paradigm was also used to explain an industrial sequence involving a movement from lower to higher value added activities and a succession of industries (textiles, chemicals, iron and steel, motor vehicles and electronic products). The ‘wide geese-flying pattern’ was formulated in the flying geese model to analyze industrial restructuring in specific countries and the relocation of industry from one country to another. This sequence was inter-national rather than intra-national and involved the transfer of products and industries from countries that were more advanced to countries occupying lower positions in the hierarchy (Yamazawa, 1990, p. 28).

In the light of the literature on Global Value Chains and Global Production Networks which have the further advantage of examining the role of multinational corporations and foreign direct investment in shaping the geographies of comparative advantage, these shifts can be interpreted as industrial upgrading/downgrading where the former is defined as ‘the process by which economic actors—nations, firms, and workers—move from low-value to relatively high-value activities in global production networks’ (Gereffi, 2005, p. 171, see also Coe, Hess, Yeung, Dicken, & Henderson, 2004; Sturgeon, Biesebroeck, & Gereffi, 2008; Dunford and Greco, 2006). The main issues involved in industrial upgrading are well documented in relation to specific industrial sectors (such as Bair & Gereffi, 2001; Tokatli, 2007 on clothing) and clusters (such as Giuliani, Petrobelli, & Rabellotti, 2005 and Humphrey & Schmitz, 2002). Mudambi’s (2008) analysis on the “smile of value creation” is particularly interesting as it points out that the high value-added upstream research and development and downstream marketing and distribution activities are normally located in advanced economies while the low value-added (labour-intensive) manufacturing activities are normally located in emerging economies (see also Dunford, 2006). However, most of these studies concentrate on value chain governance (see Gereffi, Humphrey, & Sturgeon, 2005) and on specific industrial sectors or clusters rather than the industrial structure of a country as a whole.

Any application of these theories to the Chinese case must pay attention to the specificities of manufacturing sectors in China and methodologies for estimating the technological content of China’s exports. Rodrik (2006) argued that the technological content of China’s exports (for its income level) is high and is due to industrial policies supporting the growth of consumer electronics industries rather than the usual factor endowment of a low-income country with abundant unskilled labour. In addition to ‘priority industries’ that are identified by the central government for special financial and technological support, the state insisted on the transfer of technology through the formation of joint ventures and the establishment of local content requirements (the procurement of parts and components locally). Yao (2009) however argued that the index for export sophistication used in Rodrik’s (2006) study is unable to reveal the real technological content of China’s exports due to China’s unique processing trade regime and the limitation of HS codes in identifying differentiated products in a cross-country study. Lemoine and Ünal-Kesenci (2004) and Steinfeld (2004) also contributed to this debate concluding that the economic integration of China into the global economy remains ‘shallow’.

In this paper no attempt is made to measure the technological content of China’s industries. As indicated in Section One, this paper draws instead on trade data to examine (1) the evolution of the industrial structure of China’s trade with the world and with an important group of developed market economies and (2) the underlying dynamic indicators of comparative advantage. This method of analysing China’s industrial structure provides clear...
evidence of upgrading into more advanced industries without at present losing significant competitive advantage in industries employing unskilled workers. As a result China’s trade structure stretches from industries such as textiles and clothing at one end to aerospace at the other.

Measuring revealed comparative advantage

The aim of this paper is to examine the evolution of the structure of trade and the underlying evolution of comparative advantage (in a context of increasing returns, multinational investment, differentiated goods, active industrial policies and potentially strong domestic market effects).

The most common methods for measuring a region’s comparative (dis)advantage involve inferences from empirical trading patterns rather than direct measurements. These empirical methods are employed in this paper. Called measures of revealed comparative advantage (RCA) these indicators have the advantages of drawing on reasonably reliable time-series trade data across regions and of ease of use. Two indicators are used along with one graphical representation.

The RCA of net exports as a percentage of gross exports plus imports (Balassa & Bauwens, 1988, p. 7) (hereinafter just RCA-I for the sake of simplicity) is given by:

\[
RCA_{X_{at}}^{i} = \frac{X_{at} - M_{at}}{X_{at} + M_{at}} - 1.00 \leq RCA \leq 1.00 \quad [a = 1, \ldots, n] \tag{1}
\]

where \(X_{at}\) is country \(x\)’s export value of commodity \(a\) at HS 2-digit (or higher) level at time \(t\) and \(M_{at}\) is country \(x\)’s import value of commodity \(a\) at HS 2-digit (or higher) level.

Ceteris paribus the closer the index is to \(+1.0\), the more competitive an industry is in the global economy, and vice versa: that is, RCA-I > 0 implies comparative advantage (CA) while RCA-I < 0 implies a comparative disadvantage (CD).

The advantage of RCA\(^{X-M}\) is that it can be easily modified to give the share of the absolute value of net exports to indicate the share of inter-industry trade in total trade, \(X_{at} - M_{at} / X_{at} + M_{at}\), and to show the magnitude of intra-industry trade\(^3\): \(1 - |X_{at} - M_{at}| / X_{at} + M_{at}\) (Grubel & Lloyd, 1975).

However, there is a tendency for RCA estimated from Eq. (1) to be correlated with overall trade deficits and consequently to be underestimated. To correct for this under-estimation, Eq. (1) can be modified to give the ‘balanced-trade-equivalent’ RCA\(^{X-M}\). This index assumes that the proportional composition of imports is the same, whether total trade is in balance or in deficit. The formula for the ‘balanced-trade-equivalent’ RCA\(^{X-M}\) (hereinafter called RCA for net exports or RCA\(^{X-M}\)) is as follows:

\[
RCA_{X_{at}}^{X-M} = \frac{X_{at} - M_{at}}{X_{at} + M_{at}} - 1.00 \leq RCA \leq 1.00 \quad [a = 1, \ldots, n] \tag{2}
\]

where

\[
M_{at}^{*} = M_{at} \times \left(1 + \frac{B_{xt}}{TM_{xt}}\right) \tag{3}
\]

where \(B_{xt}\) is the total balance of trade in goods and services in country \(x\), and \(TM_{xt}\) is the value of total imports of goods and services in country \(x\).

When only net service data are available, the ‘second-best’ equation for the adjustment factor is as follows:

\[
M_{at}^{*} = M_{at} \times \left(1 + \frac{BG_{xt} + BS_{xt}}{MG_{xt}}\right) \tag{4}
\]

where \(BG_{xt}\) is the balance of trade in goods in country \(x\); \(BS_{xt}\) is the net balance of services in country \(x\); and \(MG_{xt}\) is the value of imports of goods in country \(x\).

The second measure (Balassa, 1965, p. 106, 1977, 1979) is the RCA for a country’s share of the exports of particular commodities (hereinafter called RCA for export share, RCA\(^{X}\), or simply RCA-II). This index measures the share of a commodity in a country’s exports relative to the share of the same commodity in total world exports\(^4\). In equation form:

\[
RCA_{X_{at}}^{X} = \frac{X_{at}}{X_{wat}} \times \frac{\sum_{a=1}^{n} X_{at}}{\sum_{a=1}^{n} X_{wat}} \quad [a = 1, \ldots, n] \tag{5}
\]

where \(X_{at}\) is the country \(x\)’s export value of commodity \(a\) at HS 2-digit level, \(X_{wat}\) is the world export value of commodity \(a\) at HS 2-digit level, \(\sum_{a=1}^{n} X_{at}\) is total value of exports in country \(x\), and \(\sum_{a=1}^{n} X_{wat}\) is total value of world exports.

If country \(x\)’s share of world exports of commodity \(a\), \(X_{at} / X_{wat}\), is greater than country \(x\)’s share of total world exports, \(\sum_{a=1}^{n} X_{at} / \sum_{a=1}^{n} X_{wat}\), then RCA-II > 1.00 and country \(x\) has a CA in commodity \(a\). In a few words, the higher the index, the larger the CA: >1.00 implies a CA; <1.00 implies a CD.

To examine finally changes in comparative advantage, the value of trade, the evolving position of a country in wider value chains and the degree of upgrading, a visual scatterplot is used (Fig. 1).

This scatter plot records net exports of traded commodities in two selected years and provides four pieces of information. First, all commodities are represented by points located in four quadrants. Commodities with a positive trade balance are located in the first quadrant and can be considered products in which a country has a CA, whereas those with deficits and by assumption a CD are located in the third quadrant. Commodities in the second quadrant are ones experiencing a shift from CD towards CA over the period of study, whereas those in the fourth quadrant experience the opposite. Second, the \(x\) and \(y\) values record the size of the trade balance

\(^3\) Intra-industry trade is the export and import of different products in the same product category.

\(^4\) CD (or CA of imports) can be interpreted as a country’s commodity composition of imports vis-à-vis the composition of world imports.
for each commodity. Third, commodities lying above the 45° line contribute positively to the trade balance, whereas those below contribute negatively to the trade balance. Fourth, the figure identifies products recording relative changes in CA: were there no changes in CA net exports should expand/contract in the same proportion, resulting in all points lying on the 45° line. The further a point is from the line, the greater the change.

Trade data sources and methods

The data employed in this paper derive from several sources: the United Nations COMTRADE database (which includes all trade flows of all countries and economic blocs from the 1970s onwards); the China Statistical Yearbook and Provincial Statistical Yearbook (which include a time series of all Chinese aggregate economic data and disaggregated regional and industrial data from 1978 onwards); and unpublished National Bureau of Statistics data on Chinese provincial trade data (covering trade flows for 31 provinces with 27 EU Member States (EU27) by 22 sections of the HS (Harmonization System) 1996 commodity classification for 2001 and 2006).

There are significant discrepancies between China and the world/EU declared trade data in the UN COMTRADE database: in the case of China-EU trade the discrepancies reached 13 percent of eastbound and 20 percent of westbound trade in 2008 (Figs. 2 and 3). These inconsistencies derive from two factors. Methodologically, export data are recorded on a f.o.b (freight on board) basis whereas import data are recorded on a c.i.f (cost, insurance and freight) basis. This methodological difference largely explains inconsistencies between value of imports declared by China and exports declared by the EU in eastbound EU-China bilateral trade. Standing at about 10 percent since 2001, this discrepancy is relatively stable. Re-exports of Chinese merchandise by trading companies in the Hong Kong Special Administrative Region (SAR) are another source of EU-China trade data inconsistencies. According to the Census and Statistics Department in Hong Kong SAR, in 2008 Hong Kong handled about 17 percent of mainland China’s foreign trade, and 62.5 percent of Hong Kong’s total re-exports originated from the Chinese mainland. Moreover, Hong Kong traders mark-up their re-exports after no more than minor processing of the imported commodities. According to Census and Statistics Department estimates, the mark-up of Hong Kong re-exports was 27.5 percent in 2005 (Leung and Chow, 2007). These factors explain why data discrepancies for westbound EU-China trade are much larger (averaging more than 20 percent as Fig. 3 shows) than for eastbound trade.

In this paper it was accordingly decided to use EU declared trade data for EU-China bilateral trade because EU reported imports from China are based on rules of origin and therefore include Hong Kong re-exports. EU declared trade is also used for EU total trade. In the case of the Chinese total however it was decided to use China declared trade, as the destination of Chinese trade is not under consideration and the alternative of adding up Chinese imports as declared by every nation in the world was considered less reliable or subject to problems of data availability.

The geography of Chinese bilateral trade: complementarities and competitiveness

With rapid economic growth and rapidly growing exports and imports, China is becoming one of the most important trading countries in the world. In 1996, China (excluding trade through Hong Kong) accounted for 3.3 percent of the global trade value (3.5 percent and 3.2 percent of the global export and import value respectively). By 2008, this percentage share had more than doubled to 7.1 percent, partly driven by the rise in mainland China’s foreign trade, and 6.2 percent of the global value, while its imports accounted for 61.1 percent of the global value (Fig. 4).

In addition to China, the US/North America and the EU as a whole are other major world trading blocs. In 2008 extra-EU trade amounted to US$ 3.9 trillion, making the EU the top trading economy in the world, followed by US$ 3.46 trillion for the US and US$2.56 trillion for China. This figure reached $3.81 trillion if Hong Kong, Macao and Taiwan are included. In the same year the US was the largest importer accounting for 11.6 percent of the world imports, while China (if Hong Kong is included) was the largest exporter with 10.3 percent of global exports. The EU was the second largest importer and exporter in the world, accounting for 10.4 percent (US$ 1.8 trillion) of exports and 11.4 percent (US$ 2.1 trillion) of imports.

As international trade has increased, China has accumulated substantial trade surpluses with the rest of the world while the EU27 and the United States have recorded consistent trade deficits. China’s trade surplus stood at around US$ 25 billion until 2004, after which there was a surge to reach US$ 297 billion in 2008 (Fig. 4).

China’s trade surplus is not the major driver of China’s national economy. As a share of GDP Chinese net exports increased significantly from about 2 percent in 1996 and reached the peak at 8.9 percent in 2007. This figure is much lower than the figure for gross fixed capital formation, which has accounted for at least one-third of the GDP in China since the late 1970s, and government and household consumption.
Within these large trading zones the degree of involvement in international trade can vary quite widely. A relatively small number of EU Member States and Chinese provinces for example accounted for a significant proportion of their trade. Germany, Italy, France, the UK, the Netherlands, and Belgium were the leading traders and accounted for nearly three quarters (74.2 percent or US$ 364.6 billion) of the EU’s external trade value in 2008. Germany alone contributed 28.5 percent of the EU exports and 21.5 percent of the EU imports by value in 2008. In stark contrast, ten east European Member States accounted for just 7.4 percent of the EU exports and 10.8 percent of EU’s imports.

Given that a significant proportion of China’s manufacturing industries is located in supply-chain cities in coastal areas in the Yangtze and Pearl River deltas these zones not surprisingly accounted for significant shares of Sino-EU trade and Sino-world trade. Guangdong, Jiangsu, Zhejiang and Shanghai are the four main exporters of Chinese goods accounting for 72.9 percent of total exports to the EU. EU imports are mainly destined for Shanghai, Guangdong, Beijing and Jiangsu. Together these provinces account for 64.7 percent of total EU imports by value.5

Table 1 records the geography of mainland China’s trade in 1988, while Figs. 5(A) and 5(B) indicate the evolution of the geography of China’s trade in 1996–2008. In 2008 trade with the rest East Asia (Japan and South Korea) was very important as was trade with the Association of Southeast Asian Nations (ASEAN) with which it has recently established free trade agreements. In 2008 Japan accounted for 13.3 percent of Chinese imports, South Korea for 9.9 percent, Taiwan for 9.1 percent. Japan and Korea were also important export destinations. As of 2007 China’s most important trade partner was however the EU followed by the US. From 1996 until 2008 the EU share of Chinese exports rose from 13.3 to 20.5 percent, while the US share rose and fell, starting and ending at 17.7 percent and the share of Japan dropped from 20.4 to 8.1 percent. In 2008 Hong Kong accounted for 13.4 percent, of which about two-thirds would be re-exported to other markets. The EU27, the US and Japan all saw their share of Chinese imports diminish, although imports remain large (13.3 per cent for Japan, 11.7 percent for the EU27 and 7.2 for the USA). China’s imports from other parts of the world rose from 43.5 to 67.7 percent of the total reflecting a significant diversification of the geography of imports and China’s growing global role.

Clearly the relative importance of different trade partners reflects the choice of geographies to examine trade. As gravity principles imply, moreover, the largest trade markets are the ones in which the greatest possibilities exist for selling exports and finding imports so that trade volumes will ceteris paribus be large with large and affluent market areas, while distance decay effects help explain the relative importance of trade with nearby countries. The geography of trade and its evolution are also however a reflection of underlying inward and outward foreign direct investment flows and the “smile of value creation” where emerging economies are simply used as assembling sites for products designed and consumed in developed economies (see Mudambi, 2008). Chinese trade with the economically advanced EU and US is in part a consequence of direct investments in China by European, US, Japanese and Korean multinationals who chose China as an assembly site for sales of products with imported parts and components to overseas markets of which some of the largest are found in high income countries. At the same time trade with ASEAN countries reflects the impact of China’s processing trade regime and the regional production networks this regime stimulated with the manufacture of components for assembly in China. As trade theories suggest trade specialization is also a reflection of comparative advantage: much of the initial investment in China was attracted by the availability of inexpensive unskilled labour and the quality of the infrastructures enabling the circulation of goods and services. Chinese competition results in turn in further output and employment losses in the developed countries from which these investments originated as imports are substituted for domestic production. In the particular case of the EU27 Chinese exports rose from US$ 35.35 billion in 1996 to US$ 378.3 billion in 2008, while EU27 exports to China reached only US$ 113.25 billion in 2008. In the first phase the countries of origin are also important suppliers of equipment generating a large flow of imports into China, although in some cases a variety of export restrictions are imposed.

5 Three phenomena warrant attention. First, several central (such as Hebei and Shanxi) and northeastern provinces (such as Liaoning) saw moderate increases in net export value in 2001–06. Second, trade surpluses accounted for a larger share of GDP in Zhejiang and Jiangsu than in Guangdong (although Guangdong recorded the largest absolute trade surplus with the EU) in 2006. Third, Shanghai has moved from a net importer to a net exporter to the EU, while Beijing has been continuously a net importer of the EU goods.
in technologically sensitive areas contributing to the deficits of developed countries. Over time however active industrial policies permit China to move up the value chain. As it does so its resource endowment and its comparative advantage change as does its relationship with areas such as the EU which assumes the shape of one that is more competitive and less complementary. A particularly striking recent example relates to wind power: in 2004 China imported 80 percent of the wind power generation equipment installed in China from leading companies in the EU and also in the US. In 2009 80 per cent was produced in China.

To examine in more detail these ideas concerning the drivers of the evolving geography of trade attention must therefore be paid to changes in industrial structures and in particular to the extent to which upgrading has occurred and the extent to which it reflects

<table>
<thead>
<tr>
<th>Table 1</th>
<th>China’s main trading partners in 2008 (recorded by China).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exports from China</strong></td>
<td><strong>Imports to China</strong></td>
</tr>
<tr>
<td>Partners</td>
<td>$ Bn</td>
</tr>
<tr>
<td>World</td>
<td>1428.7</td>
</tr>
<tr>
<td>1 EU27</td>
<td>293.1</td>
</tr>
<tr>
<td>2 United States</td>
<td>252.8</td>
</tr>
<tr>
<td>3 Hong Kong</td>
<td>190.7</td>
</tr>
<tr>
<td>4 Japan</td>
<td>116.2</td>
</tr>
<tr>
<td>5 ASEAN-10</td>
<td>114.1</td>
</tr>
<tr>
<td>6 South Korea</td>
<td>73.9</td>
</tr>
<tr>
<td>7 Russia</td>
<td>33.0</td>
</tr>
<tr>
<td>8 India</td>
<td>31.5</td>
</tr>
<tr>
<td>9 Taiwan</td>
<td>25.9</td>
</tr>
<tr>
<td>10 United Arab Emirates</td>
<td>23.6</td>
</tr>
</tbody>
</table>

Fig. 5. Geography of China’s exports (A) and imports (B), 1996–2008 (elaborated from COMTRADE data).
the dynamic evolution of China’s comparative advantage under the impact of investment and China’s interventionist policy regime. This analysis will concentrate on China’s trade with the world and also with the EU which as China’s main trading partner has received surprisingly little attention.

Structural changes in Chinese merchandise trade

Changing profiles of Chinese merchandise trade

A more detailed assessment of the foundations and sustainability of the striking success of Chinese exports in global markets and in particular Chinese penetration of developed country markets in general and the EU in particular requires a more detailed examination of the structure of Chinese trade with the world and with the EU. As we shall show, the pattern of Chinese merchandise trade reveals an underlying change in China’s economic structure from one dominated by the assembly and processing of a wide variety of low-technology, light consumer goods such as textiles, clothing, footwear, toys, sports goods and simple household goods to higher-technology products, although in these higher-technology sectors China often remains dependent on imports of technology-intensive components.

As a result of a wide range of national and sub-national state industrial policies, China has moved up the value chain. This movement is reflected in the changing importance of machinery and textiles in China’s section-level merchandise trade. Although it accounted for 23.2 percent of China’s export value in 1996, China was a net importer of machinery. By 2008, machinery was in surplus accounting for 33.4 percent of China’s net export value (42.8 percent of the total export value and 36 percent of the total import value) (Fig. 6). Textiles by contrast still ranked second in terms of net export value at 25 percent in 2008 (and 12.6 percent of total export value). The relative significance of textiles declined but not in line with the flying geese model of dynamic specialization: the data suggests cases of successful upgrading but the rise of competitiveness of the machinery sector has not corresponded with a fall in the competitiveness of textiles and clothing in China.

China’s industries are heavily dependent on imported energy, metals and other natural resources. In 2008, mineral products accounted for a massive 71 percent of net import value, followed by optical equipment (at 10 percent) and plastics (at 6 percent) (Fig. 6(B)). China accounts for a large share of the overall increase in global consumption and plays an important role (alongside financial markets) in driving world prices of energy and raw materials such as iron ore and coal prices which increased strongly in 2009 and 2010.

Changing RCA of Chinese commodities: a sign of industrial upgrading?

With abundant labour, costing on average just some US$ 130 per month, China commands a significant CA in labour-intensive industries. In 2008 RCA-I was as high as 0.93 in footwear manufacturing, and 0.92 in miscellaneous manufacturing (which included furniture and toy making) (Table 2). China’s RCA-I score for textiles and clothing increased from 0.35 in 1996 to 0.76 in 2008. This increase in RCA-I was accompanied by a noticeable decrease in RCA-II (Table 2) essentially due to changes in the relative significance of export sectors.

The increase in RCA-I indicates that China increased its domination in textiles and clothing in terms of net export value due to increases in Chinese value added and therefore upgrading within the sector. The decrease in RCA-II suggests that exports of this labour-intensive manufacturing sector are growing more slowly than China’s share of world trade due to the more rapid expansion of exports in other sectors: Textiles and clothing accounted for 23.1 percent of China’s total export value in 1996 compared with 12.6 percent in 2008. In other words, sectors other than traditional labour-intensive manufacturing sectors made larger contributions to the rapid increase in China’s export value. These trends provide prima facie evidence to support the proposition that the upgrading in Chinese manufacturing sectors have not entirely fallen in line with the flying geese model of dynamic specialization.

Machinery, mechanical, electrical and electronic goods see very strong increases in RCA-I and RCA-II: a CD is converted into a CA as...
a result of improvements in relative competitiveness and export values as a share of China’s total export value increases from 20.6 percent in 1996 to 42.8 percent in 2008. This remarkable improvement is a reflection not just of the attractiveness of China’s production factors and the quality of logistic and communications infrastructures but is also a reflection of the combined effect of sets of preferential government policies plus a set of industrial policy mechanisms designed to promote increases in local content and technology transfer and thereby to strengthen the resource endowments that drive CA. In addition these results indicate the importance of not relying on a single indicator to reveal trade competitiveness.

An even sharper decline in RCA-II occurs in the case of minerals reflecting China’s increased domestic need for mineral resources. In this case RCA-I also declines. The rapid decline in RCA-I for mineral products from 0.11 to 0.76 reflects China’s increased dependence on imports of minerals to fuel its rapid economic growth.

Rodrik (2006) argued that the high technological content of China’s exports (for its income level) was due to industrial policies supporting the growth of consumer electronics industries rather than the usual factor endowment of a low-income country with abundant unskilled labour, although these measures can also actively alter factor endowments. Yao (2009) however argued that the index for export sophistication used in Rodrik’s (2006) study is unable to reveal the real technological content of China’s exports due to the unique processing trade regime and the limitation of HS codes in identifying differentiated products in a cross-country study. Based on a world electronics production dataset, Van Assche and Gangnes (2010) however claim that there is little evidence that China is upgrading its electronics sectors into more sophisticated production activities, although in this case the argument is not about what trade data reveals but about the limitations of trade data.

These conflicting recent findings make it vital to examine the trade data at the HS 4-digit level to identify the changing CA of Chinese manufacturing sectors. This data shows that China has a CA in base metals but with CD in copper since 2001 (Figs. 7 and 8). China also has a CD in minerals, especially crude oil from petroleum and bituminous minerals (2709) and iron ore (2601). Although machinery (8485) has recorded an increase in competitiveness at the 2-digit level, there is significant differentiation within this sector; the higher-end products, such as electronic integrated circuits and micro-assemblies (8542), suffer from increasing CD whereas automatic data processing machines (including computer hardware peripherals) (8471), machinery and mechanical appliances (8479), transmission apparatus for radiotelephony (including television, cameras and cordless telephones) (8525) and electrical apparatus for line telephony and telephone sets (8517) are increasingly competitive.

To identify the changing factor content of Chinese exports the composition of automatic data processing machines (8471), electronic integrated circuits (8542) and liquid crystal devices (9013) was examined in more detail. Computers and peripherals

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RCA-I</td>
</tr>
<tr>
<td>Mineral Products</td>
<td>-0.11</td>
</tr>
<tr>
<td>Chemical products</td>
<td>-0.11</td>
</tr>
<tr>
<td>Plastics</td>
<td>-0.40</td>
</tr>
<tr>
<td>Raw Hides, Skins</td>
<td>0.36</td>
</tr>
<tr>
<td>Wood</td>
<td>0.13</td>
</tr>
<tr>
<td>Pulp of Wood</td>
<td>-0.61</td>
</tr>
<tr>
<td>Textiles</td>
<td>0.35</td>
</tr>
<tr>
<td>Footwear, Headgear</td>
<td>0.90</td>
</tr>
<tr>
<td>Base Metals</td>
<td>-0.10</td>
</tr>
<tr>
<td>Machinery, Mechanical</td>
<td>-0.22</td>
</tr>
<tr>
<td>Vehicles, Aircraft</td>
<td>-0.12</td>
</tr>
<tr>
<td>Optical, Photographic</td>
<td>0.06</td>
</tr>
<tr>
<td>Arms, Ammunition</td>
<td>0.84</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Fig. 7. Changes in sectoral profile of Chinese merchandise trade at 4-digit level, 1996–2001.
accounted for the lion’s share of Chinese exports of automatic data processing machines (8471): portable machines such as laptop computers accounted for one-half of the export value of automatic data processing machines in 2008, followed by input or output (actually mainly output) units such as printers and displays (17 percent) (Fig. 9). Interestingly, storage units (847170), such as hard drives which accounted for 72 percent of total imports of automatic data processing machines into China in 2008, constituted the only net import within this category. As the years have passed, China has increasingly relied on imported electronic integrated circuits (8542), especially hybrid integrated circuits (854230), and liquid crystal devices (9013). The latest estimate by the General Administration of Customs (GAC) (2010) further revealed that foreign-financed enterprises in China accounted for 69.3 percent (US$ 494.4 billion) of the export value in machinery and electronic products in 2009.

This evidence suggests that notwithstanding some upgrading China still imports parts and components and assembles them before exporting the finished products to overseas markets, essentially as the original equipment manufacturers (OEM) for the lead firms in developed countries. The fact that China imports some of the most sophisticated components also suggests that the transfer of know how has so far occurred through foreign investment and the establishment of joint ventures and that some of the critical technologies are yet to be mastered.

Over the years however the overall scale of operations has increased significantly, upstream and downstream activities have developed in China and increasing integration has occurred along the value chain, partly due to the incentives to support prioritized industries as well as local content and procurement requirements policies implemented by the state. Over time the degree of technological sophistication of the activities international and domestic firms establish in China is increasing as a result of the agglomeration effects of industrial clusters and the coupling with international production networks. In addition the development of OEM is an important stepping stone for increasing technological sophistication as it is associated with lower entry barriers and may open to door to original own brand manufacturing in Chinese electronic sectors.

These findings are to some extent consistent with the unexpectedly high technological content of Chinese exports reported by Rodrik (2006) and with the findings of Yu and Tong (2003) and Gereffi (2009). If integration remains ‘shallow’ as Steinfeld (2004) and Lemoine and Ünal-Kesenci (2004) argued, shallowness is decreasing. Yao (2009) contested Rodrik’s claim that China’s trade does not reflect its factor endowment. Our evidence does not permit the adoption of a stance on this issue though it does permit us to hypothesize that a certain degree of knowledge transfer not captured in factor endowment measures has occurred.

**Structural upgrading in Sino-EU trade: CAs of Chinese commodities**

In 2008 the composition of Chinese exports to the EU was in many ways similar to its exports to the world as a whole. Machinery (41.8 percent of total EU27 imports were Chinese compared with 42.8 in the world), textiles and clothing (14.1 percent compared with 12.6), miscellaneous manufactures (including furniture and toys, 11.2 percent compared with 5.8) and base metals (8.3 percent compared with 10.1). These sectors have moreover all seen strong increases in Chinese exports to the EU27. As far as Chinese imports are concerned machinery accounted for 45.4 per cent compared with 36.0 from the world as a whole, and vehicles for 36.0 compared with 16.0. The other important difference is that although mineral imports account for 23.1 percent of Chinese imports, the EU is not a significant supplier.

In its trade with the EU27-China’s endowment with abundant labour gives it a revealed comparative advantage in labour-intensive manufacturing sectors, specifically textiles and clothing, footwear and headwear, furniture and toys (Table 3). With accumulated capital and higher technology (including precision machinery), the
EU27 might be expected to specialize in and export machinery, mechanical appliances, vehicles and spacecraft to China. However, China’s competitive strength in these sectors is increasing: the RCA-I for Chinese machinery increased from 0.13 in 1996 to 0.49 in 2008, and the index for Chinese vehicles and aircraft increased from 0.62 to 0.31. The substantial increase in Chinese machinery as a share of EU imports from China along with the slight decrease in the share of labour-intensive products (such as footwear) is indicative of a strengthening of China’s position in more sophisticated industries and consistent with China’s trading patterns with the world. This argument receives some support from the EU decision to launch anti-dumping, anti-subsidy and safeguard probes into wireless wide area networking (WWAN) modems (devices that allow links to wireless networks) in late June 2010. The unusual nature of the EU decision to launch at one and the same time anti-dumping, anti-subsidy and safeguard cases in relation to a single product illustrates the rising competitiveness of certain Chinese ITC products in the 3-G market (China Daily, 21 September 2010). This evidence relating to EU trade provides further circumstantial evidence to support the proposition that state intervention in the shape of local content requirements in joint ventures and other industrial policies assist the upgrading of Chinese manufacturing sectors.

To consider trends in competitiveness in more detail 4-digit data was used to examine the evolution of the frequency distribution of RCA-I scores for EU27-China bilateral trade. In 2008 the number of commodities for which China recorded negative RCA-I scores (CD) was much smaller than in 1996. The mean RCA-I score more than doubled and the standard deviation declined. Most striking was the remarkable decline in the number of sectors with very substantial CD and the existence of some 400 sectors with RCA-I scores close to one.

An important question that arises from these changes in China’s comparative advantage and specialization concerns the extent to which there has been a shift from inter-industry to intra-industry trade. To examine this possibility an index of intra-industry trade (IIT) was calculated as follows:

$$IIT_{jk} = 1 - \left[ \sum_i |X_{ijk} - M_{ijk}| / (X_{ijk} + M_{ijk}) \right]$$

where $X_{ijk}$ and $M_{ijk}$ represent exports and imports of products from industry $i$ in country $j$ to and from country $k$. The results show that total IIT has increased from 0.15 in 1996 to 0.235 in 2001. In 2008 it decreased slightly to 0.21. As these scores are low, EU27-China bilateral trade comprises a large share of intra-industry trade reflecting strong complementary relationships.

While intra-industry trade predominates, in the case of China there has been a significant change in the sectoral composition of its trade with the EU. In 1996, labour-intensive manufacturing products such as suitcases and toys were the most competitive products, while automatic data processing machines and telecommunications equipment rose to the top in 2001. In the case of the EU27 exports to China the most competitive commodities have remained largely unchanged, comprising motor cars, aircraft and spacecraft, and machines and mechanical appliances. Already it is clear that China is capable of itself producing equipment it formerly imported, although its expanding market still leaves a great deal of space for increased EU imports. The more recent rapid growth in China of transport equipment industries in which the EU has a strong specialization also encourages the development of complementary relationships, though in the course of time China is also likely to emerge as a significant competitor in these sectors.

### Table 3

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Animal</td>
<td>0.71</td>
<td>0.57</td>
<td>0.48</td>
<td>0.42</td>
<td>0.12</td>
<td>0.95</td>
<td>1.07</td>
<td>1.10</td>
</tr>
<tr>
<td>Vegetable Products</td>
<td>0.74</td>
<td>0.70</td>
<td>0.82</td>
<td>0.80</td>
<td>1.03</td>
<td>0.71</td>
<td>0.79</td>
<td>1.01</td>
</tr>
<tr>
<td>Animal or Vegetable Fats</td>
<td>0.13</td>
<td>0.17</td>
<td>0.37</td>
<td>0.27</td>
<td>0.06</td>
<td>0.04</td>
<td>0.86</td>
<td>1.41</td>
</tr>
<tr>
<td>Prepared Foodstuff</td>
<td>0.77</td>
<td>0.61</td>
<td>0.35</td>
<td>0.29</td>
<td>0.64</td>
<td>0.53</td>
<td>0.57</td>
<td>0.60</td>
</tr>
<tr>
<td>Mineral Products</td>
<td>0.83</td>
<td>0.79</td>
<td>0.57</td>
<td>0.65</td>
<td>0.47</td>
<td>0.51</td>
<td>0.48</td>
<td>0.46</td>
</tr>
<tr>
<td>Products of the Chemical</td>
<td>0.51</td>
<td>0.76</td>
<td>0.20</td>
<td>0.19</td>
<td>0.16</td>
<td>1.68</td>
<td>1.20</td>
<td>0.85</td>
</tr>
<tr>
<td>Plastics &amp; Articles T</td>
<td>0.62</td>
<td>0.52</td>
<td>0.35</td>
<td>0.34</td>
<td>1.20</td>
<td>1.12</td>
<td>0.87</td>
<td>0.85</td>
</tr>
<tr>
<td>Raw Hides &amp; Skins Lea</td>
<td>0.94</td>
<td>0.87</td>
<td>0.82</td>
<td>0.80</td>
<td>1.34</td>
<td>1.28</td>
<td>1.27</td>
<td>1.39</td>
</tr>
<tr>
<td>Wood &amp; Articles of Wo</td>
<td>0.79</td>
<td>0.60</td>
<td>0.32</td>
<td>0.80</td>
<td>0.80</td>
<td>1.08</td>
<td>1.00</td>
<td>1.27</td>
</tr>
<tr>
<td>Pulp of Wood or of Other</td>
<td>0.14</td>
<td>0.08</td>
<td>0.11</td>
<td>0.06</td>
<td>0.94</td>
<td>0.84</td>
<td>0.86</td>
<td>0.86</td>
</tr>
<tr>
<td>Textiles &amp; Textile A</td>
<td>0.99</td>
<td>0.91</td>
<td>0.93</td>
<td>0.93</td>
<td>0.89</td>
<td>0.86</td>
<td>1.17</td>
<td>1.30</td>
</tr>
<tr>
<td>Footwear Headgear Umbrel</td>
<td>0.98</td>
<td>0.99</td>
<td>0.98</td>
<td>0.98</td>
<td>0.71</td>
<td>0.69</td>
<td>1.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Articles of Stone Plaste</td>
<td>0.52</td>
<td>0.62</td>
<td>0.80</td>
<td>0.79</td>
<td>0.88</td>
<td>0.87</td>
<td>1.17</td>
<td>1.19</td>
</tr>
<tr>
<td>Natural or Cultural Pear</td>
<td>0.78</td>
<td>0.35</td>
<td>0.25</td>
<td>0.33</td>
<td>1.29</td>
<td>1.52</td>
<td>1.14</td>
<td>1.25</td>
</tr>
<tr>
<td>Base Metals &amp; Articl</td>
<td>0.03</td>
<td>0.39</td>
<td>0.46</td>
<td>0.43</td>
<td>1.18</td>
<td>1.04</td>
<td>1.06</td>
<td>1.06</td>
</tr>
<tr>
<td>Machinery &amp; Mechanic</td>
<td>0.13</td>
<td>0.31</td>
<td>0.56</td>
<td>0.49</td>
<td>1.01</td>
<td>1.08</td>
<td>0.96</td>
<td>0.90</td>
</tr>
<tr>
<td>Vehicles Aircraft Vessel</td>
<td>0.61</td>
<td>0.38</td>
<td>0.41</td>
<td>0.31</td>
<td>0.87</td>
<td>1.07</td>
<td>0.87</td>
<td>1.15</td>
</tr>
<tr>
<td>Optical Photographic Cin</td>
<td>0.51</td>
<td>0.53</td>
<td>0.27</td>
<td>0.21</td>
<td>1.19</td>
<td>1.16</td>
<td>0.70</td>
<td>0.69</td>
</tr>
<tr>
<td>Arms &amp; Ammunition</td>
<td>0.44</td>
<td>0.65</td>
<td>0.51</td>
<td>0.40</td>
<td>2.29</td>
<td>0.23</td>
<td>0.56</td>
<td>0.83</td>
</tr>
<tr>
<td>Miscellaneous Manufactur</td>
<td>0.97</td>
<td>0.96</td>
<td>0.97</td>
<td>0.96</td>
<td>1.08</td>
<td>1.06</td>
<td>1.17</td>
<td>1.25</td>
</tr>
<tr>
<td>Works of Art Collectors</td>
<td>0.88</td>
<td>0.60</td>
<td>0.51</td>
<td>0.57</td>
<td>0.51</td>
<td>0.61</td>
<td>0.65</td>
<td>1.06</td>
</tr>
</tbody>
</table>

**Fig. 9.** Composition of Chinese exports of automatic data processing machines (8471) in 2008.
Conclusions

China’s booming export sectors are still largely scale-driven: the expansion of trade volumes are largely of relatively low value-added assembly-based and/or energy-intensive commodities which demand the importation of raw materials and energy. There are however signs of industrial upgrading: capital and technology-intensive sectors are growing at an even faster pace than labour-intensive sectors, with strong increases in indicators of revealed comparative advantage (RCA) (RCA-I and RCA-II) in machinery and a decline in the relative importance of textiles and clothing sectors (RCA-II). An examination at the 4-digit level of HS (Harmonization System) commodity classification trade data revealed that the increase in the technological content of Chinese exports is largely a result of the growth of computers, office equipment and electronics and telecommunications equipment and that China remains dependent on imports of some of the most sophisticated components.

Theoretically, this evidence strongly supports models of dynamic specialization yet indicates that the upgrading of Chinese manufacturing sectors has not entirely fallen into line with the flying geese model of dynamic specialization. Rather than following the linear sequence of rise and fall of competitiveness of an industrial sector as in other newly industrializing countries, the rise of competitiveness of the machinery sector has not corresponding with a fall in the competitiveness of textiles in China. In addition to the significant differences in factor endowments (where the provision of lower cost workers for labour-intensive industries is less of an issue than in Japan not least as China still has a large rural population and large economically less-developed areas), the judicious state intervention in form of local content and procurement requirements as well as the incentive policies for priority industries is almost certainly an important contributor to the technological upgrading of manufacturing sectors and the maintenance and even enhancement of high levels of competitiveness in earlier areas of specialization in China.

As far as China’s trade with the EU is concerned the evidence suggests that intra-industry trade predominates and that there is a high degree of complementarity: China assembles labour-intensive commodities, such as computers (8471), line and cordless telephones and transmission apparatus (8517 and 8525), for export to the EU27, while the EU27 exports capital-intensive commodities, such as motor cars (8703), aircraft and spacecraft (8802), machines and mechanical appliances (8479) to China.

China’s trade surplus remains accordingly a matter of some controversy. Certainly it is one of elements of the increasing imbalances that have characterized increased globalization and international trade since the early 1990s (Dunford & Yeung, 2011). China has a trade surplus with the world as a whole and with economically advanced countries including the EU in particular. In the EU27 this deficit stands at less than 3 percent of GDP, although the deficit is more significant in some Member States such as the Czech and Slovak Republics. The import of low cost labour-intensive commodities has mixed effects: it is advantageous for consumers but it results in job losses and perhaps in output decline in sectors producing the same goods in the EU27. Insofar as new employment opportunities are not created the workers and communities concerned suffer from these losses in employment and income. A consequence is frequent trade friction clearly illustrated by the hundreds of anti-dumping suits and countervailing measures initiated by trading partners (including the EU) through the World Trade Organization. A striking new example is the recent anti-dumping, anti-subsidy and safeguard probes launched simultaneously by the EU into wireless wide area networking (WWAN) modems mentioned earlier, partly as a response to the dominance of one Chinese company, i.e., Huawei which alone accounts for more than 50 percent of the European market for WWAN 3-G modems (China Daily, 21 September 2010). EU allegations concerning state subsidies for the development of renewable energy industries and state procurement requirements/restrictions are another two potential future sources of trade friction between these two global trading partners. Apparently, China is able to move up the value-added chain (or “smile of value creation”, see Mumbadi, 2008) in some selected sectors. As a result China’s future trade relationships with her trading partners could in future be less complementary than in the past, as Lall and Albaladejo (2004) speculated half a decade ago.

Although China’s trade surplus as a whole accounts for less than 10 percent of GDP, the rapidly expanding export sectors in the coastal areas nonetheless provide tens of millions of (mostly low-skilled) jobs and an important source of local government revenue. The Chinese government is well aware of the dangers of a low-value added export-oriented economy. China is therefore seeking to move up the value-added chain in part to maintain the long-term competitiveness of export sectors as comparative costs increase. The evidence in this paper indicates that there is already significant evidence of upgrading and that the strengthening of the structure of China’s industries have enabled it to make strong inroads into the developed country including EU markets, not just through the force of its cheap wages but also through the import of equipment and technologies, and through the development of new technological and organizational competences that enable it to move up the value chain.

Acknowledgements

This research was supported by an ESRC grant (RES-062-23-1600) and by an NUS FRC-Tier 1 Grant (R-109-000-084-112) for a project entitled Economic Inter-dependence andComparative Regional Dynamics in Developed and Developing Economies: Trade and Regional Trajectories in China and the EU, and by a Chinese Academy of Sciences Visiting Professorship for Senior International Scientists Grant 2009S1-44.

References


