Export Diversification in China
-A Study of How Different Sectors Have Developed

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FIGURES

TABLES

ABBREVIATIONS

CEEF	Cumulative Export Experience Function
EU	European Union
FDI	Foreign Direct Investment
FFE	Foreign Funded Firms
GATT	General Agreement on Tariffs and Trade
HI	Heavy Industry
IIT	Intra-Industry Trade
NON-AE	Non-Accelerating Exports
NT-AE	Non-Traditional Accelerating Exports
RCA	Revealed Comparative Advantage
SEZ	Special Economic Zones
SOE	State-Owned Enterprises
TVE	Township-Village Enterprises

1. INTRODUCTION

In the 1950s and 60s import-substitution strategy was used in many developing countries in order to try to achieve economic growth. However, the acknowledged failure of this policy led to developing countries adopting an outward looking policy by using exports to achieve economic growth. In the last thirty years developing countries have become major players on the international arena. Between 1970 and 1999 developing countries' exporting goods had an annual growth rate of 12 per cent compared to the world's growth rate of 10 per cent. This has meant that developing countries have increased their export share on the world market from less than one fourth to nearly one third.[1] For China the increase in export was a result of substantial transformation of the Chinese bureacracy which was initiated by Deng Xiaoping in 1978 which has catapulted China into becoming an important actor on the global trade market.

1.1 Purpose

Before the reforms were realized China foremost produced primary goods. However with implementation of market-friendly reforms and alteration of industrial policy China gradually began to produce goods in accordance with its comparative advantage, its abundance in labour, and started to export labour-intensive products. China's reform process has meant that the country has evolved to a modern nation with a socialist market economy and today China's exports are already quite diversified and exporting manufacturing goods.

With China seeking to integrate even more in the world market, recently becoming a member of WTO, will certainly create new opportunities for deepening trade. Foreign direct investments will be attracted to the country's large market. This may in turn draw know-how and technology to China. The inputs may help refine and alter its initial comparative advantage to producing products which have a higher degree of sophistication which could make economic and export growth more sustainable. It is therefore the purpose of this thesis to examine China's industrial and trade reforms and whether the country's exports have become more diversified into non-traditional products:

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[1] UNCTAD: 2002, pg 51

Out of primary and labour intensive and into capital and skill intensive products. In this study I have assumed that China, in the early 90s, already has started to produce according to its comparative advantage. However, the interesting aspect is to see what trend different sectors exhibit. The focus of the study is on China's trade with EU15 using mirror data from 1995 to 2004. In addition, studies on structural changes in exports of China's trade with the EU15 and total exports are compared.

1.2 Why Study Export Diversification?

The terms-of-trade for primary products have deteriorated over the years. The developing countries that are relying on this type of goods will experience export instability which will affect the countries macroeconomic situation, often causing vulnerability. The export instability is the result of the declining trend in the international prices of primary goods. As a consequence, investments can be discouraged which can slow down the economic growth. In order to experience sustainable growth and reduce its dependence on primary products, the developing country has to diversify its goods from producing primary exports products to more complex manufacturing products based on comparative advantage. Furthermore, new technology that comes with export diversification production will benefit other activities such as knowledge spillovers. The production process will also create backward and forward linkages which will help to create new industries.[2]

Shifting production from primary to manufacturing goods is important for developing countries because the manufacturing sector is more market dynamic than the agricultural sector. Moreover, it is easier to expand the manufacturing production. However, with large developing countries taking the step from primary goods and moving into the labour-intensive manufacturing sector such as China has done, can cause the prices to increasingly drop due to the large surge in exports. As a result, the terms-of-trade will decline which cannot be avoided by an increase in developing countries' export volumes, the fallacy of composition problem, which would deteriorate the situation of the countries. Therefore, it is in the interest of both China and other developing countries to diversify its

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[2] Venables, A,J: 2001, pg 15-16

exports even more so this problem of fallacy of composition does not worsen, and the rest of the world to help them do so. However, it can also be a motivation for improving the composition of exports faster and actively striving to implement policies to encourage technical development. Studies show that already a trend can be seen in a deterioration of developing countries' terms-of-trade in this area.[3]

1.3   Different Stages of Diversification

Initially the developing country has an import-substituting industrialization which means that the domestic industries are protected by high tariff barriers and the production is determined by the demand internally. These developing countries often produce primary goods, such as agriculture products. However, once the country adopts an outward looking trade policy and start to liberalize trade, they will have to shift their production strategy away from primary products and start specializing in producing to their comparative advantage to be able to compete on the international arena, which for many developing countries are labour intensive goods. This type of diversification is called horizontal diversification. After some time these new industries will hopefully create, as mentioned before, new industries that form part of the supply chain.

Vertical diversification is the ultimate and next step in diversifying its export production after horizontal diversification but can be more difficult to attain. This means that the good will have to be more processed. In this lies the difficulty because it requires more capital, skills and more technology.[4] Many developing countries have problems producing these resources and therefore are foreign direct investments often very much needed in order to import these necessities and thereby learning how it is done.

1.4   Outline of the Study

The second chapter consists of an overview of market-friendly reforms that China has implemented and also its foreign trade policy. The theory of intra-industry trade and inter-industry trade explained by neo classic model and product differentiation are used in this study which will be presented in the third chapter. Moreover, a review of which

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[3] UNCTAD: 2002, pg 114, 118
[4] UNCTAD: 2004, pg 36

measurements used will be shown and how these are connected to studying structural change in exports. The results of the calculations from the measurements are given in the fourth chapter, which have been divided into sections based on which calculations have been used. Furthermore, certain sectors in China's exports to EU15 are studied as well in this chapter. The fifth and final chapter the results are concluded.

2. TRADE AND CHINA'S INDUSTRIAL DEVELOPMENT

In this chapter I will try to explain what how the industry structure is formatted and different reforms that have been implemented in order to achieve a higher economic growth. The reforms made are linked to China's trade performance. China has different type of companies which all have different challenges facing them. As these companies are contributing to the export output, it is important to understand how they function and which problems they face. The Chinese relationship to EU and the entrance into WTO will affect economic development and export growth even more within the coming years.

2.1 State-Owned-Enterprises (SOEs)

The SOEs are characterized by low productivity, outdated technology and excessive employment. They are dominant in heavy industries such as power, steel but also other industries such as banking, telecommunications and chemicals.[5] Before the reforms began in 1978, the production of China's industry was nearly stagnant. Between 1957 and 1978, the productivity grew at a rate of 0.5 per cent each year. As the state-owned companies were the only ownership-form allowed and with the government subsidizing them, they were highly inefficient. To make decisions in how to minimize the costs and optimal output, the decision making body needed information. However, as the information moved higher up in hierarchy this information became more distorted. As the bureaucrats and party members had multiple objectives in making decisions, the SOEs had low efficiency. It was clear that the SOEs needed the most restructuring as they were very important to the Chinese economy.[6]

2.1.1 The Market Approach

In the beginning of the 80s the state-controlled companies were given more autonomy and many of the responsibilities were shifted from the bureaucrats to the firms. The management of the firms was now faced with increased influence on output decisions.

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[5] UNCTAD: 2002, pg, 148
[6] Lecture Notes: Chinese Economy, 2005-19-15

The reform was implemented to solve this information problem that existed and to improve the work incentives and thereby increasing productivity. However, even if the decision making was decentralized, the incentives to improve productivity are small if all profits are going to the state.[7]

A dual-track price system was implemented which meant that firms were allowed to produce in excess of the quota in order to sell the production on the free market. Firms were also allowed to keep a bigger part of its profits and managers were given monetary rewards to increase work incentives. There was an increase in firm productivity and bonus payments. However, an increase in profitability did not occur as the managers were not being responsible for the company losses only the profits.[8] With this soft budget constraint, this reform did not achieve the goal it was suppose to. As a result, this market approach reform was increasing losses and subsidies from the state.

2.1.2 The Property Approach

In 1992 another reform was implemented to remedy the situation which was called the property approach. This implied a part privatization of the SOEs by introducing them to the stock market. With corporatization the government could turn the SOEs into modern-form corporations that had both state and non-state shareholders. The objective of the public listings was to raise capital for the SOEs and alter the deteriorating financial trend of the state sector. But the government and other institutional shareholders still had over 30 per cent of the total shares on average and therefore the objective was never to privatize the companies.[9] As a result of the listings, the firms' assets and sales increased which almost doubled after the listing. However, with the introduction to the stock market the SOEs operating performance declined which was reflected in the deterioration in the return on assets and sales. Firstly the reason for this was partly because; the companies used credit-sales to augment earning figures. When selecting a profitable business, they carved out the the profitable section of the company to form an independent entity for the public listing. The unprofitable unit of the company remained in the care of the parent company. Secondly, there were weak government incentives to investigate the companies.

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[7] Chinese Economy: Lecture notes 2005
[8] Groves, T: Hong, Y: McMillan, J: 1994, pg 183-186
[9] Wang, X: Xu, L: Zhu, T: 2004, pg 476

To many investigations could be damaging to the credibility of the companies in the stock market, which would make individuals withdraw their money. Thirdly, the government could still interfere with the firms, as they had the right to monitor and "offer assistance" to the companies.[10]

Today these problems still persist. As the government still have majority in shares in the SOEs the companies will be affected by the social legacy of the government. There will be ideological aspects that hinder the companies from being as efficient as they could be. However, despite these problems the SOEs have, to some degree, improved its productivity.

2.2 Other Ownership Forms

There are three other ownership forms than SOEs. Firstly, there are township-village enterprises (TVEs) which are not private firms nor SOEs. Secondly, there are private firms which exist in the urban and rural areas and foreign-funded firms (FFE). These play different part in the development of the Chinese industry.

2.2.1 Township-Village Enterprises

The TVEs are a hybrid organizational form. They are rural local public firms that are controlled by the local government. The TVEs are more efficient than the SOEs in terms of productivity growth as the TVEs are independently run locally and are therefore not apart of the overall state allocation plans. Moreover, the workers are not state employees and therefore do not receive job security and welfare from the state. Also, unlike the SOE employees, they can lose their jobs.[11] The TVEs can keep part of the profits whilst some goes to the local government. The people that live in the township are shareholders which means that they benefit from these companies which implies that the taxes that the TVEs pay go to investments in the village. However, despite of the TVEs abilities to use political connections there are disadvantages. As these companies are locally owned, they will have difficulties expanding and will therefore have limited growth potential. Moreover, as TVEs are located to one place, strategic factors of where to produce do not

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[10] Lecture Notes: Chinese Economy, 2005-19-15
[11] Jin, H; Qian, Y: 1998, pg 778

matter which will have consequences for the firms' ability to produce efficiently as they will never be able to achieve economies of scale. Also competition is very limited.[12]

2.2.2 Private Firms

The private businesses were legalized at the end of the 70s with many restrictions. These firms were usually small family businesses. These companies could absorb part of the labour market when reforms were made in the state sector. They would also stimulate market activity. As the bureaucrats were worried that private businesses would lead to exploitation and capitalism, the government made sure that the firms could only develop in a small-scale and have therefore been discriminated. In 1983 legalization of private firms were even more relaxed when the government realized their potential. The major part is the small family businesses as they are easy and cheap to set-up and require no skill.[13]

The private firms have always been discriminated against as there is political and ideological concerns which have retarded the development of this sector. As China's formal institutions such as property rights and legal institutions are weak the property protection is inadequate. As a result people will not be willing to take risks and invest a great deal in a private company. Furthermore, it is difficult to attain bank loans. Usually the Coastal Regions of China are more liberal and more market-oriented as they have been more developed and have a large inflow of foreign direct investments.[14]

2.2.3 Foreign-Funded Firms (FFEs)

Foreign-funded firms are mainly owned by investors from East Asia. These companies are medium-sized and are highly export-oriented which are involved in the finishing stages of assembly and processing operations in electronic equipment and production of machinery. The share in foreign trade has dramatically increased. Between 1986 and 2000 they exported from less than 2 per cent to 48 per cent of total exports. SOEs account for most part of the remaining exports. The companies are located to the coastal and northern regions where the infrastructure is very developed. As the FFEs use capital-intensive techniques compared to other domestic firms in the same industry, the job creation is not

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[12] Lecture Notes: Chinese Economy, 2005-10-04
[13] Lecture Notes: Chinese Economy, 2005-10-04
[14] Lecture Notes: Chinese Economy, 2005-10-05

that large. In 1996 it was estimated that these firms employ less than 0.8 per cent of the total labour force. Even though these companies do little for the employment, they generate FDI inflows as the profits of the firms are partly reinvested in China.[15]

2.3 Industrial Reforms and Trade

Before industrial reforms were implemented, China had put an emphasis on Heavy Industry (HI), which was very capital-intensive. The Heavy industry takes a long time to construct. Also, it requires advanced equipment and a lot of investments. In the 50s China's capital was limited and the market interests were high. Moreover foreign currency was scarce and very expensive due to the fact that exporting goods was limited. The goods produced were mainly low-priced primary products. This shows that China's development of HI did not benefit China and was not producing according to its comparative advantage.[16] The problems with the Chinese industry were that the majority of companies were small and there was an overall spread of overcapacity. As a result it did not pay off to have the latest technology. The industry therefore had a very low technical standard. Also, there was little interest in research and development and low innovative capacity. Instead, firms focused on activities with low entry barriers.[17]

With the institutional reforms of the industry, came a reduction in central planning and a diversification of the ownership form. The government now allowed parallell ownership forms other than SOEs, such as private firms and foreigned-owned firms, with certain restrictions. By allowing other ownership forms, the large unemployment pool could be absorbed. This would increase competition, profits and also productivity.[18] However, the SOEs still dominated important industries. The other types of companies had a much higher share in light industry such as; footwear, garments, toys and retail consumer goods.[19]

The Industrial Policy Program was launched in 1989. This program implied an increased emphasis on light-industry production, the implementation of Special Economic Zones

[15] UNCTAD: 2002, pg 154
[16] Lin, J: Cai, F: Li, Z: 1996, pg 204
[17] Lecture Notes: Chinese economy, 2005-09-19
[18] Lecture Notes: Chinese economy; 2005-09-19

(SEZs) and technology parks as specific developing tools to encourage research and development innovation. Furthermore tax incentives were employed to promote specific technology branches within the framework of national industrial policy.[20]

China's industrial policy has two sides that are very different from one another. The government has made investments and implemented a development strategy according to comparative advantage where labour is abundant and capital scarce. China has continued to develop their strategy according to the neoclassical model through liberalizing trade. The process of opening-up has been especially towards foreign trade, knowledge and technology. In attempt to develop and diversify their domestic industry and make it globally competitive, China significantly reduced the import tariff rates in the beginning of the 90s.[21]

However, despite the focus on market-oriented reforms there is another side to the Chinese industrial policy. The goal of the comparative advantage strategies is to ultimately create "national champions". These are self-reliant companies that have vertical integrated industries/firms that use cutting edge technology. As developmental tasks are passed on to local level there will be no gain of economies of scale, vertical integration and innovative communities, as there still exist local protectionism between the provinces.[22] As a result the "national champions" will be regionally limited and consequently the industries will not have access to the best suppliers which will have effects on the quality of the produced products. This, in turn, will impede the ability to compete on the global market.

Even though there are limitations in trade due to institutional bottlenecks, the Chinese industry has managed to compete on the global market. The products compete on the basis of low cost which is its comparative advantage. However, the goods have lower quality and are not as advanced technically. Due to this, the Chinese industry produces with a "catch-up" strategy. This means that the industry copies the production structure of successful innovative companies but makes it cheaper and not as technically advanced.

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[19] UNCTAD: 2002, pg 148
[20] Lecture Notes: Chinese economy, 2005-09-19
[21] Steinfeld, E: 2002, pg 26-27
[22] Steinfeld, E: 2002, pg 31-33

In 1994 China altered its exchange rate policy and is still in use today. Before this point in time China had two exchange rates; an official rate and one that was used when enterprises could change their foreign currency to domestic currency (swap rate). Just before the alteration in 1994, the official rate was lowered significantly through nominal depreciation. With the new system the currency was now allowed to fluctuate on a daily basis within narrow margins. Pegging the currency at a reasonably low level reflected that the macroeconomic policy was investment biased and also favoured exports. Since 1994 the nominal rates are down and the real interest rates have gone up and both have remained stable during the 90s. The depreciation of the exchange rate together with the increased productivity have increased China's competitiveness which has become favourable for chinese exporters and enterprises planning to produce in the country.[23]

Before the implementation of the unified exchange rate system in 1994 exporting companies had to give part of their foreign exchange profits to the official exchange rate which was higher than the swap rate which subsidized the state owned importes. The reform stopped this and the government also implemented tax incentives to promote certain export industries. Local governments were allowed to use financial support for important industries. Also different tax rates were imposed on different industries. In the late 90s a sales tax of 20 per cent was imposed on manufactures in electronic and telecommunications equipment and a tax of 77 per cent for petroleum processing. [24]

2.4 FDI-Policy

The initial stage in the open door policy was the implementation and trial of the SEZs in 1979. The four SEZs were put closely to areas that would eventually be integrated to China such as Hong-Kong and Taiwan. Three of the four SEZs were located in the Guadong province. The FDI policy was an integral element of China's reform policy. Preferential policies were granted in order to facilitate its efforts of attracting FDI. As the politicians realized the impact of these zones, they were later extended to other coastal

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[23] UNCTAD: 2005, pg 14,16
[24] UNCTAD: 2005, pg 33-34

ports and cities in 1984, to coastal economic development zones in 1985 such as the Pearl River Delta.[25]

These SEZ are areas that function as economic "laboratories". Within these areas the local authorities, under supervision of the central government, exercise policies that are much more market-oriented than in the rest of China. These policies encourage in particular foreign direct investments but also domestic investments. As long as the local governments in these zones can raise extra-funds from profits and taxation of enterprises or from banks, they are able to establish their own development of infrastructure and also commercial investment plans. In turn, the firms that are situated in these zones are allowed to make their own investment and production decisions. By trying different type of investment plans and policies in these zones first, the government can decide which of them would later be implemented in all of the country.[26]

Since the beginning of the creation of these zones, investing firms were exempted from import licenses on their imports from capital goods, intermediate goods and raw materials that were necessary for production. Separate customs were created for the zones. This meant that if the products of the firms in the zones were meant to be exported or sold within the zones, they were duty free. However, firms that imported goods that were directly sold on the market without additional processing would have to pay 50 per cent of the full duty and indirect tax rates. If the firms were to sell the products to the rest of the Chinese market firms would have to pay full tariffs and indirect taxes. These regulations were later also implemented in the Open Coastal Cities mentioned above with some moderations.[27]

 Today investments can be made throughout the country. The potential of the market and the access to cheap and abundant inputs has made it attractive to invest in China. The FDI has had significant effects on local innovation activities as the access to modern technology has increased.[28]

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[25] Ng, L: Tuan, C: 2001, pg 1054, 1055
[26] World Bank Country Study: 1994, pg 223, 224
[27] World Bank Country Study: 1994, pg 223, 224
[28] Lecture Notes: Chinese Economy, 2005-10-13

2.5 China-EU Trade Relations

China is EUs second largest trading partner after the US, and EU is China's largest. China and EU trade relations started in the middle of the 70s and has since then increased more than forty-fold. China is the second largest beneficiary of EUs Generalized System of Preferences. This system allows the EU to give trade preferences to imports from developing countries. In the 1980s EU had a trade surplus with China but since then the trade deficit has been growing and is now the largest bilateral deficit of the EU.[29]

The trading relations between the EU and China have not been without difficulties. The EU has found it difficult to reach a common policy in trade with China, as countries within the EU have been competing in the same areas of economic interests. Also, parties within the EU have had different opinions about China and its human rights issue. With the growing trade with China, EU is experiencing an augmentation in the trade deficit. This can generate discussions within the EU of how they should deal with the growing problem which can result in increase in protectionism.[30]

Since the handing over of Hong-Kong and Macau in 1997 and 1999 there have been no great disputes between EU and China. China has become more opened up and EU has become more confident. Both trading partners have released documents declaring their intentions and their policies towards each other. To honour the 30 year anniversary of trading relations the president of the European Commission Jose Barroso made a visit to China which signals that their trade relationship is important and will continue to evolve.[31]

2.6 Implications of Accession to the WTO

The motive for wanting to become a member of WTO was that China needed reliable trading conditions and also access to other markets. The negotiating process of began in 1986. Between the years of 1986 and 89 the progress of entering WTO was going reasonably well and other contracting parties were positive of China's accession and in July 1986 China applied to recommence its contracting party status in GATT. However, in

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[29] http://europa.eu/trade/issues/bilateral/countries/china/index_en.htm
[30] http://druckversion.studien-von-zeitfragen.net/China -EU%20world.html
[31] http://druckversion.studien-von-zeitfragen.net/China -EU%20world.html

1989 other contracting parties gradually became negative towards China's accession. This had partly to do with the Chinese government handling of the democratic movements, but also the need for reforming the economic sector in the country. With more countries expressing their negative opinions China began to alter policies in order for them to coincide with GATT principles and also offering more concessions than they had in the past. However, the negotiating came to a standstill in 1995 as the Chinese government was not willing to risk economic stability for sake of WTO membership. In 1996 negotiations continued, despite of certain parties being concerned over bilateral trade balance. Between China and the US, China agreed to, besides tariff reductions on industrial goods and primary products, a long-term undertaking in a numerous areas. To eliminate export subsidies, implement reforms for anti-dumping laws, telecommunications and insurance. China also agreed to safeguard mechanisms that would allow other countries within twelve years after the membership to take measures against China in the case that its exports and imports threatened to cause market disturbance. In a negotiation with EU in 2000 China made new concessions. It was agreed that China would liberalize sectors such as; telecommunications, commercial rights, state monopolies for raw oil and silk, automotive vehicles, agriculture and distribution among other sectors.[32] After much negotiating China became a WTO member in 2001.[33]

The membership of WTO will imply further liberalization of the Chinese market. The domestic firms will be more exposed to foreign competition which will eventually increase efficiency and competition and phase out the firms that are not competitive enough. Depending on the extent of protection the companies and industries had before the accession, the shocks of adjusting will be more dramatic in some industries compared to others. The products that have been protected the most are the ones that have been and will continue to be the most affected by the trade liberalization. These goods include; wheat, rice, cotton, sugar and vegetable oils, motor vehicles and parts, clothing and textiles.[34] Furthermore, the impact of the membership will also depend on the interpretation of the agreements made and how the Chinese government chooses to implement them in the future.[35]

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[32] Kommerskollegium: 2003, pg 11-12
[33] http://intl.econ.cuhk.edu.hk/topic/index.php?did=17
[34] UNCTAD: 2002, pg 149
[35] Kommerkolligiet: 2003, pg 27

3. THEORETICAL FRAMEWORK AND MEASUREMENTS

3.1 Trade Theories

Different stages in export concentration/diversification can be explained through different trade theories which try to describe inter and intra-industrial trade. Inter-industry trade arises when countries specialize their production to a certain industry and exchange them on the international market for another different industrial product. With specialization in some sectors the export concentration increases. Intra-industry trade, IIT, occurs because in order to take advantage of economies of scale and thereby benefit from productivity gains, producers will specialize on a few products or varieties of differentiated products within sectors. I have presented three trade theories below which all try to explain concentration/diversification in different ways and stages of a country's economic development.

3.1.1 Inter-Industrial Trade

One of the neoclassical models is the Hekscher-Ohlin theory which assumes perfect competition, no market distortions, countries differ in relative factor endowment, factors are mobile between industries within the country and there are constant returns to scale. The theory explains how comparative advantage and trade is caused by national differences of factor endowments. A country will export the commodity in which the relative abundant factor is used. In autarky there will be production of both goods however when trade is liberalized countries will specialize in one good in which they have a comparative advantage, sector specialization. The specialized goods will then be internationally traded and inter-industrial trade will arise. Trade will cause an equalization of commodity prices in the two countries that are trading with each other.[36]

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[36] Markusen, J: Melvin, J: Kaempfer, W: Maskus, K: 1995, pg 105, 106

The Hekscher-Ohlin theorem can be used to explain trade between developing countries and industrialized countries. As developing countries often lack technology and know-how and are relatively labour abundant, developing countries often export labour-intensive goods. The liberalization of trade will augment the demand for labour-intensive goods which will reduce the unemployment and wages will rise. This will have positive consequences on income within the country and gradually the capital accumulation will increase. Eventually, the comparative advantage of the country will begin to alter. Though it is still labour-intensive compared to developed countries, the comparative advantage will shift towards more capital-intensive goods. Eventually the developing country will start to produce more complex goods.[37]

The New Economic Geography is a form of new trade theory which explains through trade costs and economies of scale why enterprises, which need intermediate goods, cluster to one location. The labour will be attracted to regions where the wages and conditions are high. This will attract industries to locate to these regions, which will cause even more labour to move from regions with low wages to the richer areas where the industries cluster. Backward and forward linkages of industries are other motives why industries locate near each other. The upstream industries are attracted to downstream industries and vice versa. By having the upstream industries close by, the intermediate goods that the downstream industry needs can be obtained more easily at a less costly price since the transports costs are thereby reduced. Also, since there might be more competition between the upstream firms which will benefit the downstream companies through larger variety of input products. This kind of cluster on a vertical level to obtain economies of scale will produce inter-industry trade.[38]

3.1.2 Intra-Industrial Trade

The new trade theory is based on economies of scale, product differentiation, and assumption of increasing returns to scale. The production structure in a country will be based on its factor endowments as the neo classical model. However, in each of the different industries it is assumed that there exists a wide variety of differentiated products. However, as they want to lower their costs by producing longer production runs and

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[37] Markusen, J: Melvin, J: Kaempfer, W: Maskus, K: 1995, pg 105, 106

benefiting from economies of scale, they will specialize on a narrow range of product varieties, intra-industry specialization. The implications of this will be that when a country opens up for trade it will be a net exporter in the industry in which it has its comparative advantage. However, due to this intra-industry specialization countries will also be importing various differentiated goods that they are also net exporters in. Moreover, if the country is a net importer it will still produce and export similar but differentiated goods to other countries.[39]

Trade occurs for the same reasons for that of the neo-classical model, to get a larger variety of products. In order to achieve economies of scale the industry will produce few variants of each good in the country and with exportation abroad firms can achieve economies of scale. Therefore the gains from trade will be that there would exist a larger diversity of products, which offer individuals many different options. Trade between two countries that have similar factor endowments, thus similar industrial structure, will have a larger share of intra-industry trade.[40]

3.2 Measurements Used

In order to study changes in inter and intra-industrial trade in China's exports I have used "mirror"data from EU15 and also from world trade classified according to Standard International Trade Classification (SITC) on a 3-digit level from the OECD database between 1995 and 2004. To get an overview which sectors exhibit different export patterns I have divided the 240 sectors according to the Leamer index. This index is classified according to SITC data on a two-digit level into 10 types of industries. Group 11 had been added to the index which is non-monetary gold. Typical characteristic for each of these groups is that the clusters are based on the correlation of net exports of manufacturers that are well adjusted to clusters that are based on land, labour, capital intensities and skill ratios. The labour intensive products use for most part unskilled labour, the chemical products have high capital intensities and also require high skill. Capital intensive products and Machinery products have reasonable levels of capital

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[38] Amiti, M: 1997, pg 46
[39] Krugman, P: 1983, pg 344
[40] Krugman, P: 1980, pg 952

intensities and skills.[41] Usually sectors 1-6 and 11 consist more of primary products, which have a high share of land intensity, and group 7-10 manufacturing products. Of these 10 groups; 2 are based on primary products aggregates, 4 groups on crops, 4 manufacturing aggregates Throughout my calculations I will be dividing the sectors according to this index.[42]

3.2.1 Measurements on Specialization and Accelerating Export

I have used the Herfindahl (SPEC) index in order to study tendancies in export revenue specialization on China's exports. s_{it} includes in its calculations E_{it}, which represents the export in a certain industry, divided by the total exports of all industries together. This implies that one receives the share of industries i in total exports in year t.

$$ s_{it} = E_{it} / \sum E_{it} \qquad \Rightarrow \qquad SPEC_t = \sum_i (s_{it})^2 $$

If the index is close to 1, it can be interpreted as a high level of export specialization. However, if the calculations a close to 0, it will mean that there exists a high degree of export diversification. In my calculations each sector has it Herfindahl index. To calculate Herfindahl of the Leamer index groups, I have simply added all those in one group together to receive the result.

The Cumulative export experience function (c_{it}) shows the industries different growth rates from the beginning to the end of a period. The value ranges from t_0, in the beginning of the period, up to t_1 in the last year

$$ c_{it} = \frac{\sum_{t0}^{t} E_{it}}{\sum_{t0}^{t1} E_{it}} $$

If the values of cit are plotted for two or more commodities together the functions differ depending on if exports are concentrated earlier or later in the time period or fairly constant during this time. Industries that have an export experience concentrated to later in

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[41] Leamer, E: 1984
[42] See Appendix for detailed classification

the period is more to the right and industries that had its exports concentrated to earlier in the time period is more to the left. It can also be fairly stable throughout the period.[43]

The accelerating export (AE) index is the mean of the cumulative export experience function for each industry. By setting a benchmark, which I have set at 0,42 based on the results of the AE index calculations, one can separate industries that has low and stable growth from the ones that have high and accelerating growth. The industries which lie below the

$$AE_i = \frac{\sum_{t0}^{t} c_{it}}{(t_1 - t_0 + 1)}$$

benchmark are the industries that exhibit high accelerating growth, AE, and the ones that lie above are the industries with non-accelerating growth, non-AE.

In turn the AE industries can be separated into two groups, namely traditional accelerating exports (T-AE) and non-traditional accelerating exports (NT-AE). To be able to make this seperation one has to calculate the Revealed Comparative Advantage (RCA). This index has a range from –1 to 1;

$$RCA = \frac{(X_i - M_i)}{(X_i + M_i)}$$

The absolute value of the RCA is the value of inter-industry trade. The RCA is a measurement which solely gives an indication to a country's own trade performance through calculating the net/gross ratio. The X_i is the value of exports of a certain industry and the M_i represents the value of imports. If the RCA shows a value that is higher than 0, the industry has a revealed comparative advantage and will be classified as a traditional (T) industry. An increase in the value will imply an improvement in the competitiveness of the country in that good. If the value is negative, the industry has a comparative disadvantage and will be classified as a non-traditional (NT) industry.[44]

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[43] Petersson, L: 2005, pg 3-5
[44] Petersson, L: 2005, pg 4

Because intra-industry trade refers to two-way trade within industries, the measure can be written 2min(X,M). To facilitate comparisons of intra-industry trade for different industries and in trade with different countries, it is useful to express intra-industry trade as a percentage of each industry's combines exports and imports as follows:

$$IIT = 2 * \min(X_i, M_i)/(X_i + M_i)$$

Diversified exports can lead to increased intra-industry trade in three ways. Firstly it can be caused by the increased exports of import-competing product groups that has import surpluses, in other words non-traditional industries. Secondly, it can be caused by reduction in exports in product groups that has had large export surpluses, namely; traditional industries. This reduction will cause the export concentration to diminish. Diversification can also be a consequence of intra-industry specialization through growth in both of exports and imports that are in the same industry. The intra-industry trade index shows a value ranging from 0 (complete inter-industry trade) to 1 (complete intra-industry trade).[45] The connection between RCA and IIT is that when a country has a high degree of comparative advantage/disadvantage (RCA close to 1 and -1) the less is the share of IIT.[46]

$$IIT_i = 1 - |RCA_i|$$

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[45] Petersson, L: 2005, pg 3-5
[46] Petersson, L: 2005, pg 3-5, 11

4. TRADE STRUCTURE AND SPECIALIZATION

The measurements presented in the former chapter will be presented in this section. The figures are based on calculations from the OECD database of 3-digit SITC. The Herfindahl index tries to illustrate the tendencies in export specialization. The cumulative export experience function illustrates if the sectors had an export growth earlier or later in the time period. The RCA is used to identify if the sectors has a comparative advantage or disadvantage which reflects the intra-industry trade in the sector at the same time. This chapter will also study certain export sectors in order to try to assess the trade structure of China's exports. From these measurements and the study of specific sectors one can draw conclusions about China's economic development.

4.1   China's Export Performance

As shown in figure 4.1, China's exports share in world trade was quite low in the 50's and 60's showing fluctuations between 0.5 and 1.5 per cent. However, its exports have significantly increased since the first market-oriented reforms were implemented in 1978. In 2000 China's share of the world exports had sharply augmented to 4 per cent.

Figure 4.1: China's share in world trade

China's Share in World Exports

Source: Chinese Statistical Yearbook; 2001

Figure 4.2 shows the relationship between primary and manufacturing in value of exports in world trade. Most part of the exports seems to be made up of manufacturing goods which have been augmenting steadily. The export composition of primary goods has stagnated, showing almost the same values in 1992 as 2002.

Figure 4.2: Value of China's Exports

Total Value of Exports
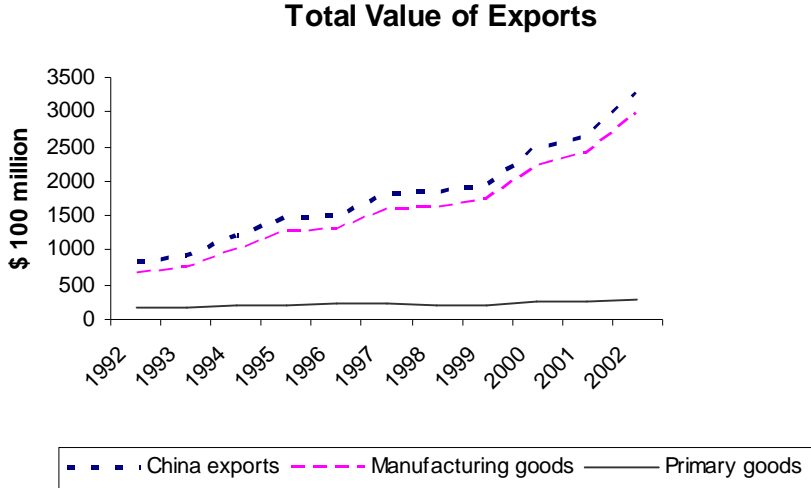
Source: Chinese Statistical yearbook,1997and 2003

Since the focus is on China's trade with the EU15, China's exports and imports with the EU as shares of China's world trade are presented in figure 4.3. We can se that the trade has had slight fluctuations over the years, but throughout the time period exports have had a share between 20 and 30 per cent. Worth noting is that the imports are much lower than the exports.

Figure 4.3: Total trade to EU in percentage

Share of Imports and Exports to EU
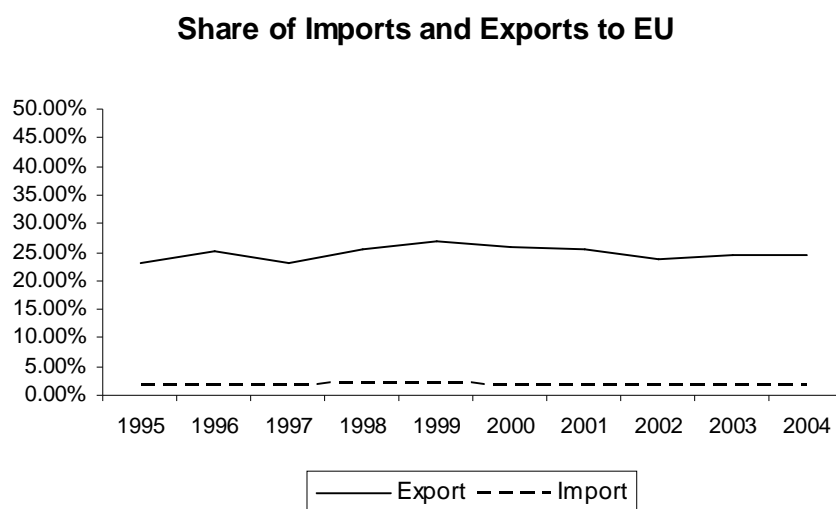
Source: Calculations based on OECD database, 3-digit SITC

4.2 Specialization According to Comparative Advantage

In table 4.1 and 4.2, the structure of China's trade with the world and the EU15 are presented and used to compare the composition and structural change of China's exports and imports in its trade with the EU and the world. According to these tables, the export share have in both world and EU15 decreased or stagnated for petroleum, raw materials, forest products, tropical agriculture, animal products and cereals. The percentages also show that the export share of labour intensive goods have notably decreased in the time period. Similar tendencies can be seen in the Capital-intensive and chemical goods. However, the decrease in export share is not that large compared to the labour-intensive sector. Moreover, a sector which has been presenting interesting results is machinery. In both tables the exports have experienced a sharp increase in the share of exports which has amounted to more than 20 per cent. All in all, the primary sectors have all been showing decreasing or stagnant exports. The largest shares in exports have labour intensive sector and Machinery in which labour intensive is decreasing and machinery augmenting. Worth pointing out is that, almost half of the exports of machinery and labour-intensive goods go to EU15.

Table 4.1: Total trade based on Leamer Index

Leamer Aggregated Index	EXPORTS WORLD			IMPORTS		
	95/96	99/2000	2003/04	95/96	99/2000	2003/04
1) Petroeleum Products	2,39%	1,56%	1,14%	3,92%	6,90%	7,41%
2) Raw Materials	3,30%	3,15%	3,11%	5,05%	6,46%	7,26%
3) Forest Products	1,50%	1,37%	1,31%	3,37%	4,03%	2,31%
4) Tropical Agriculture	3,08%	2,04%	1,48%	1,47%	1,01%	0,89%
5) Animal Products	4,12%	2,74%	1,81%	1,07%	1,44%	1,07%
6) Cereals	2,45%	1,90%	1,06%	7,78%	3,73%	3,75%
7) Labour-Intensive	35,71%	33,90%	25,65%	4,26%	4,22%	3,00%
8) Capital-Intensive	16,58%	13,60%	13,05%	17,32%	13,48%	9,91%
9) Machinery	24,88%	34,68%	46,95%	42,70%	44,80%	52,66%
10) Chemicals	5,99%	5,05%	4,44%	13,07%	13,92%	11,74%
11) Non-Monetary Gold	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%

Source: Calculations based on OECD database, 3-digit SITC

Table 4.2: Total trade to the EU based on Leamer Index

Leamer Aggregated Index	EXPORTS EU			IMPORTS		
	95/96	99/2000	2003/2004	95/96	99/2000	2003/2004
1) Petroeleum Products	0,06%	0,06%	0,05%	0,27%	1,12%	0,42%
2) Raw Materials	1,87%	1,45%	1,14%	1,87%	2,70%	3,52%
3) Forest Products	1,24%	1,28%	1,20%	1,52%	3,09%	2,47%
4) Tropical Agriculture	1,63%	1,17%	0,86%	0,20%	0,59%	0,48%
5) Animal Products	1,94%	1,29%	0,79%	0,72%	1,29%	1,14%
6) Cereals	1,81%	1,19%	0,65%	3,35%	2,11%	0,94%
7) Labour-Intensive	46,62%	41,08%	33,68%	3,22%	5,26%	4,54%
8) Capital-Intensive	10,78%	10,07%	9,62%	6,51%	6,61%	8,42%
9) Machinery	28,67%	38,47%	48,56%	74,88%	68,77%	69,21%
10) Chemicals	5,38%	3,91%	3,43%	7,42%	8,44%	8,81%
11) Non-Monetary Gold	0,00%	0,03%	0,00%	0,04%	0,02%	0,04%

Source: Calculations based on OECD database, 3-digit SITC

Indications of the country's trade composition can further be seen in the tables 4.3 and 4.4. The net exports have been calculated by subtracting imports from exports in each of the Leamer index sectors. The absolute values from these results have then been added together, type of measurement on total inter-industry trade. To get the share of total inter–industry trade of each sector seen in the tables, the net exports have been divided by the total absolute value of all sectors. When taking the absolute values of the sectors this signals that all have a net export which means that every sector has a comparative advantage, according to the neoclassical model, inter-industry trade. By taking the share of each sector and dividing it by the total absolute values one gets the share in inter-industry trade. In total inter-industry trade, increases in net import can be distinguished in both tables especially for world trade for petroleum products which went from -1.74 per cent to -11.65 per cent. Net imports have also augmented in raw Materials. Decreases in net export can be seen in both tropical agriculture and animal products. In the labour intensive sector the net exports have significantly

decreased especially in trade data of EU15 where the share has decreased from almost 68 per cent per cent to around 52 per cent. The capital intensive sector has been showing signs of a net export increase in world trade. However, the net exports have stagnated in the trade with EU. In the machinery sector noteworthy changes in inter-industry trade have occurred. Both tables show a rapid decrease in net imports. But even though there has been a large augmentation in exports in both tables, in world machinery still shows that China imports more than it exports compared to EU where net exports are showing. In 95/96 the net import share in EU15 was around -10 per cent and in 03/04 the net export share had augmented to almost 35 per cent. Chemicals also seem to be showing signs of an increase in net imports. In conclusion, the net exports of total inter-industry trade of primary sectors in decreased, except for cereal products. Machinery had by far the largest increase in net exports of all sectors.

Table 4.3: Structure of net exports in total trade according to factor intensity percentages (share of sum of absolute value of net exports)

Leamer Aggregated Index	NET EXPORTS WORLD			RCA		
	95/96	1999/2000	2003/2004	95/96	99/2000	2003/04
1) Petroeleum Products	-1,74%	-7,88%	-11,65%	-0,19	-0,59	-0,72
2) Raw Materials	-1,90%	-4,38%	-7,43%	-0,16	-0,28	-0,37
3) Forest Products	-2,35%	-3,80%	-1,72%	-0,34	-0,44	-0,25
4) Tropical Agriculture	2,68%	2,04%	1,28%	0,40	0,40	0,28
5) Animal Products	4,80%	2,63%	1,62%	0,62	0,37	0,29
6) Cereals	-6,94%	-2,40%	-4,93%	-0,48	-0,26	-0,54
7) Labour-Intensive	48,56%	53,27%	45,70%	0,81	0,80	0,80
8) Capital-Intensive	1,50%	3,22%	7,49%	0,03	0,07	0,17
9) Machinery	-20,71%	-7,84%	-5,00%	-0,21	-0,06	-0,03
10) Chemicals	-8,81%	-12,54%	-13,17%	-0,33	-0,41	-0,43
11) Non-Monetary Gold	0,00%	0,00%	0,00%	1,00		1,00

Source: Calculations based on OECD database, 3-digit SITC

The RCA has decreased in petroleum and raw materials. This suggests that the net imports have augmented and that inter-industry trade has increased. Groups that show the same trends for tropical agriculture and animal products are declining towards zero which implies an augmentation in intra-industry trade. Cereals in world and EU are going in opposite direction. In world the RCA value has augmented to -0.54 and in EU the value has increased to 0.27. Although the RCA is going in different directions in the two tables the sector show an increase in inter-industry. The labour-intensive sector is showing very similar values. In world the value in 2003/2004 was 0.80 and in EU15 0.90 which has been quite steady over the years. This means that the sector has the largest comparative advantages on exports to EU. Furthermore, machinery, in world trade, has been increasing, experiencing change in its RCA

value of -0.21 to -0.03 which implies that this sector has an extremely high share of IIT in contrast to the other sectors.

Table 4.4: Structure of net exports in EU trade according to factor intensity percentages (share of sum of absolute value of net exports)

Leamer Aggregated Index	NET EXPORTS EU			RCA		
	95/96	99/2000	2003/2004	95/96	1999/2000	2003/2004
1) Petroeleum Products	-0,11%	-0,50%	-0,19%	-0,37	-0,75	-0,58
2) Raw Materials	1,47%	0,76%	-0,41%	0,36	0,21	-0,10
3) Forest Products	0,79%	0,29%	0,37%	0,28	0,08	0,10
4) Tropical Agriculture	2,31%	1,45%	1,07%	0,89	0,70	0,63
5) Animal Products	2,41%	1,27%	0,54%	0,70	0,48	0,28
6) Cereals	0,32%	0,71%	0,45%	0,13	0,25	0,27
7) Labour-Intensive	68,09%	59,36%	51,53%	0,94	0,91	0,90
8) Capital-Intensive	11,60%	11,81%	10,33%	0,56	0,63	0,49
9) Machinery	-10,06%	22,39%	34,94%	-0,10	0,23	0,28
10) Chemicals	2,82%	1,43%	-0,15%	0,21	0,14	-0,01
11) Non-Monetary Gold	-0,03%	0,03%	-0,02%	-0,95	0,47	-0,60

Source: calculations based on OECD database, 3-digit SITC

4.3 Trade Specialization

The static measure of specialization will give indication of how the Chinese trade composition has been developing over the time period. Figure 4.4 presents specialization tendencies in the Chinese exports. The degree of specialization diminishes as the values get closer to zero. The trade structure for EU lies between 0,025 and 0,04 in the last ten years. However, since 2000 a trend of a slight augment in export specialization has been showing for both EU and World exports.

Figure 4.4: Herfindahl Specialization Index

Herfindahl Specialization Index
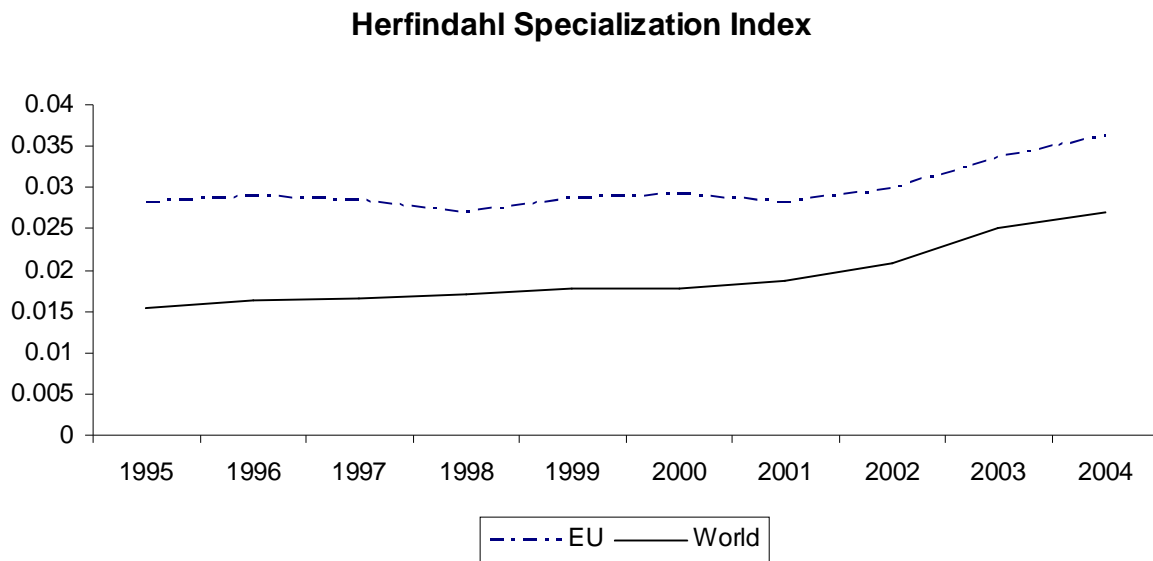
Source: own calculations based on OECD database, 3-digit SITC

The trade structure for primary sectors is presented in figure 4.5 below. The forest products (3) show declining specialization between 1995 and 1997. During 1998 the sector had a slight increase in export concentration. However since 1999 it has showed a continuing decrease in specialization. The animal product sector (5) has from 1996 to 1998 had roughly constant value of index. But since then, the sector has had a rather fast decrease in specialization all years except for 2000. In recent years the rapid decrease has stagnated. The specialization index of cereals (6) has also had a fast decline in export concentration between 1996 and 2004. However between 1997 and 1999 the sector experienced stagnation with minor fluctuations. Raw materials (2) exhibited in 1995 a very fast decline in export concentration. However, from 1996 to 1998 the sector showed stagnation. Since 1998 and 2001 the sector has had some fluctuations. In the following two years the export concentration has gone down. However, during the last year in the period the sector has showed a small increase in export specialization. The tropical products (4) had a rapid decline in export concentration between 1995 and 1997. Since then the specialization has a decreased. However, small fluctuations occurred in 1997 and 2001. The sector that shows the most specialization is the forest sector which presents a value between 0,00005 and 0,00006. The index for this group is higher than the other primary sectors. These other sectors were all in 2004, between 0,00001 and 0,00003.

Figure 4.5: Herfindahl index for EU exports

**Herfindahl for Primary Goods**
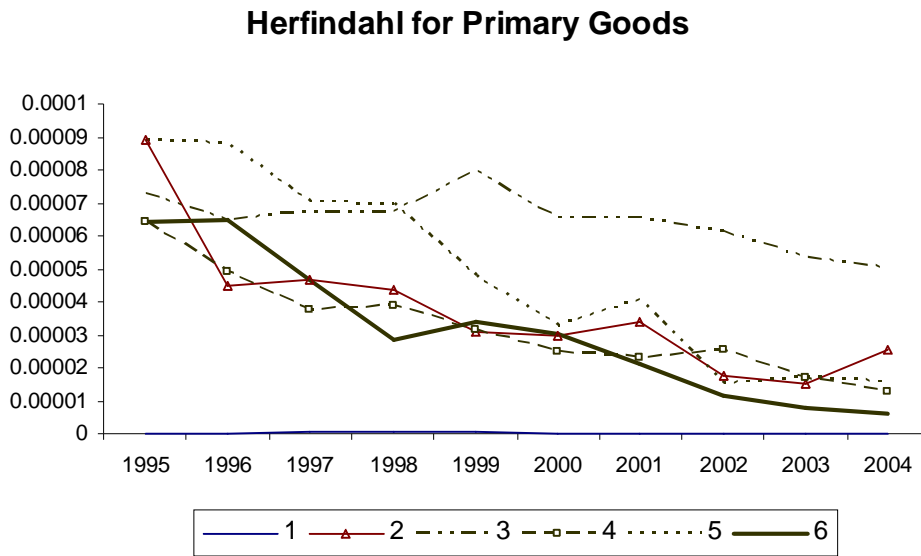
Source: Own calculations based on OECD database, 3-digit SITC

The Specialization index for manufacturing goods is shown below in figure 4.6. Capital-intensive (8) and chemical products (10) show low values in total throughout all years which suggest that these sectors have experienced a low share of export concentration. The labour-intensive sector (7) had a stagnation of specialization in 1995 and 1996. Since then the specialization has decreased slightly all the way through the 2004. However, there has been some stagnation in 1998 and 2001. In 1995 the labour intensive sector presented a value of 0,022 and in 2004 it had a value of 0,01. Machinery (9) has had a minor increase in export concentration between 1995 and 1997. This trend had continued in the following years but augmenting slightly more. In 1999 the specialization had a modest increase. However, the real boost in export concentration came in 2001 and has persisted. In the beginning of the 90s the index showed a value of 0,006 and in 2004 the value was approximately 0,027.

To summarize, China's specialization index of China is quite low in general. This could be because China is such a large country which has more resources and therefore has a lower export concentration in general. Moreover, the specialization index for EU15 exhibits a higher value than world. This may be related to that trade towards EU is more concentrated to certain goods in certain sectors. The primary products have experienced a decline in export concentration. The labour intensive sector has been decreasing throughout the time period. Machinery is the only sector which shows a steady increase in export concentration.

Figure 4.6: Herfindahl index for EU exports

Herfindahl for Manufacturing sectors
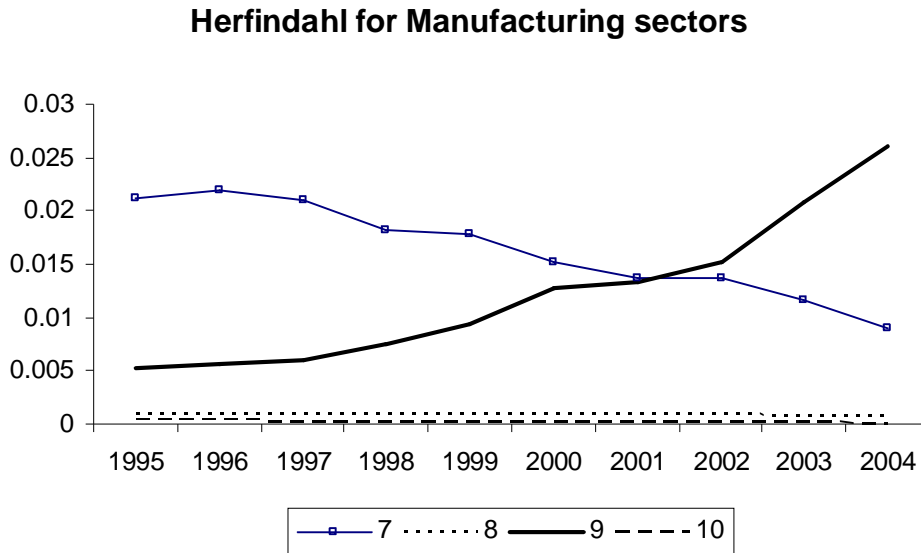
4.4 Cumulative Export Function

The cumulative export experience distribution function illustrates when in the time the export growth in a sector occurred. These distribution functions for world and EU15 trade are presented in figure 4.7 and 4.8. The group 11, non-monetary gold, is not apart of these figures as it is such a small sector it is difficult to interpret the result. The 10 other groups in the Leamer Index indicate the relationship between the land, capital, labour and skill ratios in production. The sectors which are showing the most linear shape are animal products (5) and cereals (6). This indicates that they have had rather constant growth over the time period.

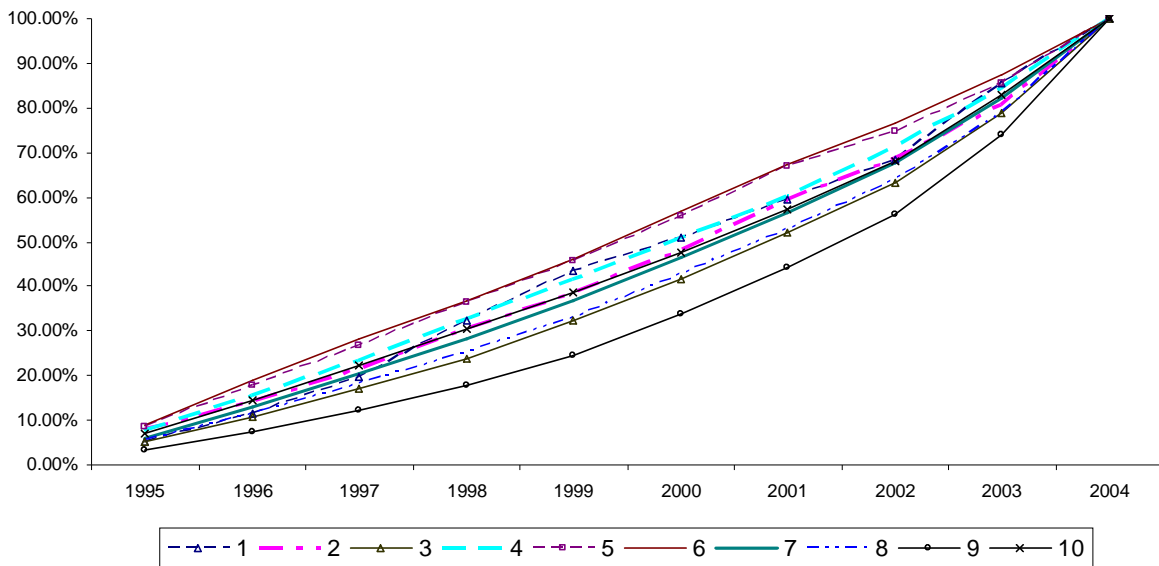Figure 4.7: Cumulative Export Experience Function based on Leamer Index

Cumulative Export Experience based on World Exports
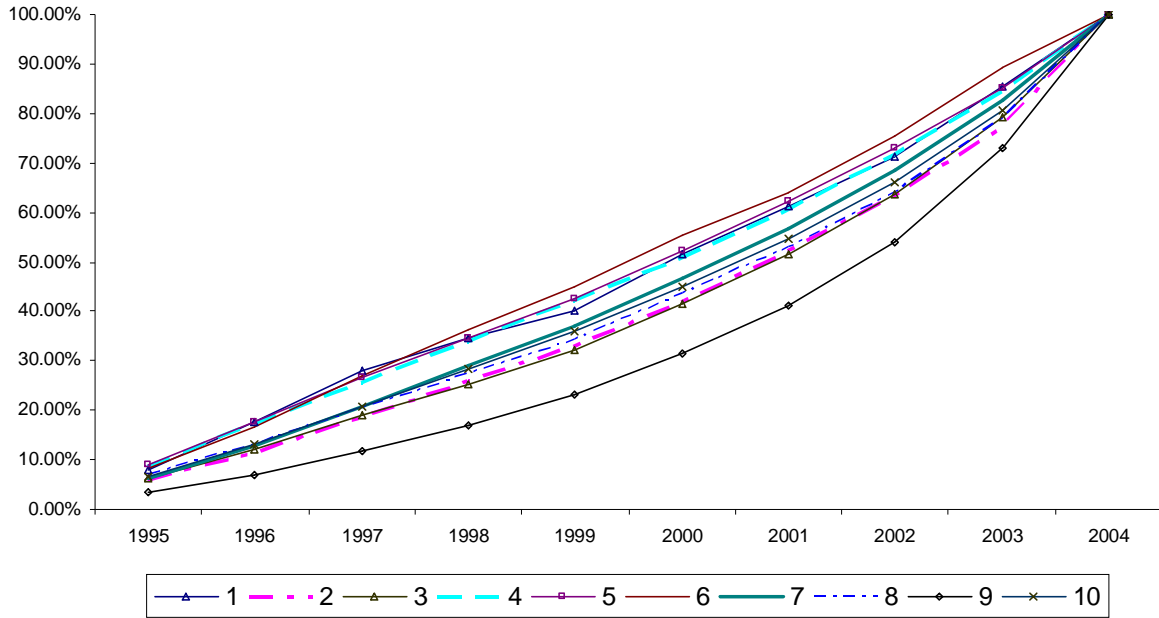
Source: Own calculations based on OECD database, 3-digit SITC

Figure 4.8: Cumulative Export Experience Function based on Leamer Index

**Cumulative Export Experience Function based on Exports to EU**

Source: Own calculations based on OECD database, 3-digit SITC

As the focus is on the diversification of exports in non-traditional exports, the manufacturing sectors have been separated from the rest of the sectors in figure 4.9 below to get a clearer view of the result. Labour-intensive (7) which use most unskilled labour and chemical products (10) which have high share of capital intensity and require high skill, are showing very similar export growth in time. However, Machinery (9) that has moderate levels of capital intensities and skills and capital-intensive (8) have experienced more growth later in the period. Of the two sectors Machinery has had export growth concentrated later in time.

In conclusion, the functions show that all of the sectors are shifting more or less to the right in both figures which indicates that all sectors are quite diversified. However, the primary sectors are shifting more to the right and therefore experiencing a slightly earlier export growth. The sectors which are situated furthest to the right and with that showing the experience in export growth later in the period are the manufacturing sectors showing a later export growth, especially the machinery sector as it is positioned the furthest to the right.

Figure 4.9: Cumulative Export Experience Function, based on EU15 trade
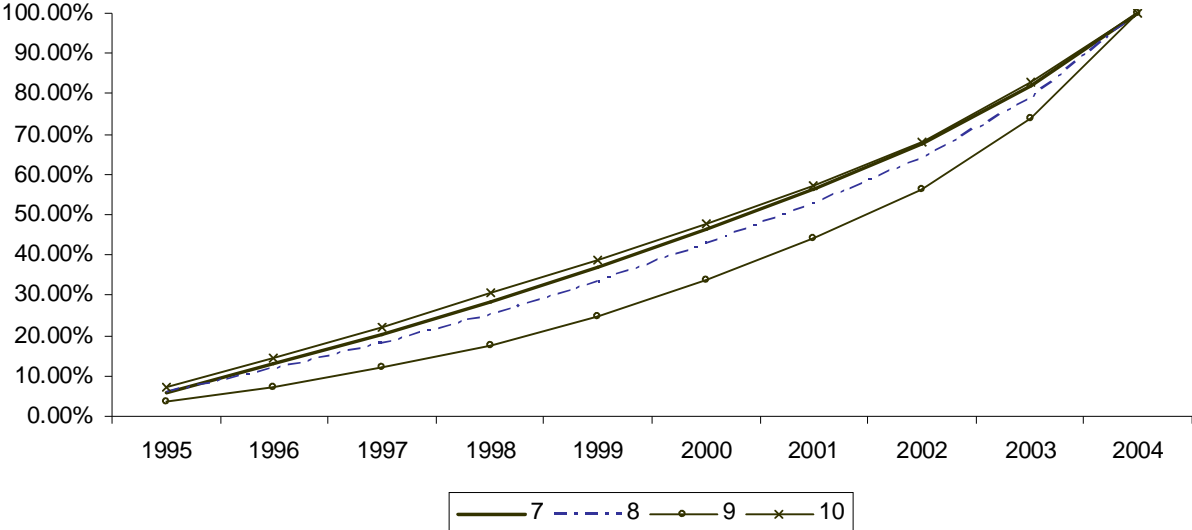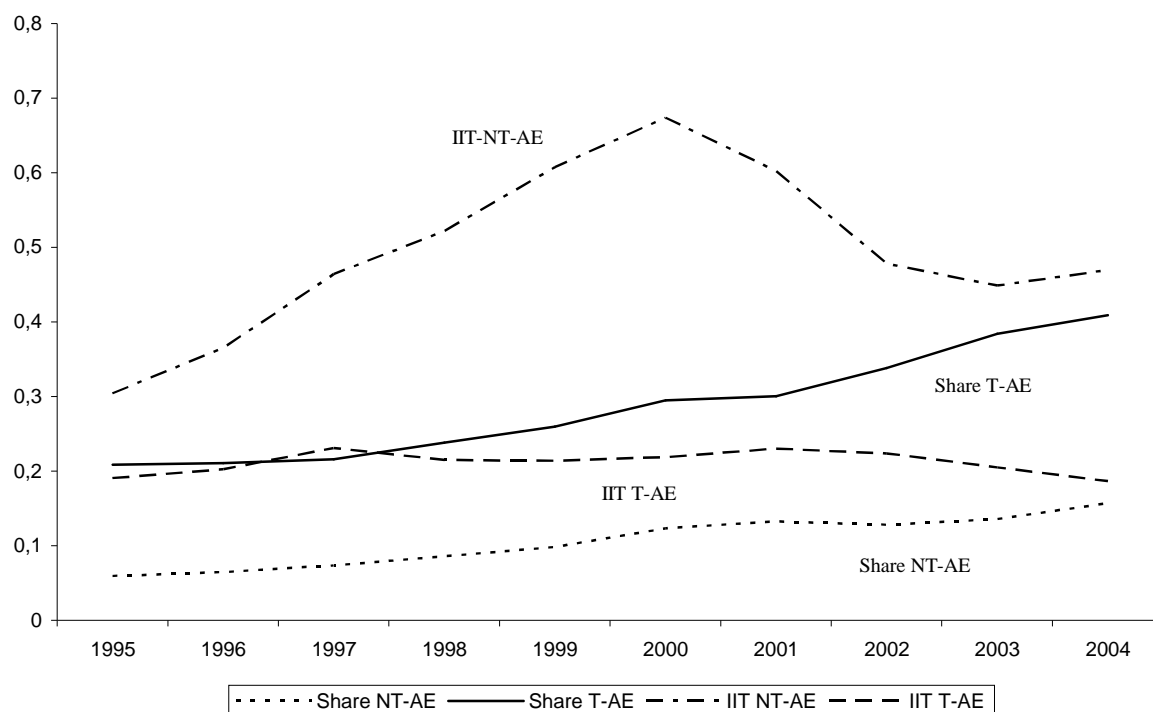

Source: Own calcultions based on OECD database, 3-digit SITC

4.5 IIT Share in Traditional & Non-Traditional Products

As mentioned earlier, intra-industry trade is connected to accelerating exports as economies of scale can be utilized for longer production runs. Figure 4.10 shows the share of traditional and non-traditional in total exports and intra-industry trade to the EU15. The AE-benchmark is in this figure set at 0.40. The traditional sector has had a stagnant share in total exports from 1995 to 1997, around 21 per cent. Since then the share has increased more and more, especially since 2001 and at the end of the period the share for traditional products was about 37 per cent. The intra-industry share of traditional products has throughout the period been quite stagnant showing modest fluctuations and in the last years decreasing slightly. The share of intra-industry trade in the latest year was around 18 per cent. The share in total exports for non-traditional products has been exhibiting a slow increase from 1995 to 2004, from a share of 7 percent to 14 per cent. The intra-industry share of the aggregate non-traditional products had dramatically increased from the beginning of the time period to 2000. This sector had an increase in 1995 from 30 per cent to almost 70 per cent in 2000. Since then the non-traditional sector has experienced a sharp decline. However in 2002 this decrease levelled out and has from then on had minor fluctuations. In conclusion, the total exports of the aggregate of traditional products show a continuing climb in growth whilst the total exports of aggregate for non-traditional products has a lower share but slightly increasing. The highest intra-industry share is dominated by the non-traditional products.

Figure 4.10: Share in total exports and intra-industry trade of traditional and non-traditional accelerating export industries to the EU15

4.6 Study of Sectors

The focal point is on diversification of China's trade structure and as many developing countries, including China, initially use labour-intensive goods to achieve economic development, this section will partly focus on labour-intensive sector. Furthermore, the sector that shows interesting results in the analysis is machinery, which suggests that China is starting to shift its production more complex goods. The tables and figures in this section are based on exports to EU15.

Figure 4.11 shows an overview of how large share the labour-intensive and Machinery sector have in total exports. The labour intensive sector has had a decreasing tendency throughout the time period. The sector had gone from exporting around 46 per cent in 1995 to around 30 per cent in 2004. However, relatively small increases can be seen in 1999 and 2000. The Machinery sector has experienced an increasing trend. It has had a slow but stable augment in

its exports. The values presented in 1995 show a share of 28 per cent. The end of the time period presents an export share of almost 50 per cent.

Figure 4.11: Labour intensive and machinery sectors' share in total exports

Share in Total Exports
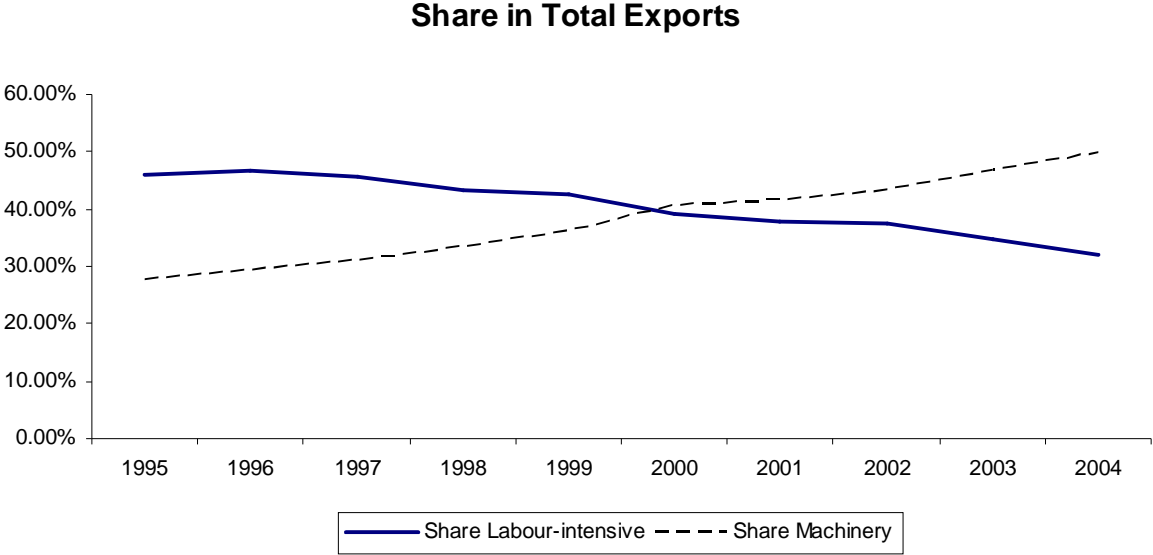
Source: Calculations based on OECD database, 3-digit SITC

Figure 4.12 below shows the Chinese trade composition of Machinery and labour-intensive exports divided into non-traditional, traditional exports and non-accelerating exports. These are shares of the total export of those goods in all Leamer Index that are classified as T-AE, NT-AE and NON-AE. The figure is based on trade with the EU 15 with an AE- benchmark of 0.40. The non-accelerating (Non-AE) exports in the labour-intensive sector seem to be quite high. In 1995 the share was 59 per cent and throughout the time period it has been stagnant with small fluctuations. In the machinery sector this level has been much lower. This share has also been quite constant with moderate changes. In 2004 the share exhibited a value of 14 per cent. The traditional (T) sector for the labour-intensive sector has showed a value of around 12 per cent which have been fairly continuous during the time line. Machinery has had a slight increase in traditional products in 1999 as well in 2002 and 2004 the share for traditional products presented a value of 69 per cent. The non-traditional (NT-AE) sector for labour-intensive was in 1995 4 per cent and since then the share has increased with a few percentages. In 2000 it experienced a decrease and in the last year the share of non-traditional products in the labour-intensive sector was around 5 per cent. Machinery presented results that were much higher in this group. In 1998 it had a small decline but following years have been showing same values as in 1995. In 2004 the share of non-traditional products in

machinery had a value of 87 per cent. In all, total exports of the two aggregates of accelerating export products, non-traditional and traditional, are dominated by machinery and the aggregate of non-accelerating export products (Non-AE) of goods classified as labour intensive.

Figure 4.12: Share of machinery and Labour-intensive goods in sector NT-AE, T-AE, Non-AE based on total exports to EU15 and leamer Index

Share of Machinery and Labour-instensive goods in NT-AE, T-AE and non-AE
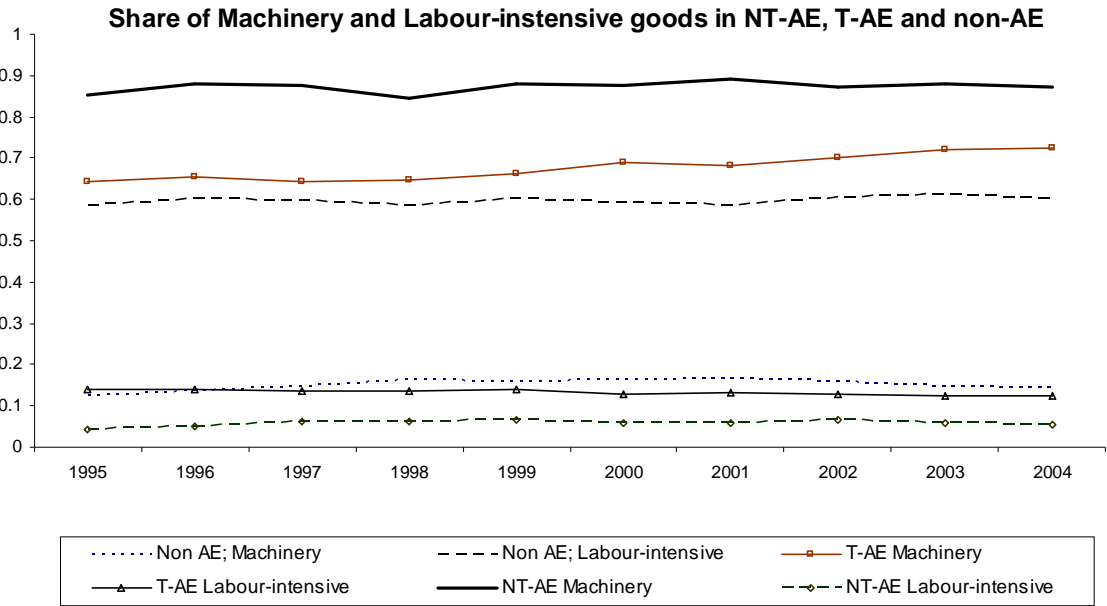
Source: calculations based on OECD database, 3-digit level

In order to study the structure of the labour-intensive and Machinery sector, the tabels 4.5 to 4.7 show the specific goods in each of these sectors and they have been divided into NT-AE, T-AE and Non-AE. The specific goods show the percentage of total export in Labour intensive and Machinery sectors. At the bottom of the tables, each sector's share of performance in the total exports to the EU15 have been calculated. In table 4.5 goods that dominate the exports of the aggregate of non accelerating products in labour intensive products are Baby carriages, toys, games and sporting goods (894). This group showed a percentage of almost 24 per cent in 95/96 and has since then increased to almost 26 per cent. Moreover, travel goods such as handbags, purses and briefcases (831) aslo showed a large percentage of total exports within the sector but has been decreasing and in 2003/2004 it had a share of approximatevly 10 per cent. A group that has increased its exports during the time line is women's outer garments of textile fabrics (843). In 1995/1996 the good had a percentage of 9.34 per cent and has augmented to 12.12 per cent. The footwear (851) has been

quite constant but does still make up an important part of the sector. Most of the exports in the other groups have gone down or stagnated. In this sector the share of total export to the EU15 was in 1995/1996 43 per cent which have dramatically decreased to almost 28 per cent.

The aggregate of non-accelerating in the machinery sector the dominate export group has been Radio Broasdcast receivers (762) but has under the time period had a rather large decline, from 32 per cent to 22 per cent. Also, watches and clocks have decreased in this sector. Two groups of goods that have had a large increase in its export is office machines (751) and electric power machinery and parts thereof (771). Each of these have increased by approximatively 6 per cent. The other groups in Machinery have other wise been stagnant in growth or declined. The share in total exports have also in this sector gone down, from 9.52 % to 6.68 per cent. In all, the total exports of the aggregate of the non-accelerating exports are dominated by labour intensive products, where the goods that show the largest export share have been characterized by miscellaneous manufactured articles (89) and travel goods (83).

Table 4.5: Non-accelerating products in Labour intensive and Machinery sector

Non-AE Labour intensive (7)		95/96	2003/2004
843	Outer garments, women's, of textile fabrics	9.34%	12.12%
663	Mineral manufactures, n.e.s	0.34%	0.49%
845	Outer garments and other articles, knitted	6.38%	8.30%
851	Footwear	8.14%	8.57%
894	Baby carriages, toys, games and sporting goods	23.68%	25.57%
893	Articles of materials described in division 58	7.30%	7.82%
847	Clothing accessories of textile fabrics	1.49%	1.67%
842	Outer garments, men's, of textile fabrics	6.96%	7.03%
846	Under garments, knitted or crocheted	5.87%	5.09%
896	Works of art, collectors pieces & antiques	0.08%	0.06%
831	Travel goods, handbags, brief0cases, purses, sheaths	12.03%	9.69%
899	Other miscellaneous manufactured articles	7.82%	6.03%
666	Pottery	1.77%	1.40%
844	Under garments of textile fabrics	1.80%	1.29%
848	Art.of apparel & clothing accessories, no textile	6.54%	4.72%
931	Special transactions & commod., not class.to kind	0.37%	0.16%
939	Special transactions and commodities not classified	0.09%	0.00%
961	Coin (other than gold) not being legal tender	0.01%	0.00%
total		100.00%	100.00%
Share in Total Exports		43.09%	27.70%
Non-AE Machinery (9)			
751	Office machines	8.92%	14.67%
874	Measuring, checking, analysing instruments	4.94%	7.82%
773	Equipment for distributing electricity	5.36%	9.15%
737	Metal working machinery and parts	0.33%	0.52%
951	Armoured fighting vehicles, arms of war & ammunit.	0.04%	0.06%
771	Electric power machinery and parts thereof	10.36%	16.69%
716	Rotating electric plant and parts	6.26%	7.01%
882	Photographic & cinematographic supplies	0.44%	0.48%
871	Optical instruments and apparatus	2.34%	2.32%
885	Watches and clocks	15.55%	12.46%
792	Aircraft & associated equipment and parts	2.51%	1.61%
736	Mach.tools for working metal or met.carb., parts	2.02%	1.54%
762	Radio0broadcast receivers	32.98%	21.74%
881	Photographic apparatus and equipment, n.e.s.	7.96%	3.93%
783	Road motor vehicles, n.e.s.	0.00%	0.00%
883	Cinematograph film, exposed0developed, neg.or pos.	0.00%	0.00%
total		100.00%	100.00%
Share in Total Exports		9.52%	6.68%

Source: Calculations based on OECD database, 3-digit SITC

The traditional products are represented in table 4.6 for each sector. In the labour-intensive furniture and parts thereof (821) have augmented from almost 40 percent to around 51 percent during the time period. However, Jewellery, goldsmiths and other parts (897) which is the second biggest export group have gone down. Most of the other groups have decreased in exports. However, the ones that have augmented have done so slightly. The labour intensive

goods in the traditional sector has in the beginnning of the period a share of almost 3 per cent in total exports to EU15. The performance since then has showed positive trends and has augmented to 5 per cent.

In machinery the group that has the highest share of exports is Automatic data processing machines (752). This group has increased its share from aapproximatively 21 to 39 per cent. Also gramophoes and other sound recorders (763) have gone up by almost 4 per cent. However, all other groups with large exports share such as Electrical Machinery and apparatus (778), Household type electrics (775) and (759) have gone down by 4 per cent or more. The share in total exports have increased rather rapidly showing shares from 13.59 per cent to a share of 28.71 per cent in 2003/2004. In conclusion, the total exports of the traditional products are heavily dominated by machinery and the products that have the highest share of export in this sector is electrical (77) and office data processing (75).

Table 4.6: Traditional products in Labour intensive and Machinery sector

T-AE Labour intensive (7)		95/96	2003/2004
664	Glass	3.59%	3.25%
892	Printed matter	9.58%	7.95%
665	Glassware	4.39%	5.89%
898	Musical instruments, parts and accessories	11.18%	10.68%
821	Furniture and parts thereof	39.44%	50.59%
895	Office and stationery supplies, n.e.s.	9.91%	6.36%
897	Jewellery, goldsmiths and other art. of precious m.	21.91%	15.27%
total		100.00%	100.00%
Share in Total Exports		2.93%	4.94%
T-AE Machinery (9)			
872	Medical instruments and appliances	1.58%	0.91%
776	Thermionic, cold & photo0cathode valves, tubes, parts	2.52%	3.89%
786	Trailers & other vehicles, not motorized	0.58%	0.43%
778	Electrical machinery and apparatus, n.e.s.	17.51%	11.93%
873	Meters and counters, n.e.s.	0.51%	0.33%
884	Optical goods, n.e.s.	3.68%	1.91%
752	Automatic data processing machines & units thereof	20.34%	38.92%
785	Motorcycles, motor scooters, invalid carriages	2.16%	1.80%
775	Household type, elect.& non0electrical equipment	21.41%	10.69%
759	Parts of and accessories suitable for 75100or 7520	18.83%	14.54%
761	Television receivers	2.07%	2.23%
763	Gramophones, dictating, sound recorders etc	8.80%	12.42%
total		100.00%	100.00%
Share in Total Exports		13.59%	28.71%

Source: calculations based on OECD database, 3-digit SITC

In table 4.7 non-traditional groups are presented in both industries. Also, the groups that dominates completely in the labour-intesive sector is non-metal minerals (66). Pearls and precious stones have declined in exports from almost 66 per cent to 57 per cent. All the other groups have been increasing in exports. The second important group is lime, cement and fabricated construction materials which have augmented from 30.42 to 34.23 per cent. The labour intensive sector had at the beginning of the time period a share of 0.29 per cent of total exports to the EU15 which has increased in recent years but still exhibits a rather small share of 0.81 per cent.

Table 4.7: Non-traditional products in Labour intensive and Machinery sector

NT-AE Labour intensive (7)		95/96	2003/2004
662	Clay construct.materials & refractory constr.mater	3.94%	9.08%
667	Pearls, precious& semi0prec.stones, unwork./worked	65.63%	56.69%
661	Lime, cement, and fabricated construction materials	30.42%	34.23%
total		100.00%	100.00%
Share in Total Exports		0.29%	0.81%
NT-AE Machinery (9)			
711	Steam & other vapour generating boilers & parts	0.01%	0.01%
782	Motor vehicles for transport of goods/materials	0.02%	0.06%
712	Steam & other vapour power units, steam engines	0.02%	0.01%
727	Food processing machines and parts	0.07%	0.07%
781	Passenger motor cars, for transport of pass.& goods	0.10%	0.20%
791	Railway vehicles & associated equipment	0.03%	0.05%
718	Other power generating machinery and parts	0.04%	0.11%
713	Internal combustion piston engines & parts	0.32%	0.59%
725	Paper & pulp mill mach., mach for manuf.of paper	0.20%	0.19%
728	Mach.& equipment specialized for particular ind.	1.96%	2.14%
793	Ships, boats and floating structures	0.70%	3.73%
726	Printing & bookbinding mach.and parts	0.17%	0.16%
724	Textile & leather machinery and parts	1.64%	1.14%
722	Tractors fitted or not with power take0offs, etc.	0.02%	0.03%
742	Pumps for liquids, liq.elevators and parts	0.44%	0.87%
723	Civil engineering & contractors plant and parts	0.38%	0.38%
741	Heating & cooling equipment and parts	3.98%	9.24%
784	Parts & accessories of 72200, 78100, 78200, 78300	0.77%	1.74%
744	Mechanical handling equip.and parts	2.51%	1.79%
774	Electric apparatus for medical purposes, (radiolog)	0.44%	0.34%
745	Other non0electrical mach.tools, apparatus & parts	3.66%	2.91%
743	Pumps & compressors, fans & blowers, centrifuges	2.96%	2.29%
721	Agricultural machinery and parts	0.27%	0.46%
764	Telecommunications equipment and parts	51.22%	52.44%
772	Elect.app.such as switches, relays, fuses, plugs etc.	13.95%	9.34%
714	Engines & motors, non0electric	3.55%	2.74%
749	Non0electric parts and accessories of machines	10.58%	6.97%
total		100.00%	100.00%
Share in Total Exports		5.36%	12.83%

Source: Calculations based on OECD database, 3-digit SITC

In machinery a very important export group and by far dominate is telecommunications equipment and parts (764) which showed a share of 52.44 per cent in 2003/2004. Although it has only had a a small increase in the time period, approximatively 1.5 per cent, it is much larger than the rest of the others goods' share. Another group with a relatively high increase is heating and cooling equipmentand parts (741), which have increased by more than 5 per cent. Electrical apparel such as switches relay and fuses (772) and nonelectric parts and accessories of machines have had a relatively large decrease and in1995/1996 and 2003/2004 had a percentage of 9.34 to 6.97 per cent. The remaining groups take up a rather small share of the exports. The share in total exports have increased from 5.36 per cent to 12.83 per cent. To summarize, the total exports of the aggregate of non-traditional products are dominated by machinery. Goods that have the highest share are foremost telecommunications (76) but also electrical (77) and general industrial goods (74). The share for total exports is small for labour intensive goods and they are all non-metal minerals

5. CONCLUSION

The purpose of this thesis was to study the Chinese industrial and trade reforms and how these changes have affected the country's export growth and economic development. The increase in liberalization of trade has had affects on the composition of exports but in order to have a steady economic growth, export diversification from traditional to non-traditional products are necessary. It is assumed that China already has a certain level of export diversification in labour intensive manufacturing goods and therefore the aim has been to see if the inter industry specialization in manufacturing are, through intra-industry specialization, becoming more based on complex manufacturing goods.

When it comes to looking at the overall trend of export diversification the calculations of Herfindahl index and exports showed declining tendencies in export specialization within the primary sectors. The convergence of the primary sectors in decreased export concentration together with decreasing exports that indicates decreasing inter-industry trade, show that the sectors are becoming more diversified and more stable. Part of the manufacturing sector has been experiencing diversification throughout the time period such as the capital intensive and chemical sectors. The labour intensive sector has been characterized by large export surpluses with declining export. This together with a decrease in export concentration suggests that this sector is becoming quite diversified. The machinery sector, characterized by net import in the early 90s, is the only sector which shows a trend of increased export concentration and in later years this concentration has significantly increased. The cumulative export experience function further supports these findings as all sectors are positioned quite close to each other with machinery being the sector showing the latest growth. The fact that they are closely positioned implies that they are all relatively diversified.

In order to examine whether China has been shifting its production from labour intensive goods to more complex goods in machinery the total exports of the two aggregates of accelerating export products (non traditional, traditional) were calculated. The figures showed that these aggregates were dominated by machinery. The non accelerating export product was dominated by the labour intensive goods. To get an idea how large the two sectors' share in total exports was to EU15, the three aggregates (non-accelerating, traditional and non traditional export products) were calculated. The results suggest that China has begun shifting

its production to more complex goods in machinery as this sector shows a significantly dominating share of total exports compared to labour intensive goods in the two aggregates of accelerating exports (traditional and non traditional) products. Furthermore, the labour intensive goods dominated in the total exports of the aggregate of non accelerating export products.

By looking at the dominant goods in the aggregates of accelerating exports, traditional and non traditional products in machinery, one can draw conclusions in what type of goods China is specializing in. The calculations show that telecommunications is by far dominating in the non traditional export products as well as electrical apparel, household type electronics, automatic data processing machines and electric machinery. The augmenting specialization one has seen has been in these goods that are more complex than products in the labour intensive sector.

With the membership in the WTO, China will have to implement reforms and liberalize its market even more. This will attract new investors. The increased efficiency caused by the elimination of trade barriers and inefficient industries/firms may further encourage intra-industry trade as economies of scale can be easier reaped. This will almost certainly have effects on the diversification/concentration of exports in the future.

APPENDIX

The classification of group 1 to 10 is based on Leamer's 10 commodity clusters on a 2-digit SITC-code. The classifications of the different groups are as follows;

Group 1, (PETROLEUM); 33 Petroleum and derivatives.

Group 2, (RAW MATERIALS); 27 Crude fertilizers and minerals, 28 Metal-ferrous ores, 32 Cole and coke, 34 Gas, natural and manufactured.

Group 3, (FOREST PRODUCTS); 24 Lumber, wood and cork, 25 Pulp and waste paper, 63 Cork and wood manufactures, 64 Paper.

Group 4, (TROPICAL AGRICULTURE); 05 Vegetables, 06 Sugar, 07 Coffee, 11 Beverages, 23 Crude rubber.

Group 5, (ANIMAL PRODUCTS); 00 Live animals, 01 Meat, 02 Dairy products, 03 Fish, 21 Hides and skins, 29 Crude animals and vegetables, 43 Processed animal and vegetable oils, 94 Animal products,

Group 6, (CEREALS ETC.); 04 Cereals, 08 Feeds, 09 Miscellaneous, 12 Tobacco, 22 Oil seeds, 26 Textile fibres, 41 Animal oil and fat, 42 Fixed vegetables oils.

Group 7, (LABOUR-INTENSIVE); 66 Non-metal minerals, 82 Furniture, 83 Travel goods and handbags, 84 Articles of apparel, 85 Footwear, 89 Miscellaneous manufactured articles, 91 Postage packaging, not classified, 96 Coins (non-gold).

Group 8, (CAPITAL- INTENSIVE); 61 Leather, 62 Rubber, 65 Textile yarn and fabric, 67 Iron and steel, 69 Manufactured metal n.e.c, 81 Sanitary fixtures and fittings.

Group 9, (MACHINERY); 71 Power generating, 72 Specialized, 73 Metalworking, 74 General Industrial, 75 Office and data processing, 76 Telecommunications and sound, 77 Electrical, 78 Road vehicles, 79 Other transportation vehicle, 87 Professional and scientific instruments, 88 Photographic apparatus, 95 Firearms and ammunitions.

Group 10, (CHEMICALS); 51 Organic, 52 Inorganic, 53 Dyeing and tanning, 54 Medical and pharmaceutical products, 55 Essences and perfumes, 56 Fertilizers, 57 Explosives and phyrotechnics, 58 Artificial resins and plastics, 59 Chemical materials.

Group 11, (GOLD, NON-MONETARY)

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