DETERMINANTS
OF
CHINA'S TRADE BALANCE

A THESIS SUBMITTED IN FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY IN ECONOMICS

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STATEMENT ON THE CONTRIBUTION OF OTHERS

I recognise China Scholarship Council for granting me a CSC-JCU PhD Scholarship which enables me to purse a Ph.D. degree in James Cook University and complete this thesis. Also, I also acknowledge the support of James Cook University in providing with research assistance grants and conference grants which aided in the successful completion of this thesis.

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ABSTRACT

Integrating economic, political and socio-cultural considerations, this thesis identifies the key determinants of China's trade balance with a view to drawing policy implications that can assist in correcting China's excessive trade surplus.

China's economic reforms and open-door policy over the past three decades have led to its fast economic growth and concomitant rapid trade expansion. While China's trade was largely in balance (a modest surplus) from the early 1990s to the early 2000s, a large and persistent trade surplus has emerged since 2004. The surplus has now been widely regarded as excessive and harmful to China's macroeconomy, for the following reasons. (1) A large and persistent trade surplus could lead to problems of domestic excessive liquidity and high inflation; leaving limited room for the Chinese government to use monetary and fiscal policies to manage its macroeconomy. (2) An over-reliance on external demand could leave the Chinese economy vulnerable to external shocks. (3) The large trade surplus could worsen China's trade relations with its trading partners. All of these could affect China's sustainable economic growth. A sustainable growth of China's economy, however, is crucially important not only for China itself due to the employment pressure resulting from the huge population but also for the rest of the world given that China has been one of the major economic engines, contributing to economic growth elsewhere around the globe. Hence, it is utterly imperative for China to curtail the excessive surplus in order to lessen any potential large-scale damages to the Chinese economy. To reduce the surplus, understanding its determinants is essential. So far, there is still a dearth of comprehensive examination of key determinants that have resulted in China's excessive trade surplus. This study is an attempt to fill this void.

Many factors can affect the balance of trade of a developing country like China where peculiar circumstances exist. They can be economical, political, or even social and cultural. Available studies on China's trade balance tend to focus largely on economic factors. This study, embracing a multi-faceted view, examines not only economical, but also political, social and cultural factors that may affect China's trade balance. Such a

comprehensive analysis generates valuable insights into the mechanism by which China's trade balance may have been affected. It was also invaluable for the design and conduct of empirical analysis for this study, which focused on verifying the relations between trade balance and a number of important economic variables.

For the empirical analysis, an integrated multi-channel approach was developed, building on existing trade balance literature. The main channels included in this approach, through which economic determinants may affect the balance of trade, include: the supply-side channel, the demand-side channel and the relative price effect. The empirical investigations were carried out to assess how some key economic determinants, as identified from earlier comprehensive analysis, affect China's trade surplus at both aggregate and disaggregate levels. To better measure the impact of productive capacity and the relative price effect on trade balance, this study augmented the conventional model of trade balance by incorporating the variables of FDI and labour cost into the econometric analysis.

The econometric modelling with aggregate data reveals the existence of long-run equilibrium between trade balance and domestic income, foreign income, exchange rate and FDI. The results suggest that changes in China's trade balance are chiefly dominated by income movements at home and abroad. FDI has a short-run impact on China's trade balance but the long-run effect is not significant. Real effective exchange rate, which represents the relative price effect, does not seem to have a significant impact on China's trade balance in both the long and short run.

Using disaggregate data, the actual level of China's bilateral trade balance with its major trading partners is re-estimated using Hong Kong's re-export data. Four major variables: FDI, exchange rate, relative income and relative unit labour cost are incorporated into the econometric model. The results reveal two new significant determinants of China's trade balance: labour cost and FDI. The low labour cost has a much greater impact on China's trade surplus, followed by FDI. The impact of the exchange rate, though important, but again not as critical as many others have claimed. The impact of income on China's trade balance is also presented but not as significant as revealed in the aggregate analysis.

This study makes the following important contributions to the trade balance literature. (1) It emphasises the importance of analysing trade balance determinants by going beyond economic factors and also including political, social and cultural factors for countries like China where peculiar situations prevail. (2) It proposed a multi-channel and multi-perspective conceptual framework for better identifying economic factors that may affect a country's trade balance. (3) It adds to the understanding of empirical relationships between key economic determinants and trade balance with findings from econometric modelling using both aggregate and disaggregate data.

The findings of this study have important implications for China to curtail its excessive trade surplus. The most effective way to reduce China's trade surplus is to boost the disposable income of Chinese consumers, especially those low-income consumers, so that they can afford to consume more. To induce higher domestic consumption, innovative policy instruments have to be devised to channel more income to ordinary consumers, especially those low-income consumers, through significantly increased investments to improve social security, to provide low-cost education and health care, and to provide other public goods that help ordinary people to reduce their cost of living. In the meantime, measures have to be devised and effectively implemented to ensure wage-earners obtain an equitable share of the income they generate.

In addition to boosting ordinary people's income, directly and indirectly, some other measures should also be considered in order to reduce China's trade surplus. In terms of FDI, it probably no longer makes any sense for China to provide incentives to attract any inflow FDI (especially, those low value-adding processing trade and heavy polluters). Instead, policy incentives may be used to attract inward FDI that are technologically intensive and advanced so to help China to protect its environment, develop renewable energy, and produce high-valued products. Further, it will also be useful for China to relax exchange rate control. The Chinese yuan should be allowed to float more freely against other currencies; letting the market forces have a major play in determining the value of the yuan.

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Chapter 1 Introduction

1.1 Introduction

China's large trade surplus accumulated in recent years has prompted a strong need to assess the determinants of its trade balance. This thesis investigates the key determinants of China's trade balance integrating socio-cultural, political and economic aspects. The overall aim is to draw policy implications that can assist in correcting China's excessive trade surplus.

In less than three decades, China has grown from having a negligible role in world trade to being one of the world's largest exporters. During the first few years after the economic reform that began in 1979, China often had trade deficits. But after 1994, a trade surplus started to emerge and gradually gathered momentum. Between 2004 and 2008, China's trade surplus, as a percentage of GDP, has increased from 2% in 2004 to 7% in 2008. The absolute value of the trade surplus (goods and services) in 2008 is $32.10 billion, nearly ten times the amount of the trade surplus in 2004. Despite shrinking demand caused by the global financial crisis of 2008-2009, China is still experiencing a large amount of trade surplus.

So, what are the underlying causes behind China's recent huge trade imbalance? A number of explanations have been put forward for China's large trade surplus, which can be categorized as being either domestic or international. Some argue that the main reason for the increase in China's trade imbalance is its export-led growth model and exchange rate policy (Ahmed & Park, 1994; Goldstein & Lardy, 2006; Rodrik, 2006; Aziz & Li, 2008; Corden, 2009; Krugman, 2009).The processing trade, where exports are inextricably linked to imported inputs, is considered to be an important contributor to the ballooning trade surplus. In addition, the real exchange rate, as the relative price of export and import, is also considered as an important factor in China's trade balance. Therefore, China's exchange rate regime and policy are often criticized by the U.S. and other Western countries, believing as the Chinese authorities heavily manage their currency and the real value of the Chinese currency (the RMB or yuan). On the other hand, some internal observers, Yu (2007), Huang (2010) and others have been discussing the structural imbalance problems. Two of the most frequently identified problems in their

work are over-investment (which leads to an excess output capacity and current account surpluses) and the distortion of factors markets (including labour, land and capital), are considered to be largely responsible for the growing imbalance problem.

Investigating the underlying determinants of trade surpluses is important for identifying ways to correct the external imbalance. China's large trade surplus is widely deemed as being negative to China's sustainable economic growth by many scholars and policy makers. Firstly, export-dependent surplus has over-relied on resource consumption and external demand. The current growth model poses a number of serious problems including environmental sustainability, the rising level of income inequality and the large amount of foreign reserve in US dollar assets. The likely evolution of the imbalance and the sustainability of the growth model are seen as the main threat to orderly development of domestic economy. The enormous surge in liquidity and the recent global financial crisis turns out to be a prelude to more profound crises in the near future. Secondly, the rising external surpluses have worsened China's trade relations with its major trading partners. During the recent global financial crisis of 2008-2009 and beyond, China's surplus has been frequently singled out for special mention (Bernanke, 2005; Bown *et al.*, 2005; Chinn & Ito, 2007). Researchers have also attributed the causes of the global financial crisis to an increase in saving rates and trade surplus of the emerging Asia economies; for example, the so-called "saving glut" hypothesis by Bernanke (2005).

The importance and urgency of correcting the external imbalance has also been recognized by the Chinese government. The Wen Jiabao government set the rebalancing of economic structure and transformation of the growth model as its policy priorities in early 2003. The policy makers have taken decisive steps to correct the trade imbalance by adopting various policy measures including reducing the export rebates, allowing the Chinese currency to appreciate and stimulating domestic consumption. However, the trade imbalance problem has deteriorated during the past seven years, despite repeated policy efforts (Huang & Wang, 2010). It is thus imperative to identify the underlying causes of the trade imbalance problem and address them effectively. This study aims to identify the determinants of China's trade balance with a view of drawing policy implications to help correct its excessive surplus.

1.2 Motivations for this study

Firstly, available theoretical models in the balance-of-trade literature tend to focus on one economic factor or a certain type of shocks to explain trade imbalance issues, e.g., the effects of the exchange rate (Bahmani-Oskooee & Brooks, 1999), productivity shock (Hunt & Rebucci, 2005) and monetary shock (Koray & McMillin, 1999). However, there are diverse factors that may affect a country's trade balance. Focusing on the impact of just one factor or one economic aspect inevitably means that insufficient information will be available to make a full assessment. In response to this deficiency, a more comprehensive approach that account for more potentially important factors to analyse China's trade surplus issue is needed and is proposed in this study.

Secondly, existing empirical studies have generated different views on the factors underlying trade balance dynamics. Most of those studies use aggregate data to evaluate the determinants of trade balance. Their results are likely to be biased because of the "aggregation bias problem" (Bahmani-Oskooee & Brooks, 1999). There is a gap in knowledge of economic determinants from a disaggregate perspective. Accommodating the aggregation bias, this thesis examines the effects of determinants on China's trade balance at both the aggregate and disaggregate levels.

Thirdly, there is limited literature on the effects of non-economic factors on a country's trade balance. Existing economic discussions have struggled to explain how some important economic factors have affected China's trade surplus, for example, exchange rate and FDI. Therefore, when examining a country's trade balance issues, particularly for those developing countries such as China, it is extremely important to consider not only economic factors, but also peculiar political, cultural and social factors as they can have a very influential impact on a country's trade balance.

Lastly, while researchers have tried to investigate the underlying causes of external imbalances, most of the available empirical tests have been devoted to addressing whether a country can sustain a large deficit. The United States has received most of the attention for its increasing deficit in this field of research, which is at the heart of "global imbalances" (Glick & Rogoff, 1995; Bernanke, 2005; Edwards, 2005; Blanchard, 2007). However, there have been few academic studies that have analysed, in a systematic way,

the process through which countries with large external surpluses could reduce their imbalances. This thesis is an attempt to fill this void.

1.3 Research questions and objectives

The primary research question for this thesis is: What are the key determinants that affect China's trade balance? More specific research questions include:

- What has happened to China's international trade in the past three decades?
- What is China's current trade balance position?
- What economic, political and socio-cultural factors, especially those that are peculiar to China, have affected China's trade surplus in the past decades?
- How, and to what extent, have some of the important economic factors affected China's balance of trade?

The main objective of this study is to identify the key determinants of China's trade balance with a view of drawing policy implications for correcting China's excessive trade imbalance. Specific objectives are to:

- examine the evolution of China's trade performance and trade policy since the 1980s;
- access the current status of China's trade balance;
- investigate the key factors that determine China's trade balance, integrating economic, political and socio-cultural aspects;
- empirically examine the relationship between the trade balance and some important economic determinants; and
- draw policy implications that can help China to correct its excessive trade surplus.

1.4 Methodology

To answer the above research questions and achieve the stated objectives, the research strategy adopted in this thesis involves developing a multi-channel and multi-perspective conceptual framework, to better understand the trade balance dynamics. This framework then identifies those key factors that could have affected China's balance and empirically tests some key economic factors to see how they have impacted on China's trade surplus. Details about the research methodology are given in Chapter 4.

Data required for this study are some key macroeconomic indicators including export, import, the nominal exchange rate, the real effective exchange rate, price level, unit labour cost, income per capita and FDI inflows. These data are collected from the UN COMTRADE database, Economist Intelligent Unit (EIU) Country Data and CEIC macroeconomic database for global emerging and developed markets. All the data collected are annual, ranging from 1983 to 2010.

During two field trips to China, key researchers in China who have had experience in studying China's trade balance were interviewed. Visits were also made to local firms, to talk to managers across a range of industrial sectors about their export behaviours. Those interviews and visits have proved very valuable in gaining insights about China's trade balance dynamics. This allowed the candidate to solicit their views about China's trade imbalance problem, discuss issues with them, and clarify some questions the candidate had.

A number of estimation techniques are used for data analysis. A unit root test was applied to check the stationarity of the data series to determine the order of integration. A cointegration test was conducted to determine the long-run relationship among the data series. Long-run and short-run elasticities, which measure the effects of independent variables (the key economic determinants such as FDI, income, exchange rate and labour cost) on the dependent variable (China's trade balance), were estimated.

1.5 Significance of the research

Firstly, most previous studies have focused on one single determinant or economic aspect. This study instead develops a multi-channel and multi-perspective conceptual framework for identifying the determinants of China's trade balance. This framework views the trade balance from three main channels: supply-side, demand-side and relative price effect. Under this framework, the key factors of trade balance can be tracked through the three major channels. This framework will be especially useful to many developing countries, where country-specific economic, political, social and cultural factors have to be taken into consideration when examining the trade balance.

Secondly, existing trade balance research has normally considered the impacts of economic factors. This study attempts to generate a better understanding of China's trade balance by taking into account the role of non-economic factors. Some special political,

social and cultural factors can be very influential in generating a trade surplus, especially in countries like China. For such countries, simply investigating economic factors is not sufficient. By examining the influence of economic, socio-cultural and political factors on China's trade balance, this thesis will fill a gap in the literature.

Thirdly, existing empirical studies mainly evaluate the determinants of the trade balance based on an aggregate analysis. Their results are generated by estimating the relationship between China's overall trade balance (China's trade balance with the rest of the world) and its determinants. Hence, such studies may suffer from an "aggregation bias problem" (Bahmani-Oskooee & Brooks, 1999). In this study, a combination of empirical analyse at both the aggregate and disaggregate levels is carried out. Thus, an alternative disaggregate analysis (China's bilateral trade balances with its major trading partners) will need to be explored to overcome the "aggregation bias problem". This thesis will contribute to existing literature by empirically examining the determinants at both aggregate and disaggregate levels.

Additionally, the findings of this research are of great relevance to policy in China and some other economies. The key determinants and the mechanism underlying trade balance dynamics are identified in this study, and these help to draw policy implications.

1.6 Organisation of the thesis

Following this introductory chapter, the next chapter (Chapter 2) provides some background information concerning China's trade. China's trade performances and trade reforms are discussed to aid the understanding of the evolution of its trade balance. In Chapter 3, relevant literature is reviewed.

Chapter 4 presents the conceptual framework which provides a mechanism for exploring the likely factors affecting China's trade balance. The chapter then goes on to explain and justify the research design and research techniques used.

Chapter 5, 6 and 7 report the research findings. In Chapter 5, from a multi-faceted perspective, the key economic, socio-cultural and political-institutional factors that may affect China's trade balance are explored. Some of the more important economic factors are further empirically evaluated in Chapters 6 and 7. Econometric models are used to examine the relationships between these factors and China's trade balance in Chapter 6

(aggregate analysis) and Chapter 7 (disaggregate analysis). Finally, Chapter 8 concludes the thesis.

Chapter 2 China's Trade Performances and Trade Reforms

2.1 Introduction

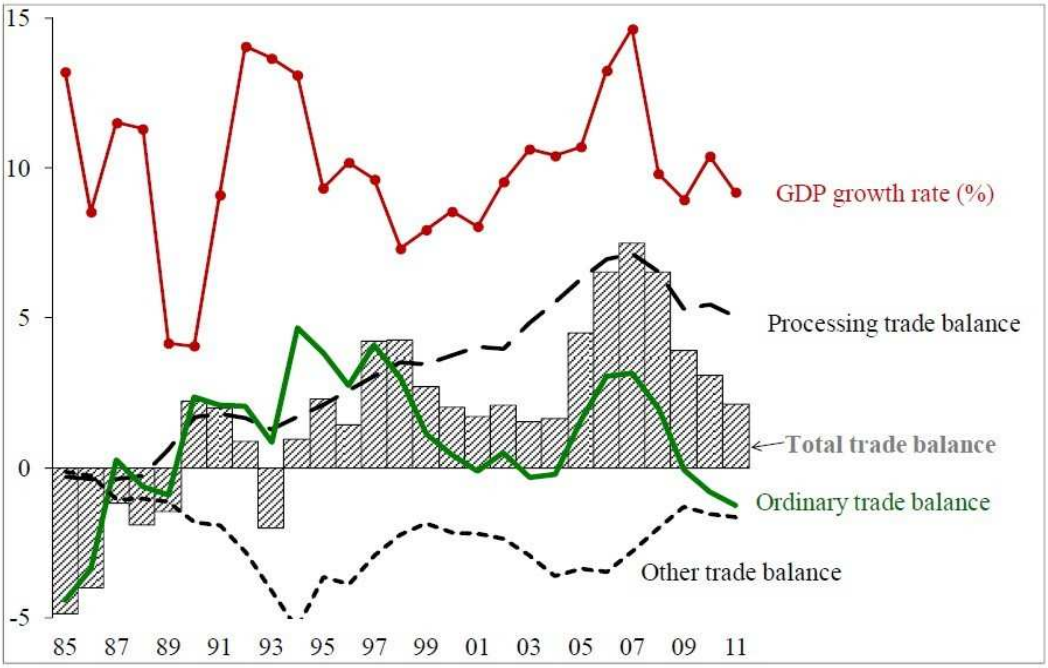
Before addressing the issue of determinants of trade balance, it is important to understand China's trade performance and its trade environment in the past decades. Hence, this chapter is devoted to provide background information about current issues concerning China's trade balance position. In doing this, Section 2.2 provides an overview of the current trade balance position. This is followed by a discussion of China's trade performance in Section 2.3, with a focus on the characteristics of trade and the changes of China's general trade pattern over time.

Section 2.4 reflects on the history of China's trade experience in particular its export performance and the determinants of trade growth since the late 1970s. This involves a brief discussion of China's changing trade environment and its trade policy reforms that liberalized the foreign trade system. In Section 2.5, the importance of China's export and the expanding trade surplus on China's economic growth is highlighted. Finally, Section 2.6 concludes the chapter.

2.2 China's trade balance position

China's large trade surplus is a relatively recent phenomenon. From the early 1990s to the early 2000s, trade in goods and services displayed a surplus which remained relatively modest and less than 4% of GDP. Starting in 2004, the size of China's trade surplus rapidly increased. Since the global crisis erupted in 2008, the amount of trade surplus has considerably reduced but still remains large (see Figure 2.1). Ordinary trade and processing trade are two major components of China's foreign trade, which contributed at times in different ways to the evolution of the total trade balance. Ordinary trade balance fluctuated while processing trade displayed a steadily growing surplus and there was a rapid expansion of processing activities which accelerated in the late 1990s.

Figure 2.1 China's trade balance (in % of GDP)



Source: CEIC database.

Academic discussions (Yang & Zhu, 2007; Yu, 2007; Huang & Tao, 2010; Yao, 2011) attribute China's economic growth to domestic economic reforms, and the recent faster growth in exports. In this regard, a more detailed discussion of China's trade performances and trade reforms should help understand how China has reached its today's trade balance position.

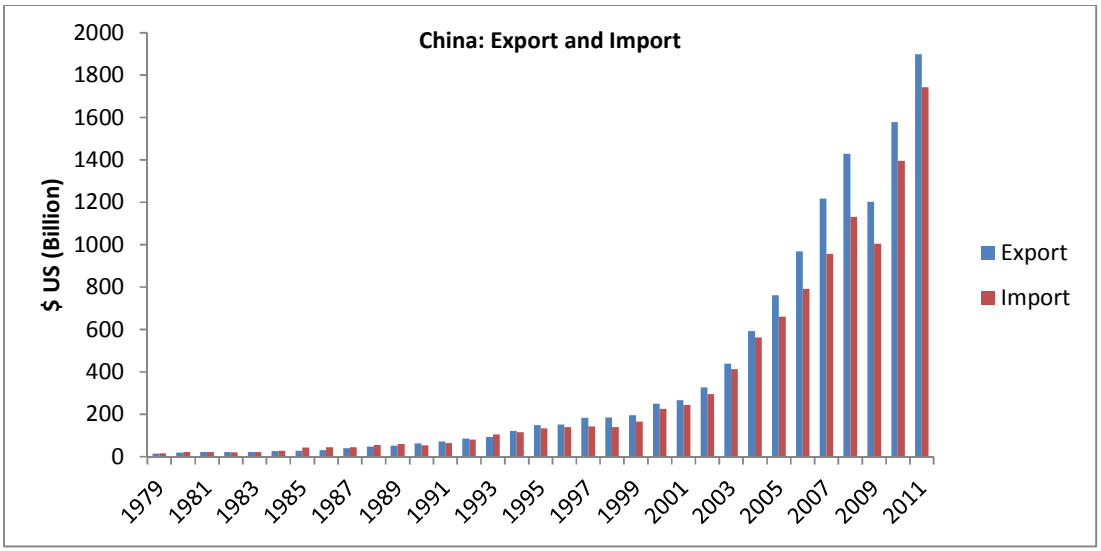
2.3 China's foreign trade

Since launching the economic reforms in the late 1970s, China has become increasingly integrated into the world economy as shown by its rapid increasing trade share and the attraction of a large share of foreign direct investment (FDI). From 1979 to 2011, China's exports plus imports, increased from $29.2 billion to $3642.0 billion, a growth of over 125 times (Figure 2.2). The total share in world trade expanded from over 0.8% in 1979 to about 9.8% in 2011. China has emerged as an international trading power and become the second largest trading nation in the world.

The booming FDI since the beginning of the 1990s has been regarded as an important factor behind the successful expansion of China's foreign trade. Inflows of FDI to China

were virtually non-existent before 1979. During the 1980s, FDI inflows grew steadily but remained relatively low, confined largely to joint ventures with Chinese state-owned enterprises. A further surge in FDI preceded and accompanied China's accession to the World Trade Organization (WTO) in December 2001, promoting China to top position as an FDI destination in 2003.

Figure 2.2 China's foreign trade 1978-2011

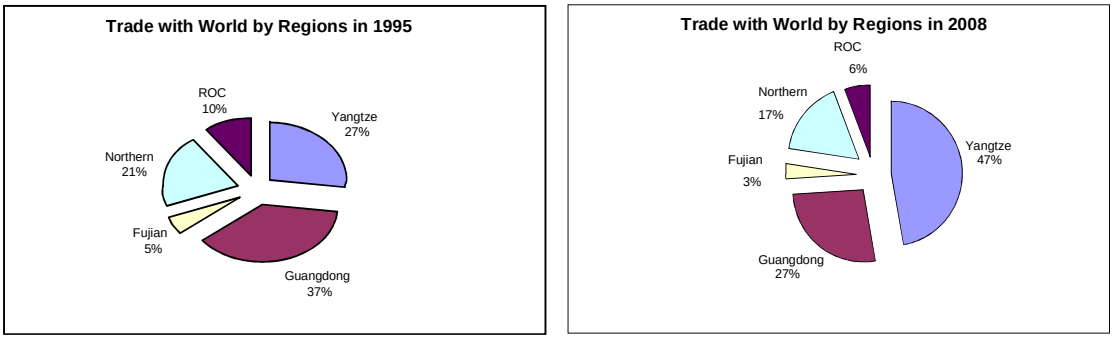


Source: International Financial Statistics (IFS).

Trade distribution by region

For the purpose of this study, China is divided into five regions: the Yangtze Delta (the city of Shanghai and the two provinces of Jiangsu and Zhejiang), Guangdong Province, Northern China (Beijing and Tianjin), Fujian Province and the Rest of China (ROC). The regional distribution of total trade (export plus import) in 1995 and 2008 (the year before the global financial crisis) with the rest of the world is given in Figure 2.3. In 1995, Guangdong's share of the total trade volume was 37%, the largest among all regions. By 2008, however, the relative importance of Guangdong Province declined while the Yangtze Delta has grown significantly. Figure 2.3 shows the Yangtze Delta produced 47%, nearly half of China's total trade in 2008. The share of Guangdong Province dropped to 27%. The share of Northern China and Fujian Province also slightly declined.

Figure 2.3 Trade distributions in 1995 and 2008



*Yangtze: Shanghai, Jiangsu and Zhejiang; Northern: Beijing and Tianjin; ROC: the rest of China. These regions refer to the locations where exports are originally produced and imports are finally consumed.

Source: CEIC database.

In terms of regional distribution of inflow FDI, the coastal provinces, especially Jiangsu and Guangdong, received more FDI. The strong growth of the export sector in the coastal area has been supported by the massive use of FDI. Their exports and imports have much higher shares of national trade volumes than provinces in the central and western regions. FDI initially concentrated in the Special Economic Zones (SEZ) and the provinces of Guangdong and Fujian in the early stage of economic reforms. As part of gradual open-door policies, similar preferential policies were granted to other coastal regions, such as the Yangtze Delta and the Pearl River Delta. The share of Guangdong Province fell by about 7 percentage points from 1995 to 2003. Since 2003, Jiangsu Province has replaced Guangdong as the largest FDI destination.[1]

The unbalanced regional growth in foreign trade and changing weights are to some extent affected by geographic factors. During the early stage of China's liberalization, Hong Kong had been moving its labour-intensive manufacturing industries to the southeast region of China, mainly Guangdong Province. These firms contributed to the fast growth of processed exports in the region. On the other hand, Fujian Province became the manufacturing base of the firms from Taiwan due to its geographic and cultural proximity to Taiwan. As the role of high-tech industry became more significant in China's output, the Yangtze Delta's trade share expanded for its comparative advantage in skilled-labour and capital-intensive industries.

[1] In 2002, utilized FDI inflows in Jiangsu jumped from $6914.8 million in 2001 to $10190 million, and in 2003, reached to $10564 million, from CEIC database.

China's trade with world regions

As shown in Tables 2.1 and Table 2.2, Asia is the most important merchandise export destination for China, which absorbed 46.7% of the total exports during 2006-2010. However, their share has now declined from 68.9%, their peak level during the 1990s. The importance of North America and Europe in China's exports has increased and North America took more than 20% of the exports and Europe took more than 23% during the 2000s. The other regions, such as Africa, Latin America and Oceania, accounted for less than 5% of total exports. However, the share of these regions in China's exports has increased rapidly in recent years.

China's rapid growth and integration with the global economy has also led to faster growth in import demand. The reliance of China's trade on Asia can be seen in merchandise imports. Asia is by far the largest supplier of China's imports and it accounted for more than 60% of China's imports during the 2000s. Furthermore, its share has been more stable than that for exports. The next largest supplier is Europe. However, their share declined from 26% to 15% of the total imports over the past few decades. North America has been the third, with a share of around 10% and this share has been declining gradually over the period. There is a significant increase in China's imports from Africa. The import value has increased from $6.1 billion during the late 1980s to $162.6 billion in recent years.

Table 2.1 China's exports to major world regions ($US Billion)

Export To	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2005**	**2006-2010**
Total	232.5	518.2	981.8	2385.1	6397.0
Asia	160.3	332.4	553.3	1196.7	2988.4
Africa	6.1	8.1	19.0	55.6	222.9
Europe	40.6	79.0	167.2	483.7	1466.5
Latin America	2.7	9.2	25.5	71.5	308.2
North America	20.6	83.2	202.7	537.9	1289.9
Oceania	2.2	6.3	14.1	39.7	120.9

Source: General Administration of Customs, China.

Table 2.2 China's imports from major world regions ($US Billion)

Import From	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
Total	251.4	495.7	812.2	2172.7	5279.2
Asia	130.0	296.0	502.0	1422.7	3286.0
Africa	1.5	4.3	13.3	55.3	231.4
Europe	65.4	105.6	153.2	355.5	802.5
Latin America	9.0	10.6	18.8	78.5	312.9
North America	37.5	67.1	104.1	207.6	447.9
Oceania	8.0	12.1	20.8	53.1	198.4

Source: General Administration of Customs, China.

The expansion of China's international trade has been facilitated by a global reduction in trade barriers and the adoption of its own openness and trade-oriented policies. The distribution of China's trade with the world is mainly determined by China's evolving role in the international division. The high-income industrialized regions (North America and Europe) are the major destinations of China's total merchandise exports. China serves as a platform for last stage processing and assembly for an increasing volume of final goods exported to North America and Europe. Compared to the growth of China's exports to North America, China's export growth to Europe has increased dramatically during the 2000s.

China's recent trade expansion has also coincided with rapidly growing intra-regional trade in Asia. For its comparative advantage in labour-intensive products, China has been involved in international production sharing with Asian economies, as firms from Hong Kong, Taiwan and other Asian countries have relocated their labour-intensive industries to the mainland (Naughton, 1997). The implementation of the ASEAN-China Free Trade Area also has signified a deeper dimension in ASEAN-China trade relations.

The fast growth of the trade volume between China and other regions, such as Africa, Oceania and Latin America, has received considerable attention over the past few years. China's policy makers are seeking to expand their exports by increasing the variety of exports. The share of the bilateral trade between China and these regions remains relatively small. For instance, China's export to Africa accounts for only 3.4% of China's total foreign trade volume, promising a huge potential for further growth. On the import

side, China is dependent upon imports for some critical supplies. China's quest for resources is driving its significant presence in Africa, Oceania and Latin America.

Commodity composition of China's trade

The structural transformation of China's economy, with agriculture diminishing in importance relative to the GDP while industry's weight was rapidly rising, had a profound impact on the commodity composition of exports and imports. Table 2.3 and Table 2.4 show China's export and import volumes of primary goods and manufactured goods over time.[2] In 1980, primary goods accounted for 50.3% of China's exports and manufactured goods accounted for 49.7%. During the first half of the 1980s, the share of primary goods declined slightly and remained at around 50%. Since then, exports of manufactured goods have grown at a much faster rate than exports of primary goods. As a result, the share of manufactured goods increased to 94.7% by 2011.

Table 2.3 reports five subgroups for primary goods and four subgroups for manufactured goods. In 1980, food, textiles and minerals accounted for 16.5%, 22.1% and 23.6%, respectively, which dominated China's exports. The machinery share of the total exports was only 4.7%. Beginning in the mid-1980s, this picture was dramatically changed. The high level of textiles and miscellaneous exports contributed close to 40% of China's export supplies. Since the 1990s, the machinery and transport equipment has exhibited the most significant surge in exports. Its share expanded from 4.7% in 1980 to 50.2% in 2011.

The changes in the commodity composition of China's imports can be seen in Table 2.4. The share of primary goods in total imports fell from 34.8% in 1980 to 16.7% in 2002 and since then it has increased to 34.7% in 2011. The share of food has declined from 14.6% in 1980 to 1.6% in 2011. On the other hand, the share of minerals in imports has been steadily increasing during this period. China's export performance is heavily dependent on imports of intermediary goods and also led to a rising demand for minerals and other products.

[2] The composition of China's exports and imports during the period from 1980 to 1989 is not shown in Table 2.3 and Table 2.4.

Table 2.3 Composition of China's export ($US billion)

	Primary goods						Manufacture goods				
	Total	**Food**	**Beverage**	**Raw materials**	**Mineral**	**Oil**	**Total**	**Chemicals**	**Textile**	**Machinery**	**Miscellaneous products**
1990	15.89	6.61	0.34	3.54	5.24	0.16	46.21	3.73	12.58	5.59	12.69
1991	16.15	7.23	0.53	3.49	4.75	0.15	55.70	3.82	14.46	7.15	16.62
1992	17.00	8.31	0.72	3.14	4.69	0.14	67.94	4.35	16.14	13.22	34.23
1993	16.67	8.40	0.90	3.05	4.11	0.21	75.08	4.62	16.39	15.28	38.78
1994	19.71	10.02	1.00	4.13	4.07	0.50	101.30	6.24	23.22	21.90	49.94
1995	21.49	9.95	1.37	4.38	5.33	0.45	127.30	9.09	32.24	31.41	54.55
1996	21.93	10.23	1.34	4.05	5.93	0.38	129.12	8.88	28.50	35.31	56.42
1997	23.95	11.08	1.05	4.20	6.99	0.65	158.84	10.23	34.43	43.71	70.47
1998	20.49	10.51	0.98	3.52	5.18	0.31	163.22	10.32	32.48	50.22	70.20
1999	19.94	10.46	0.77	3.92	4.66	0.13	174.99	10.37	33.26	58.84	72.51
2000	25.46	12.28	0.75	4.46	7.86	0.12	223.74	12.10	42.55	82.60	86.28
2001	26.34	12.78	0.87	4.17	8.41	0.11	239.76	13.35	43.81	94.90	87.11
2002	28.54	14.62	0.98	4.40	8.44	0.10	297.06	15.33	52.96	126.98	101.15
2003	34.81	17.53	1.02	5.03	11.11	0.12	403.42	19.58	69.02	187.77	126.09
2004	40.55	18.86	1.21	5.84	14.48	0.15	552.77	26.36	100.65	268.26	156.40
2005	49.04	22.48	1.18	7.48	17.62	0.27	712.92	35.77	129.12	352.23	194.18
2006	52.92	25.72	1.19	7.86	17.77	0.37	916.02	44.53	174.82	456.34	238.01
2007	61.51	30.74	1.40	9.12	19.95	0.30	1156.27	60.32	219.88	577.05	296.84
2008	77.85	32.76	1.53	11.35	31.63	0.57	1350.70	79.31	261.74	673.33	334.61
2009	63.10	32.60	1.64	8.16	20.38	0.32	1138.56	62.05	184.78	590.43	299.67
2010	81.72	41.15	1.91	11.60	26.70	0.36	1496.22	87.59	249.15	780.33	377.68
2011	100.55	50.50	2.28	14.98	32.28	0.53	1798.05	114.79	319.60	901.91	459.41

Source: General Administration of Customs, China.

Table 2.4 Composition of China's import ($US billion)

	Primary goods						Manufacture goods				
	Total	**Food**	**Beverage**	**Raw materials**	**Mineral**	**Oil**	**Total**	**Chemicals**	**Textile**	**Machinery**	**Miscellaneous products**
1990	9.85	3.34	0.16	4.11	1.27	0.98	43.49	6.65	8.91	16.85	2.10
1991	10.83	2.80	0.20	5.00	2.11	0.72	52.96	9.28	10.49	19.60	2.44
1992	13.26	3.15	0.24	5.78	3.57	0.53	67.33	11.16	19.27	31.31	5.59
1993	14.21	2.21	0.25	5.44	5.82	0.50	89.75	9.70	28.53	45.02	6.50
1994	16.49	3.14	0.07	7.44	4.04	1.81	99.13	12.13	28.08	51.47	6.77
1995	24.42	6.13	0.39	10.16	5.13	2.61	107.67	17.30	28.77	52.64	8.26
1996	25.44	5.67	0.50	10.70	6.88	1.70	113.39	18.11	31.39	54.76	8.49
1997	28.62	4.30	0.32	12.01	10.31	1.68	113.75	19.30	32.22	52.77	8.55
1998	22.95	3.79	0.18	10.72	6.78	1.49	117.29	20.16	31.08	56.85	8.46
1999	26.85	3.62	0.21	12.74	8.91	1.37	138.85	24.03	34.32	69.45	9.70
2000	46.74	4.76	0.36	20.00	20.64	0.98	178.36	30.21	41.81	91.93	12.75
2001	45.74	4.98	0.41	22.13	17.47	0.76	197.81	32.10	41.94	107.02	15.08
2002	49.27	5.24	0.39	22.74	19.29	1.63	245.90	39.04	48.49	137.01	19.80
2003	72.76	5.96	0.49	34.12	29.19	3.00	340.00	48.98	63.90	192.83	33.01
2004	117.27	9.15	0.55	55.36	47.99	4.21	443.96	65.47	73.99	252.83	50.14
2005	147.71	9.39	0.78	70.23	63.95	3.37	512.24	77.73	81.16	290.48	60.86
2006	187.13	9.99	1.04	83.16	89.00	3.94	604.33	87.05	86.92	357.02	71.31
2007	243.09	11.50	1.40	117.91	104.93	7.34	712.87	107.55	102.88	412.46	87.51
2008	362.78	14.05	1.92	167.21	169.11	10.49	770.31	119.20	107.16	441.92	97.62
2009	289.20	14.82	1.95	140.82	123.96	7.64	716.35	112.12	107.73	408.00	85.19
2010	432.56	21.57	2.43	211.12	188.70	8.74	962.27	149.64	131.11	549.56	113.53
2011	604.38	28.76	3.68	285.26	275.56	11.11	1139.08	181.14	150.33	630.39	127.71

Source: General Administration of Customs, China.

Other significant changes in commodity composition of China's imports revolve around manufactured goods and their products. The share of machinery and transportation equipment rose from 25.6% in 1980 to 40.6% in 2011. This was evidenced by the fact that China has become a global production base and processing trade has encompassed imports to be processed for exports.

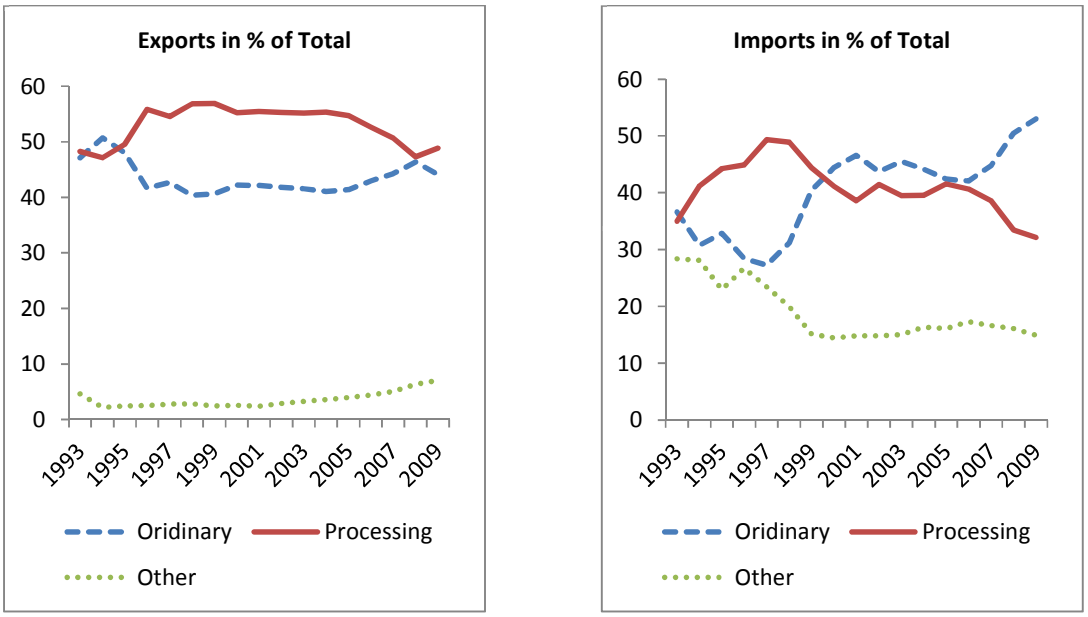
China's specialization in processing activities

Processing trade remains an important feature of China's trade. Taking its comparative advantage in labour costs, China has become a global manufacturing base for multinational firms and is involved in the international splitting-up of the value-added chain. Most remarkable of the composition of China's trade has been the diversification of its manufactured products and the rapid expansion of processing exports. China's policy regime of processing trade provides incentives for the import of intermediate goods and re-exports (Lardy, 2002). Duty exemptions have been granted to selected categories of imports to promote export-oriented industries and to stimulate inflow of capital and technology through foreign direct investment.

Figure 2.4 shows the amount of processing trade, ordinary trade and other types of trade regimes from 1993 to 2009.[3] Processing trade which encompasses imports to be processed for exports and the corresponding exports accounted for over half of China's total exports throughout the period from 1995 to 2006. During the Asian financial crisis (1998-1999), exports of processed goods performed better than other categories of exports and the share of processing exports achieved 56.9%, the peak level being in 1999.

[3] Trade data corresponding to these different trade segments are available since 1993.

Figure 2.4 Breakdown of China's trade by customs regimes, 1993-2009



Source: General Administration of Customs, China, author's own calculation.

By contrast, ordinary exports are goods that are produced mainly using local input, and imports aimed at the domestic market are subject to normal tariff rates. The share of imports for processing rose from less than 40% in 1995 to almost 50% in 1997. Since 1998, the imports for processing have lagged behind ordinary imports and the share of ordinary imports has increased from over 30% during the 1990s to almost 50% of total imports in 2009. During the recent global financial crisis, the import parts that are typically assembly for re-export suffered whereas the ordinary imports have increased significantly (see the right panel of Figure 2.4). The diagrams suggest during the time period between 2007 and 2009, the domestic economy has become a major driving force in the recovery. The changes of trade structure in recent years to some extent reflect the structural changes in China's consumption pattern. The increasing domestic demand could lead to more imports, reducing China's large trade surplus.

2.4 Reform of China's trade regime

Before China's economic reforms in the late 1970s, the whole economy was virtually isolated from the world and China's foreign trade system was strictly controlled by the government. Since the beginning of the reform era, the Chinese economy has been moving in the direction of marketization and integration with the world market. China's

share of world output and trade volume has grown substantially in response both to trade liberalization and to productivity growth in the domestic economy. China's GDP has grown at a rate of around 10% during 1980-2011. China has also grown from a negligible player in world trade to being one of the world's largest trading nations. Understanding the reform of the trade regime is essential to gain insights about China's trade environment and sources of China's trade expansion in the past few decades.

The expansion of economic dynamics in China has come to be known as the flying-geese pattern (Akamatsu, 1962), following the East Asian development model. One of the first steps for central government is to stimulate the growth of exports by decentralizing the right of approval of participating in foreign trade. China's pre-reform foreign trade regime was regarded as an extreme example of import substitution. For the Chinese government, exports are a means of acquiring imports, and imports are made only to serve the country's socialist industrialization. Following the implementation of the open-door policy, the international trade is viewed as indispensable and the importation of technology is an effective means for China's development. During the 1980s, the concept of an international division of labour was explicitly recognized in the literature by Chinese economists, such as Yuan *et al*. (1980), Chao (1982) and Wang (1983).

Academic discussions on this issue gradually lead to fundamental changes in government trade policies. The incentive of foreign trade is directly related to the growth-oriented context and to entering the international division of labour through exports. This trade policy actively pushes export growth by promoting a supportive macroeconomic environment and providing microeconomic incentive to selective industries. The trade policy reforms undertaken involve the liberalization in different sections and a few important steps: (1) to implement institutional changes and decentralization of trading rights, (2) to develop the trade policy instruments and regulations such as tariffs and quotas that were unimportant under the planning system, and (3) to restore market-determined prices to reallocate resources (see Lardy, 1992).

Institutional changes and decentralization

A central feature of China's reform is the institutional changes and the decentralization of trading rights through increasing the number and type of enterprises eligible to trade. In the pre-reform era, China's foreign trade was dominated by ten to sixteen foreign trade

corporations (FTC) through a rigid state planning system (Lardy, 1992). Only Sino-Foreign Joint Ventures and a few big Chinese enterprises were granted direct trading rights. In 1979, new institutions directly and indirectly related to trade were established and reorganized. The Ministry of Foreign Economic Relations and Trade (MOFERT) was established by merging the Ministry of Foreign Trade with the Import Export Commission, the Commission of Economic Relations and the Foreign Investment Commission, bringing the jurisdiction of foreign trade and foreign investment under the same ministry.

In the meantime, ministries and provinces were allowed to set up FTCs outside the realm of central control. The number of FTCs with trading rights was gradually expanded, with trading rights provided to branches of the FTCs controlled by the central government and to those controlled by regions and localities. By 1994 there were already over 8000 FTCs in operation. In addition, there were 17400 foreign-invested enterprises which enjoyed foreign trade rights (World Bank, 1994). As China's WTO commitments require, further progress appeared in 2004. The State Council approved revisions to the *Foreign Trade Law*. Full trading rights were granted to all enterprises, including foreign-invested enterprises (FIEs).

Trade barriers

As the scope of foreign trade planning diminished, China began to make more active use of tariffs as trade policy instruments beginning in the early 1980s. In the pre-reform era, the role of tariffs had little effect on foreign trade behaviour in centrally planned economies (Wolf, 2002).

Beginning in the 1980s, changes in tariff rates became more frequent and of greater importance in influencing the volume and commodity composition of both exports and imports. Tariffs ranging between 10% and 60% on various exports were introduced in 1982 (Lardy, 1992). Compared to other developing countries, the pace of China's integration was less impressive. China kept its average tariff at a relatively high level during the 1980s and early 1990s. Since then, there has been a wave of further liberalization in developing countries. Some data on average tariff rates of China and other developing countries are given in Table 2.5. As can be seen from the table, for accession to the World Trade Organization (WTO), China has made substantial progress

in reducing the average tariff rates. The average import tariff level just before admission to WTO was 17.6% (1996-2000), which was only about half of that of the early 1990s, being 36.5% (1991-1995). Recently reported tariff rates in 2010 have further gone down to 7.9%. China has essentially been catching up with other large developing countries in reducing tariff rates.

Table 2.5 Trends in average MFN applied tariff rates in developing and industrial countries, 1981-2009 (unweighted, in %)

Country	**1981-1985**	**1986-1990**	**1991-1995**	**1996-2000**	**2001-2005**	**2006-2010**
Brazil	49.0	42.0	17.2	15.8	13.9	12.8
China	49.5	39.3	36.5	17.6	11.5	8.5
Egypt	47.4	39.7	31.6	19.4	19.5	13.8
India	74.3	93.5	53.8	34.1	25.9	12.1
Indonesia	32.0	25.8	18.4	9.5	6.1	5.4
Korea	23.1	17.5	9.7	9.5	9.1	9.0
Malaysia	10.6	14.9	14.3	8.4	7.5	5.8
Mexico	24.8	13.9	10.5	15.3	14.3	6.7
Philippines	30.4	27.9	22.9	10.8	5.5	5.3
Thailand	36.8	40.3	31.9	16.9	13.1	10.7
Turkey	28.9	26.9	17.7	6.0	2.7	2.2

Source: World Bank (2010), siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/tar2010.xls.

As part of its negotiations for WTO accession, China has also committed to eliminating most nontariff barriers. The coverage of nontariff barriers has been significantly reduced. Lardy and Brookings (2002) summarized that "by the late 1990s quotas and licensing requirements limited imports for only 4% of all tariff lines, and trading rights were widely available for all but a handful of commodities that accounted for only 11.0% of China's total imports". The import coverage of all nontariff barriers in China fell from 32.5% in 1996 to 21.6% in 2001 (see Table 2.6). The significant remaining measures, coverage of import licensing and quotas fell from 18.5% in 1996 to 12.8% in 2001, and the coverage of the state trading from 11.0% to 9.5%.

Throughout the liberalization process of trade barriers, exemptions on processing trade and foreign investment should be highlighted. Raw materials and intermediate goods used to produce or assemble final goods have been eligible for tariff exemptions for much of

the reform era (Lardy, 1992; Hope *et al.*, 2003). It provided various incentives for the processing of raw materials for exports and the assembly of imported parts and components to produce finished goods for export. The reduction of non-tariff barriers has also reinforced the changes in the structure of output generated by the tariff reductions. China's heavy reliance on exemptions for goods used in the production of exports as a way to stimulate its export production has clearly encouraged development of export processing industries that rely heavily on imported intermediate goods. Clearly, the export processing activities have largely accounted for China's trade surplus in recent years.

Table 2.6 Import coverage of non-tariff barriers (in %)

Barrier	1996	2001
Licenses and quotas	18.5	12.8
Tendering	7.4	2.7
Licensing only	2.2	0.5
State trading	11.0	9.5
Designated trading	7.3	6.2
Any other non-trade barriers	53.6	68.3
Total	100.0	100.0

Note: For 1996 nontariff barrier coverage, the trade weights used were for 1992, while for 2001 the trade weights used were for 2000.

Sources: For 1996, Lardy (2002); for 2001, Mei Zhen of the Ministry of Foreign Trade and Economic Cooperation during an internship at the World Bank, using data from WTO.

Reforms of the foreign exchange system

In a market economy, the closeness of domestic prices of trade goods to international prices is an important indicator of integration. In the pre-reform era, the strict control of foreign exchange in China provided little room for prices to serve their allocative and incentive functions, particularly on the export side. There was a complete separation between domestic and world market prices. The overvaluation of the domestic currency reflected the import substitution characteristic of the trade regime and the users of imported machinery, equipment, and industrial raw materials received implicit subsidies (see Lardy, 1992).

Since 1979, there have been substantial reforms in the foreign exchange system in China. The introduction of a foreign exchange retention system and the devaluation of Chinese yuan were the major elements in the reform process. The foreign exchange retention

system was introduced in 1979 to enhance enterprises' incentive to export. These export enterprises and local governments were allowed to keep a certain portion of foreign exchange they earned above the level set by the plan. This retention of foreign exchange was also liberalized gradually. The right to hold the remaining foreign exchange was granted to local governments, exporting enterprises, and extended to all enterprises including state-owned and collectively-owned enterprises. In 1994, the retention quota system was abolished and replaced with a RMB settlement system for all export earnings.

The other major reform was devaluation beginning in January 1981 when the State Council introduced an "internal settlement rate" of RMB2.8 per US dollar which led to a depreciation of about 100% compared to the official exchange rate of RMB1.5 per US dollar at that time. This measure in fact introduced a dual exchange rate system and China's currency continued to depreciate until it was unified at the prevailing swap-market rate of RMB8.7 in January, 1994. From 1994 to 2005, the exchange rate for RMB was maintained basically stable and the currency was pegged informally against the value of the US dollar. In July 2005, the Chinese government adjusted the yuan by 2.1% against the U.S. dollar. Together with this revaluation, the exchange rate system has been transformed from a traditional dollar peg to a "loose" currency basket system, under which it would refer to a selection of multiple currencies when implementing exchange rate policies. For its surging trade surplus, China's exchange rate policy has received by far the most attention since the 2000s and the Chinese government recently announced in 2010 that it would gradually make the yuan's exchange rate mechanism more flexible and achieve full convertibility of RMB.

2.5 Structural changes and external dependence

China's economy has undergone dramatic and continuing structural changes (Maddison *et al.*, 2007). Since the economic reforms, China has achieved an impressive performance in agriculture. Total farm production has largely kept pace with the growth of population. Technological advances permitted increasing quantities of food and agricultural raw materials to be produced by a relatively smaller labour force. As a result, the surplus labour could be released from agriculture to other sectors and there was a dramatic reallocation of resources between sectors.

Rates of growth and changes in the economic structure

Experiencing a high speed of development with comprehensive economic reform, China has maintained an average annual growth rate of 10.0% from 1981 to 2011. This growth acceleration was mainly due to increased efficiency and the Chinese economy has experienced massive structural transformation over the past several decades.

From Table 2.7, agriculture accounted for more than half of the GDP in 1952 when the Chinese economy was largely agrarian. While there have been significant increases in agricultural productivity, the share of agriculture in total GDP has declined as the other sectors have grown much faster. By 1994, the share of agriculture had declined to about 20% of the GDP indicating a rapid rate of structural change. From 1952 to 2011, agriculture's share of the GDP fell from 50% to 10% and its share of employment fell from 83.5% to 34.8%.

Table 2.7 Changes in economic structure, China (%)

	Agriculture, Forestry and Fishery	**Industry and Construction**	**All Services**	**Total**
		GDP		
1952	50.4	20.9	28.7	100.0
1978	28.2	47.9	23.9	100.0
1994	19.9	46.6	33.6	100.0
2011	10.1	46.8	43.1	100.0
		Employment		
1952	83.5	7.4	9.1	100.0
1978	70.5	17.3	12.2	100.0
1994	54.3	22.7	23.0	100.0
2011	34.8	29.5	35.7	100.0

Source: National Bureau of Statistics, China, author's own calculation.

The huge expansion of industry-construction output in the pre-reform period can also be seen from Table 2.7 and industry accounted for 47.9% in 1978 compared with 20.9% in 1952. In the pre-reform period, industry was tightly controlled and investment fully funded by the government. For the policy priority, a heavy concentration of investment resources helped to raise relative levels of labour productivity in this sector. During the reform period, industrial-construction growth continued at the same pace. However, the

change in industry's employment share was relatively modest because this sector has been much more heavily capitalised than other parts of the economy.

The service sector has experienced major swings in growth or expansion due to economic expansion. From 1952 to 1978 the service sector was subjected to deliberate controls and this share of the sector had declined from 28.7% to 23.9%. After 1978, when the service sector was greatly relaxed from government controls, it grew very quickly. The share of employment in this sector rose from 12.2% in 1978 to 35.7% in 2011.

The rapid transformation in China's economic structure indicates the large difference in productivity among sectors and has led to a dramatic reallocation of resources between sectors. As agricultural productivity increases, demand for labour declines, releasing more to the industrial sector. The rapid development in Chinese industry and its pattern of performance (Eckstein, 1977) has greatly enhanced China's production capacity in the manufacturing sector and accelerated China's foreign trade volume.

Structural openness and external dependence

An important feature of China's reforms is a continuing promotion of economic openness through international economic cooperation, investment, trade and exchange. FDI and international trade contribute positively to China's economic growth (Harrold, 1995; Lardy, 1995; Pomfret, 1997). As a result of its market reforms and open-door policies, China has achieved substantial progress in poverty reduction (Tisdell, 2009), economic liberalization and society development.

These changes have altered China's economic system substantially but at the same time, the structure of its political system has hardly altered. It still heavily relies on the guidance of a one-party government during the whole process of China's reform. Deng's approach of gradualism combined with learning-by-doing was retained. The significance of this type of approach to China's development was claimed by Roland (2000) as the "spatial" and "sectoral" gradualism in industrial sector rather than radical reforms in agriculture.

The "opening" of the Chinese economy was also a gradual process. Proposed new institutional structure and forms of trade were tried and established only in a particular region or locality or sector of the economy first. Four special economic zones and other

special arrangements including fourteen coastal cities established in 1984 were all located in coastal areas (Lardy, 1992). The conventional indicator for measuring the degree of "openness" of the Chinese economy, frequently referred to as the trade ratio (the ratio of export plus imports relative to GDP), has dramatically increased (see the calculations of Lardy, 1992; Takahiro, 2010). However, the estimations of this measure cannot give a full picture of the extent of China's openness and the indicators calculated at the aggregate level could ignore the imbalance of the regional growth and sectoral disparity in foreign trade.

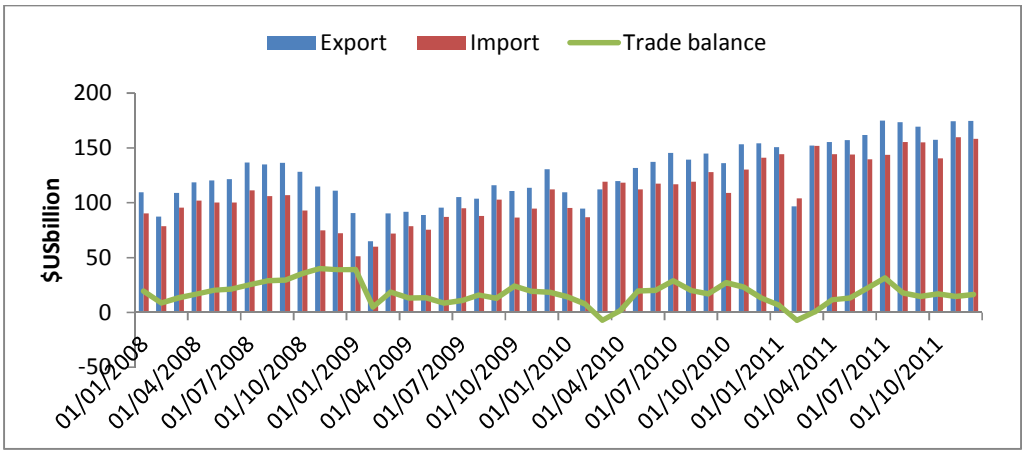
Another characteristic of China's structural openness is the imbalance of sectoral trade expansion. The trade volume of manufactured goods performed much better than other categories of commodities. Manufactured goods as a share of total exports rose rapidly, from 49.5% in 1980 to 94.7% in 2011 (see Table 2.3). FDI is an important driving factor in the strong growth of the manufacturing sector. The latest figures sourced from the Ministry of Commerce of China show that the major proportion of FDI is drawn from the manufacturing field, which takes up over 60% in 1998 and almost half of the total utilized FDI in 2011.

Now China's economy is increasingly market-driven and more open. China's total foreign trade as a percentage of GDP in 1978 was 9.8% but this ratio increased substantially after 1978 to reach 60.3% in 2003 and has continued to rise since 2003. In 2008, China's gross exports amounted to about 40% of its GDP and net exports contributed to 8% of the GDP, from an average of about 3% of the GDP between 2000 and 2004 (World Bank, 2008). The trade surplus has been propelled by a sharp rise in the manufacturing sector surplus. In particular, machinery, electronic appliances, and transportation equipment account for more than half of the trade surplus, compared with a significant deficit only a few years ago.

However, China's growing trade dependency has also led to a greater risk of macroeconomic fluctuations than in the past. China's economic performance has long relied on export growth. The global economic crisis has tested the dependence of China on exports for their growth. During the global recession, China's exports dropped significantly due to the sudden weakening in external demand for China's products (see Figure 2.5). To maintain economic growth, the government had to take aggressive

expansionary fiscal and monetary policies. Some economists warned of an inflation and overheating crisis (see for example Huang & Tao, 2010).

Figure 2.5 China's recent trade performance (monthly)



Source: General Administration of Customs, China.

In early 2009, as a result of the global slump, more than 20 million workers lost their jobs (IFPRI, 2009). The increasing unemployment in China could have triggered social and political unrest. Therefore, the Chinese government acted swiftly. Strengthening domestic demand is expected to be the major driver of the nation's growth. Since the government's implementation of its stimulus package, China's imports have increased rapidly. However, it is the stimulus investment rather than consumption fuelling the domestic aggregate demand. As the export-led growth model has been substantially changed, China sustains a massive trade surplus.

2.6 Summary

This chapter provides an overview of the evolution of trade reforms and trade structure in China. It illustrates changes in China's trade in the context of changing Chinese economic structure. This enriches our understanding of China's liberalization during the past three decades. The relative importance and changing trade volumes by regions and sectors are also highlighted. Attention is also given to the processing activities of China since the commencement of liberalization and export-oriented policy. Utilizing its comparative advantage in abundant labour supply and openness to FDI, China has become a leading location for the assembly of manufactured goods for the global market.

The surging trade surplus has been considered to be harmful to both domestic economy and trading relations. The Chinese government has realised the excessive trade surplus problem and attempt to reduce its large trade surplus by reducing export rebates. However, the lack of accurate identification of the factors underlying the trade surplus has affected the policy effectiveness. The background information in this chapter is crucially important for us to further investigate the underlying causes of China's external imbalances. The accumulation of a recent trade surplus is grounded in the way the trade environment is formed and the process that China is involved in global trade. All such issues deserve careful study. Before addressing the methodology to investigate these issues, the next chapter first reviews the literature to highlight what research has been done on the subject and to position this research within the current knowledge of China's balance of trade.

Chapter 3 Review of the Literature

3.1 Introduction

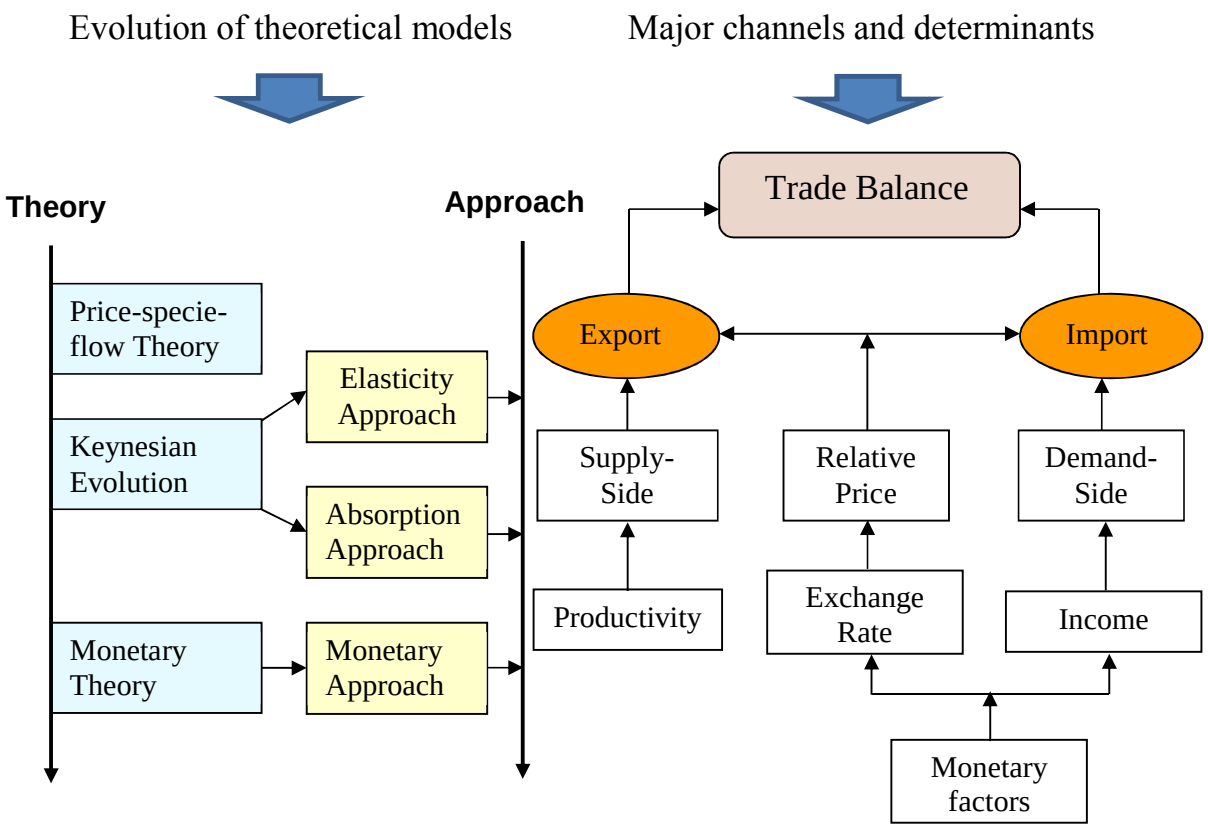
This chapter reviews studies that examine the theoretical basis of the main determinants of the balance-of-trade disequilibrium in the literature, as well as looking at key empirical studies that examine the signs and magnitude of the coefficients of the relationships between the trade balance and these determinants. This review intends to help us in our efforts to study trade imbalance issues concerning developing countries, and shed light on the examination of major determinants of the balance-of-trade as they are related to the developing world in general and China's excessive trade surplus in particular.

Why do some countries remain surplus while others remain deficit and what are the causes for the disparities between those countries? This chapter thus draws on the previous work and develops a framework that captures the determinants of balance-of-trade disequilibrium through reviewing the evolution of theoretical models. In doing so, we will map the path of prior research on this subject and characterize the relationships between these determinants and the balance of trade position in general.

The literature can be organised in different strands (see Figure 3.1). One strand of literature is the evolution of trade balance theories which consists of three main dimensions: the classical price-specie flow theory under the gold standard, the Keynesian model with assumed sticky price and post-Keynesian period incorporating monetary factors. Accordingly, over time, in response to the three major theories, three approaches have emerged in the literature to identify the relationships between a country's trade balance and its determinants. Two approaches, namely the elasticity approach (Robinson, 1937) and absorption approach (Alexander, 1952; 1959), have evolved from the Keynesian model. A monetary approach has evolved from the monetary theory (Johnson, 1977). The elasticity approach is a partial equilibrium analysis, while the other two approaches are general equilibrium analysis. The other strand of literature is organised in three channels through which all the possible determinants affect a country's trade balance. Simplistically, the trade balance can be broadly defined as the difference between a nation's exports and its imports. From this perspective, the determinants of the balance of trade are any factors that affect a country's imports and exports and can be

tracked through three major channels: the supply-side, the demand-side and the relative price effect.

Figure 3.1 A framework for identifying the determinants of trade balance



Note: the evolution of related theories and approaches is displayed in the left side of Figure 3.1. In the right side, three major channels, supply-driven, relative price and demand driven, have been sorted out to analyse the behaviour of the balance of trade. The main determinants, such as productivity, exchange rate, income, and monetary factors are linked to each other. For a simplistic notion of the three major channels, the interactive effects between these variables are omitted in this figure.

Domestic income positively affects the demand for foreign goods and services (import) and subsequently exerts a negative impact on the trade balance. Domestic productivity positively affects the domestic production of goods and services, part of which are exports. Thus, income is a demand-side factor, while productivity is a supply-side factor. The exchange rate, as a “pass-through” factor, affects the relative price of exports to imports. In addition, the monetary factors are also taken into consideration as they exert impacts on the trade balance through their impacts on the exchange rate and domestic income. For instance, an expansionary monetary policy leads the interest rate to decreasing, which in

turn causes depreciation in the exchange rate, *ceteris paribus*. The exchange rate depreciation can lead to an improvement in the trade balance.

In the remainder of this chapter, we proceed as follows: Section 3.2 reviews the evolution of the trade balance theories and provides a "definitive" statement of the theoretical determinants of external imbalances. The empirical studies that examine the relationship between these determinants and trade balance are presented in Section 3.3. Section 3.4 reviews the existing literature on determinants of China's trade balance. The final section provides a summary of the whole chapter.

3.2 Theoretical basis for determinants of trade balance

The theory of trade balance or the current-account balance is concerned with the economic determinants of the balance of trade. Three theories of trade balance dominate: (1) According to the classical price-specie-flow mechanism developed by David Hume (1752), the adjustment of the trade balance is viewed as an automatic process under free trade. This doctrine was predominant before the Great Depression in the 1930s. (2) Since the emergence of a large imbalance or disequilibrium in many countries after World War I and the collapse of the fixed exchange rate system (Klein, 1948), the Keynesian macroeconomic approach was widely adopted by many countries (Johnson, 1958). The Keynesian approach advocates more government interventions in the market. (3) During the 1950s, a monetary approach was proposed by Frenkel and Johnson (1976). According to this approach, the disequilibrium of trade balance is considered as a monetary phenomenon (in models in which the monetary approach is used, the term "balance of payment" rather than "balance of trade" is more frequently used to capture the composition of a country's international accounts).

The importance to identify and understand the determinants of balance-of-trade dynamics can be traced back to the early writings of such influential thinkers as J.R. Hicks, Johnson and Metzler. Hicks (1953) describes "the long-run dollar problem" as a problem of disequilibrium raised by the disparity in productivity; Johnson (1954) introduces income as well as the increasing productivity effects on the balance of trade – showing that income effects were likely to help equilibrate or worsen the trade balance under assumed price inflexibility; and Metzler (1949) is concerned with the need for price adjustment through exchange rate changes and holds the view that a devaluation is effective in

improving the trade balance. Monetary shocks are also introduced into Meade's (1951) model for analysing the balance of payment. Accordingly, these key determinants such as productivity, income, exchange rate and monetary factors which have been identified in the literature are discussed below.

3.2.1 Productivity and trade balance

The effects of productivity on the balance of trade date back to the Ricardian models where the trade pattern is determined by productivity in each country. Hicks (1953) sketches an intuitive analysis of Ricardian models of these varying effects of improved productivity and the state of disequilibrium. He argues that the technological progress in the U.S. is strongly biased in favour of import substitutes, and therefore imposes a disequilibrium with the outside world, which is later formally modelled by Johnson (1954). In a two-country model, Johnson derives the equations that capture the relationship between the trade balance, and price and productivity trends. On the one hand, the faster productivity growth raises the real income and tends to deteriorate the balance of trade. On the other hand, the relatively falling prices are likely to improve the trade balance of the faster-growing country under the assumption that the elasticities of international demand are high enough for devaluation.

Dornbusch *et al.* (1977) consider the effects of uniform technological progress on the trade balance in the case of a continuum of goods. They develop a model of the equilibrium relative wage, price structure and associated pattern of efficient geographic specialization. A uniform technological progress implies a uniform proportional reduction in the foreign unit labour requirement and therefore a proportional downward shift of the relative unit labour requirement. Due to the reduction in the foreign unit labour costs, the loss of a comparative advantage in the home country will imply a loss of some industries in the home country and a corresponding trade deficit.

Krugman (1979) also attempts to introduce technological changes into the theory of international trade. He considers the trade pattern between a technologically advanced country and its less advanced trading partner based on more realistic premises. In his model, the technical progress takes the form of development of new products instead of increased productivity in the manufacture of old products. The lag of technology transfer gives rise to trade, with the technologically advanced country exporting new products and

importing old products. For less developed countries, the transfer of technology also brings the benefit of improved terms of trade, raises the relative labour wage and improves the export output.

The above mentioned models assume that all goods are traded, or in other words, can be divided into export and import goods. Criticism of this assumption in the pure theory of the international trade stresses the relative prices of non-traded to traded goods (see Balassa, 1964; Samuelson, 1964). They thus extend the traditional Ricardian trade model to include non-tradeable goods and identify the productivity differentials between the tradable and non-tradable sectors as the source of a country's internal price relative change. When a country is experiencing a positive productivity shock that affects only traded goods, its currency appreciates in real terms and its trade balance deteriorates. The Balassa-Samuelson hypothesis has been playing a pivotal role in this area and has had provided far reaching implications for both theoretical and empirical studies.

Many extensions of the Balassa-Samuelson model have emphasized the role of international transmission. The general equilibrium models including both non-tradables and country-specific tradable goods have contributed to the discussions of this international transmission and the linkage between macroeconomic volatility and international trade (see for example Obstfeld & Rogoff, 2000; Corsetti *et al.*, 2006). In related work, Corsetti et al. (2008), analyse the macroeconomic dynamic response to the persistent productivity shock in a standard dynamic stochastic general equilibrium (DSGE) model with traded and non-traded goods. A few recent studies also examine the potential role of total factor productivity (TFP) differences across countries in explaining the global imbalances based on multi-country dynamic general equilibrium (DGE) models (see for example Guerrieri *et al.*, 2005; Hunt & Rebucci, 2005; Cova *et al.*, 2008; Cova *et al.*, 2009). Their simulation results indicate that TFP developments in these economies account for a significant fraction of the total deterioration in the U.S. trade balance since 1990s.

Further research on the technology shock is raised by the recent micro-level studies related to trade. Bernard *et al.* (2000) introduce firm-level heterogeneity into a model of trade by adapting a basic Ricardian theory to firm-specific comparative advantage. They provide a good fit to a combination of micro- and macro-level data based on the differences of productivity. Ghironi and Melitz (2005) have pointed out one potential

problem with the Balassa-Samuelson effect which is the reliance on the law of one price for traded goods. They use Melitz's (2003) model to consider the impact of aggregate productivity shock rather than sector-specific and provide a fully micro-founded, endogenous explanation for the Balassa-Samuelson effect. Importantly, a policy-relevant issue raised by this class of model is that when the model allows for international borrowing and lending, more productive economies or less regulated ones, exhibit higher average prices relative to their trading partners.

3.2.2 Income and trade balance

Conceptually, income is an important determinant for both imports and exports since imports are domestic demand for foreign goods while exports are foreign demand for domestic goods. National income determination in an open economy is analysed using a traditional Keynesian model where the income effect of the trade balance first attracts attention. In the Keynesian model, autonomous changes in exports, imports and domestic investment are transmitted from one country to the other through changes in foreign trade induced by income changes. In the absence of government activity and unilateral transfers, the changes of income depend on whether domestic investment plus export is greater than or less than savings plus imports (Stern, 1973). Therefore, the changes in income will serve to help equilibrate or worsen the trade balance.

Most of the early analysis of the income effect concentrates exclusively on the unequal income elasticities across countries. In a two-country model, Johnson (1954) shows that even if trade is initially balanced in a two-country model, prices are constant and income growth is the same in both countries, the trade balance can still change through time if their respective income elasticities of demand for the other's exports differ. Houthakker and Magee (1969) find that the income elasticity for Japan's exports is substantially higher than that of its imports, whereas the United Kingdom and the United States are the opposite.

The criticism of the Houthakker-Magee hypothesis, and all income-based trade models, is that the analysis is too partial-equilibrium in nature as it ignores cross-relations among relative prices of goods, demand and supply. One branch of the criticism, represented by Artus (1979) and Sachs (1981), reminds us of the absorption approach (Alexander, 1952; 1959) that any improvement in the trade balance requires an increase of income over total

domestic expenditures. Application of the absorption approach to the observed current account imbalances in the 1970s yields the conclusion that the observed imbalances reflected inter-country differences in the incentives to savings and investment (see Artus, 1979). Another branch of criticism comes from the monetary approach (Frenkel & Johnson, 1976) which considers the balance of payment as a monetary phenomenon. Countries with high growth rates of real income will run balance-of-payments surpluses because of the positive effect of higher real income on the demand for real money. When the domestic interest rate is higher, foreigners are more interested in buying domestic financial assets. This creates capital inflow, and a balance of payment surplus (see Goldstein & Khan, 1985). In such a framework the balance of trade could be viewed as being determined by relative price, real income and monetary factors.

So most empirical analyses of the trade balance or current account balance have traditionally been performed within the Keynesian model of income determination. It is important to distinguish between transitory and permanent disturbances in income in the analysis of the current account determination. Within a dynamic intertemporal framework, the correlation between income and the trade balance is investigated by emphasizing the distinction between transitory and permanent changes in income (Sachs, 1981). The results presented in the paper of Sachs (1981) show that a permanent increase in income leaves the trade balance unaffected because the income and consumption changes by the same magnitude. A transitory increase in income, however, may either increase or decrease the trade balance in the short run, depending on the source of the change. If the increase is induced by aggregate demand, the trade balance tends to decrease and it could be corrected with demand-side policies (Cardia, 1991). On the other hand, real business cycle models, such as Backus *et al.* (1994) and Mendoza (1991) suggest that the countercyclical behaviour of the trade balance can be generated by productivity shocks without relying on demand disturbances.

3.2.3 Exchange rate, relative price effects and the balance of trade

There is a long history that exchange rate has been considered to be a major determinant of trade balance. A growing agreement in the literature is that prolonged and substantial exchange rate misalignment can create severe macroeconomic disequilibrium and the exchange rate policy can help correct the external imbalance.

In the price-specie-flow mechanism of David Hume, an automatic adjustment of international disequilibrium is motivated by money flow and consequential changes in the national money price level. After the collapse of the international regime of fixed exchange rates in 1930, the emergence of mass unemployment as a major economic problem and the Keynesian revolution have altered the basic assumption of wage and price flexibility with full employment to wage rigidity with normal mass unemployment. The international adjustment is not viewed as an automatic process, but as a policy problem for governments.

The conventional view on the impact of currency depreciation on trade suggests that the depreciation leads to an expansion in trade via lower exporter prices and improves the trade balance. On the import side, the depreciation raises the domestic price of imported goods, leading to increased demand for domestic goods. On the export side, the depreciation raises the home price and/or lowers the foreign currency price of domestic exports. The extent to which the depreciation is passed on to foreign consumers in the form of lower foreign currency prices of exports (their imports) depends on the elasticities of export supply and demand. This view is rooted in the classic model of international trade developed by Bickerdike (1920), Robinson (1937) and Metzler (1949). It has come known as the elasticity approach or BRM model. The essence of this view is that the substitution effects in consumption and production induced by the relative price (domestic versus foreign) changes are caused by a devaluation. Attention is therefore focused on the "elasticity" condition required for the effects of devaluation. In a series of papers, Haberler (1949), Meade (1951) and Friedman (1953) argue in favour of freely floating exchange rates using something like the elasticity model. They have moved from investigating the effects of an exchange rate change to exploring the concept of the exchange rate as an instrument of policy.

In particular, much of the work centred on two concepts of the Marshall-Lerner (ML) condition and the J-curve phenomenon which have become the underlying assumptions for those who support devaluation as a means to stabilize the foreign exchange market and improve the trade balance. According to the ML condition, success of the devaluation depends on whether the sum of import and export demand elasticity exceeds unity. However, there have been circumstances under which this condition is satisfied yet the trade balance continues to deteriorate (see Bahmani-Oskooee, 1985). The focus, therefore,

has shifted to the short-run dynamics and the trade balance is said to follow the J-curve pattern. While exchange rates adjust instantaneously, there is a lag in the time consumers and producers take to adjust to changes in relative prices.

The elasticity approach provides a partial equilibrium framework for analysing the impact of exchange rate changes on the trade balance. However, this approach does not take into account the numerous general equilibrium interactions arising from currency movements, such as the responsiveness of production and consumption to relative price shifts (Dornbusch, 1975). It also does not explain how the excess of income over expenditure that corresponds to a trade surplus arises.

Alexander and Miller (1952) and Johnson (1958) tackle the criticism on the elasticity approach by their absorption approach which is based on the aggregate income and expenditure considerations. The presentation of the absorption approach as an alternative to the elasticity approach leads to a considerable controversy and researchers put in extensive efforts to reconcile the two. Among the supporters of the elasticity approach, Machlup (1955) points out that it is not correct to neglect the relative price of imports and exports and concentrate on absorption and income. However, the absorption approach asserts that a favourable effect from devaluation alone, in a fully employed economy, depends not only on elasticities but requires that the inflation resulting from the devaluation under these conditions produces a reduction in aggregate absorption relative to the aggregate productive capacity.

Several attempts at reconciliation of the two approaches by Alexander and Miller (1959) and other researchers bring an end to the initial debate by giving their own synthesis of the elasticity and absorption approaches. This synthesis consists of treating the effect of devaluation on the balance of payments, as being determined by the traditional elasticity approach, as an initial effect, to which a multiplier is applied in order to obtain the changes in the national income of the two countries concerned and hence the induced changes in the home country's imports and exports.

In the analysis of Alexander and Miller's (1959) proposal of the absorption approach, a negative trade balance implies national expenditure in excess of national income. This obvious truth is underscored by Machlup (1955) who emphasizes the role played by credit creation in sustaining the excess expenditure in the case of the trade deficit and concludes

that the role of the supply of money and credit cannot be neglected when considering the effects of devaluation. The rediscovery of the significance of monetary factors, however, has not been reflected in the mathematical models for the analysis of the effect of devaluation on the balance of trade. The monetary view will be discussed in more detail in the next section.

Another strand of the exchange rate effect on the balance of trade is to assess the impact of exchange rate volatility on trade by considering the level of the firm's exports. Theoretical studies generally predict that increased uncertainty about the exchange rate will lead to a lower level of trade under the assumption that traders are risk averse. For example, Clark (1973) demonstrates that exchange rate uncertainty is likely to have a negative effect on trade in a simple static model. This basic model has been elaborated by a number of authors, e.g., Hooper and Kohlhagen (1978), Baldwin *et al*. (2005), who also reach the same conclusion of a clear negative relationship between exchange rate volatility and the level of trade. Recent work on this topic employing the gravity model has found some evidence of a significantly negative relationship between exchange rate variability and trade (see Frankel & Wei, 1993; Deardorff, 1995; Dell'Ariccia, 1999; Rose & Engel, 2000; Tenreyro, 2003).

One aspect of the relationship between trade and exchange rate volatility that needs to be mentioned is the role of "sunk costs". Much international trade consists of differentiated manufactured goods that typically require significant investment by firms to adapt their products to foreign markets. The sunk cost would tend to make firms less responsive to short-run movements in the exchange rate. The decision to enter or exit the export market involves considering explicit fixed and variable costs, but also exercising the option to enter or exit the market (see, for example, McDonald & Siegel, 1986; Dixit, 1989; Krugman, 1989). The greater the volatility in exchange rates, the greater the value of keeping the option, and hence the greater the range of exchange rates within which the firm stays in the export market, or stays out if it has not yet entered. This suggests that increased exchange rate volatility would increase the inertia in entry and exit decisions.

3.2.4 Monetary view of trade balance

The role of money and credit is totally disregarded in the conventional relative prices (elasticities) and aggregate spending (absorption) approaches. Even Alexander himself

(Alexander, 1959) tends to neglect the role of money in his discussion of the multiplier process engendered by the initial change in the trade balance. In this respect, Meade's (1951) model for the analysis of the balance of payment stands out. Under the "neutral economy" assumption, the money supply and the interest rate are clearly included in his model.

Subsequent to the work of Meade (1951), Polak (1957), and Lee and Sampson (2000), in contrast to the emphasis of the standard model on the influence of relative prices on trade flows, the new monetary models consider the trade disequilibrium as a monetary phenomenon and assume perfectly flexible prices and wages instead of constant prices in the Keynesian model. In these monetary models, the term "balance of payment", rather than "balance of trade", is more frequently used to accurately capture the composition of a country's international accounts. A broad class of open economy macroeconomic models (see for example Mundell, 1963; Calvo & Rodriguez, 1977; Frenkel & Rodriguez, 1982) investigate the relationship between a country's balance of payments and its money supply. They argue that there is disequilibrium in the money market if there are surpluses or deficits in the balance of payments.

The monetary approach, therefore largely emphasizes the monetary implications of balance of payments disequilibrium. Following a permanent increase in the money supply, the decrease in the interest rate leads to an increase in investment and subsequently output, an increase in the price level, and a decrease in the exchange rate (depreciation). If the Marshall-Lerner condition holds, the exchange rate depreciation will lead to an improvement in the trade balance. In the long run, money is neutral. Thus, over time, output, the interest rate, the exchange rate, and the trade balance are expected to return to their initial values (long-run equilibrium), and the price level is expected to be permanently higher. Recent evidence by Eichenbaum and Evans (1995), Strongin (1995), Christiano *et al.* (1996), and Koray and McMillin (1999) provides support for some of these results predicted by conventional models.

The above mentioned studies on key determinants of trade balance or current account determination are summarized in Table 3.1. Some other models which are not discussed above and nor presented in the table also provide explanations for trade and current account patterns. We mention a few of them for example. Frenkel and Razin (1986) illustrate the importance of consumer preferences towards consumption, which in turn

affects the trade balance. Kim (2001) identifies money demand and the asset return as the key factors in generating a specie-flow mechanism. The critical role played by the asset price has also been emphasised in the adjustment process of a small open economy.

In summary, productivity, exchange rate, income and monetary factors have been identified as the main determinants of trade balance in the existing theoretical models. The directions and significant levels of the relationships between the trade balance and these determinants are evaluated in different theoretical models. Productivity improvements that are export-biased tend to induce a trade surplus. At the same time, the increasing productivity would also affect domestic income and labour wage. As a result, the changing price level in tradable sectors would affect the relative price of home and foreign goods through the pass-through effects of exchange rate. In the monetary models, the balance of is more treated as a monetary phenomenon.

However, most theoretical models focus on one single factor or one aspect of factors to explain the trade imbalance phenomenon thus the effects of other relevant factors would be ignored under the specified modelling assumption. There is a lack of an integrated framework that identifies all the key determinants and the relative importance of these determinants.

Table 3.1 Summary of key theories on determinants of the balance of trade

Authors (Year)	Methodology	Main assumptions	Determinants examined	Main results
Hicks (1953)	An intuitive and descriptive analysis of Ricardian models	Constant cost all commodities are produced at a cost per unit which is independent of the amount produced.	Productivity and money incomes	Productivity improvements that are export-biased tend to cause a deficit in the home country's balance of payment. When its productivity gains turn to import-competing industries, the barter and monetary effects will cause a deficit in the foreign country.
Johnson (1954)	Two-country model of international trade	Increasing productivity is reflected in proportionately rising money incomes or in proportionately falling prices.	Productivity and income-price trend	The faster productivity growth raises the real income and tends to deteriorate the balance of trade. Falling prices are likely to improve the trade balance if the elasticities of demand are high enough for devaluation.
Dornbusch, Fischer and Samuelson (1979)	Extension of the Ricardian model to determine the equilibrium relative wage and price structure with the efficient geographic pattern of specialisation	Constant unit labour requirements for commodities that can be produced in home and foreign countries and constant expenditure share.	Technological progress	The uniform technological progress in the case of a continuum of goods with a proportionate reduction in foreign unit labour requirement leads to a loss of comparative advantage in the home country and trade deficit.
Krugman (1979)	A general-equilibrium model of North-South trade	Labour is the only factor of production and all goods (old and new) are produced with the same cost function. Labour productivity is the same in the North and South.	Innovation and technology transfer	The technology transfer gives rise to trade and improves the terms of trade for less-developed countries.
Balassa and Samuelson (1964)	Non-tradeable goods are included in the traditional Recardian model	A two-country, two commodity world with one scarce factor, labour, and constant input coefficient technology.	Productivity differentials	A positive productivity shock that affects only traded goods, and leads to currency appreciation and its trade balance deterioration.

Table 3.1 (Continuation)

Authors (Year)	Methodology	Main assumptions	Determinants examined	Main results
Johnson (1954)	Two-country model of international trade	Trade is initially balanced, price is constant, and income growth is the same in both countries.	Income elasticity of demand for imports	The trade balance between countries will change if their respective income elasticity of demand of other's exports differs.
Artus (1979)	Analysis of production and consumption at the disaggregate level	The national accounting identity between aggregate income and the components of aggregate demand.	Differences in the incentives to savings and investment	Distortions in saving incentives that result from government policies and institutional constraints.
Sachs (1981)	An integrated analysis of absorption and elasticities approaches to the current account	Output levels are supply-determined and not affected by aggregated demand. Real interest rates are tied to the marginal productivity of capital and are not influenced by monetary policies.	Income and exchange rate	A permanent increase in income leaves the trade balance unaffected and a transitory increase in income depends on the source of change.
Bickerdike (1920), Robinson (1937) and Metzler (1949)	An elasticity approach in terms of independent markets for imports and exports in a framework of partial equilibrium	Separate markets for imports and exports. In each market, demand and supply depend only on the nominal price in terms of the importing or exporting country's currency.	Exchange rate and relative price	The trade balance effects of devaluation are due to the fiscal policy the devaluation brings into operation.
Alexander and Miller (1959)	A synthesis of elasticity and absorption approaches	The rate of exchange rate must equalize foreign and domestic prices.	Exchange rate and income	The effect of devaluation on the balance of payment is determined by the traditional elasticity approach, as the initial effect, to which a multiplier is applied in order to obtain changes in the national incomes and induce changes in the home country's imports and exports.

Table 3.1 (Continuation)

Authors (Year)	Methodology	Main assumptions	Determinants examined	Main results
Alexander and Miller (1952)	An absorption approach in a full economic model	In a fully employed economy exchange rate changes only the price of traded goods, while all the other prices (non-traded) and income remain unchanged.	Exchange rate	The effect of depreciation depends only on elasticities but requires that the inflation resulting from the devaluation under these conditions produces a reduction in aggregate absorption relative to aggregate productive capacity.
Mundell (1963)	Monetary approach to the balance of payment in a small-country model	The supply of domestic output is elastic and its price level constant and the balance of trade depends only on income and the exchange rate.	Money supply	Deficits are caused by money supply exceeding money demand, while surpluses are caused by money demand exceeding money supply.
Calvo and Rodriguez (1973)	Two-sector model of exchange rate determination	The residents are assumed to hold foreign exchange besides their own currency.	Money supply and exchange rate	The real exchange rate depends on monetary variables (the rate of monetary expansion) in the short run while it is fully determined by real variables in the long run.
Frenkel and Razin (1986)	A two-country general equilibrium model of the world economy	The world capital markets are fully integrated and individuals and governments in both countries face the same market rates of interest.	Budget deficits and government spending	The qualitative effects of fiscal policies depend on whether the country introducing the policies runs a surplus or a deficit in its current account.
Obstfeld and Rogoff (1995)	A model of international policy transmission that embodies the main elements of the intertemporal approach	Monopolistic competition and sticky normal prices.	Money supply and government purchase	Money supply shocks can have real effects via current accounts and a permanent rise in world government purchases temporarily lowers world real interest rates.
Kim and Lee (2001)	A small open economy model with non-traded goods based on the monetary approach	In a model with incomplete market and an asset price which is a land price, is the only market price determined in the system. Goods price is assumed determined by the purchasing power parity.	Asset price and money demand	Money demand and the asset return are key factors in generating a specie-flow mechanism. There is a positive association between the asset price and monetary injection via the balance of payments surplus.

3.3 Empirical research

Having given a broad overview of the determinants of the trade balance through the evolution of theoretical models, a question arises: What happens when the long-run theory is subjected to empirical tests applied to short-run data? This section reviews empirical studies on the relationship between the balance-of-trade and its key determinants. Most of the studies focus on industrial countries or developed countries, either as a group or individually, and typically with emphasis on the response of the current account balance to shocks in specific variables.

3.3.1 Country-specific studies

The United States has received most of the attention due to its increasing current account deficit. Since the mid-1990s, the U.S. economy has experienced a productivity surge. The productivity acceleration was accompanied by an investment boom and followed by an expansion in consumption. The seminal work by Glick and Rogoff (1995) focuses on both country-specific and global productivity shocks to explain the current account behaviours. In their empirical implementation of the intertemporal current account model, country specific productivity shocks negatively affect the current account balance, while the global productivity shocks do not have any significant impact.

In the work by Kollmann (1998), the U.S. productivity changes have been identified as the main source of fluctuation in net exports for the U.S. during the period 1975-1991, and contributed to the sharp drop in U.S. net exports in the first half of the 1980s. Hunt and Rebucci (2005) and Engel and Rogers (2006) attribute the widening U.S. current account deficits to funds from Europe and Japan seeking higher returns in the U.S. A rise in U.S. productivity relative to the world, raises U.S. investment and consumption, and increases the U.S. current account deficit. Guerrieri and Henderson (2004) show that when there is a positive productivity shock in traded goods, its currency appreciates in real terms and the trade balance of that country deteriorates. Estimates by Bems and Dedola (2007), Edwards (2007) and Corsetti *et al.* (2006) detect even larger elasticities between a persistent county-specific productivity shock and imbalances.

A few recent studies also examine the potential role of productivity differences across countries in explaining the global imbalances based on multi-country dynamic general

equilibrium (DGE) models. Guerrieri *et al.* (2005) and Hunt and Rebucci (2005), for instance, find that a permanent shock to the level of TFP in the United States can at least partly explain the behaviour of the U.S. trade deficit in the late 1990s. Obsfeld and Rogoff (2004), Corsetti *et al.* (2006) consider the effect of productivity growth in other industrialized countries, especially in Japan and Europe. Their empirical results suggest that productivity growth in most industrial countries, especially in Japan and Europe, is likely to raise the global demand for U.S. products and help reduce the U.S. current account deficit.

This "productivity view", however, cannot explain the rising U.S. deficits since 2000. The TFP growth of the U.S. and the "rest of world" calculated by Chakraborty (2009) indicates that the U.S. productivity growth has lagged by a large margin compared to that of the world since 2000. If the differential productivity view is correct, then the U.S. should have been running current account surpluses or at least decreasing its deficits. Therefore, the effects of other determinants must be taken into consideration.

The analysis of the growth of national income and changes in relative prices begins by estimating their parameters in the trade models. Estimated income elasticities for the trade models are positive and statistically significant in driving the trade flows. Bryant *et al*. (1993) and Hooper *et al.* (1998) find that the long-run elasticity of U.S. exports of goods and services with respect to foreign national income is 0.80, while the long-run elasticity of U.S. imports of goods and services with respect to U.S. national income is 1.8. This asymmetry appears consistently in analyses over different estimation periods (see Houthakker & Magee, 1969; Cline, 1989; Wren-Lewis *et al.*, 1998).

The distinction of the permanent and transitory changes of the income effect has been investigated in intertemporal models. Kim (1994) develops an empirical analysis of the income effects on the U.S. trade balance using the U.S. post 1973 data. The results indicate that a permanent increase in income deteriorates the trade balance whereas a transitory increase improves it. Miljkovic and Paul (2008) investigate the impact of transitory and permanent income disturbances on the sectoral trade balance by applying the data in three major trading sectors of the U.S. They find that both permanent and transitory shocks in real income decrease the trade balance for the whole economy and for each sector.

What about the role of relative price in affecting the current account behaviour? A good proxy for relative price is the real exchange rate of the dollar, which has been appreciating since the mid-1990s when the relatively faster productivity growth began to emerge in the U.S. data. A number of researchers have explored how a country's trade balance moves after the devaluation of its currency, where two major empirical strategies are widely used. Firstly, studies such as Magee (1973), Moffett (1989) and Rose and Yellen (1989) have estimated the exchange rate impacts on the balance of trade by examining the relationships between the prices and quantities of trade flow. The empirical evidence for the U.S. for the 1967 to 1987 period shows that there is no significant impact of currency depreciation on the trade balance. Rose and Yellen (1989) use the additional data including the post-1987 adjustment and the subsequent recession and they find that the improvements in the U.S. trade balance require a large depreciation in the value of the dollar.

The second approach has relied on an econometric technique to investigate whether the J-curve behaviour exists in the U.S. Rose and Yellen (1989) employ disaggregated, bilateral trade data and do not find support for the J-curve effect. Bahmani-Oskooee and Brooks(1999) analyse the bilateral disaggregated U.S. trade data with respect to six major trading partners using the autoregressive distributed lag (ARDL) approach developed by Pesaran and Shin (2001) and report a significant long-run relationship between the trade balance and the exchange rate. Demirden and Pastine (1995) and Shirvani (1997) use a Vector Error Correction Model (VECM) for the United States with respect to the rest of the world and G7 countries respectively, and find evidence supporting the empirical validity of the Marshall-Lerner condition.

During the 1980s, the role of monetary policy attracted increasing attention due to its impact on the exchange rate. Naturally, researchers have also tried to explore this impact empirically. Eichenbaum and Evans (1995) investigate the effects of shocks to U.S. monetary policy on nominal and real exchange rates applying the annual monthly data from 1974 to 1990. They find strong evidence that U.S. monetary policy contributes significantly to the overall variability of U.S. exchange rates in the post-Bretton Woods era. Using a vector auto-regression model, Sims (1980) analyses the response of the trade balance to monetary innovations in the same period of the U.S. economy. His findings

indicate that contractionary monetary policy leads to transitory appreciations and a short-lived improvement in the balance of payments.

Mirroring the deterioration in the trade and current account positions of the United States, Japan has achieved a trade surplus to the extent that no country has ever experienced during the 1980s. The basic cause of the surplus is believed to be the export-oriented nature of Japan's industrial growth and its heavy dependence on imported oil (Krugman, 1986). There is also a Balassa effect for Japan's case: as the rapid Japanese productivity growth is disproportionately concentrated in tradeables, there is a substantial bias to real exchange rate measures based on aggregate prices. Following the view of the biased nature of productivity growth, Marson (1989) is concerned with the productivity performance within Japan's manufacturing sector and shows the pattern of real exchange rates across sectors is only related to the relative productivity growth in the two countries. This result indicates that even if the misalignment of the dollar is corrected, relative price changes will persist as a long-term phenomenon.

During the 1980s, the concerns about the improvement in the U.S. trade deficit have garnered increasing attention in the bilateral trade imbalance between the U.S. and Japan. Sato (1988) attributes Japan's lower import elasticity with respect to income as one of the major factors of Japan's trade imbalance through comparing the elasticities of imports and exports with those of the U.S., Germany and Korea. Noland (1989) concentrates on Japan's trade elasticities using export demand, export supply, and import demand functions in an elasticity approach framework. His results indicate that the lags on responses to price changes are much longer than previous estimations have allowed. Jung and Doroodian (1998) apply the Shiller lag model to examine the persistence of Japan's trade surplus and the existence of a J-curve effect for the period 1975-1990. The empirical findings show that there is an effect of an exchange rate change on the trade balance with considerable time lags.

After the 1985 Plaza Agreement, the Japanese yen appreciated from 260 yen/dollar to 125 yen/dollar by 1988, lending hope that the trade surge might at last be reversed. Japan's trade surpluses against the United States decreased in the second half of the 1980s and were stable in 1990-91, despite a sharp increase in overall current account surpluses. Adams and Gangnes (1996) suggest the relatively weak price responsiveness of Japan's trade flows as the possible explanation for the limited effects of the appreciation of the

Japanese yen. This point has also been made by McKinnon (1993) and others in their recent critiques of a “weak dollar policy” for reducing the US-Japan trade imbalance.

The trade balance of the U.S. and Japan has attracted considerable attention due to their importance in the world economy. Taken as a whole, we see a significant relationship between the productivity growth and the changes of the trade balance in the U.S. and Japan. A large persistent shock of other factors, such as the relative price changes and income can have a large effect on trade flows while a small or temporary shock has little effect.

3.3.2 Cross-country studies

Early attempts of cross-country studies mostly focus on a particular aspect of country groups, with emphasis on the response of the current account balance to shocks in a specific determinant. The exchange rate, owing to its important policy implications, has attracted most attention. A number of studies such as Cooper (1971) show that the devaluation “improves” the balance of goods and services. As Miles (1979) points out, these studies do not investigate if the impact of the trade balance is temporary or permanent, and do not account for the effects of other variables such as the monetary or fiscal policies. Using annual data from 14 countries over the period 1956-1972, Miles finds that devaluations do not improve the trade balance but improve the balance of payment using annual data from 14 countries over the period 1956-1972. This implies that the devaluation mechanism involves only a portfolio stock adjustment through the capital account. However, Himarios (1985) supports the traditional view on nominal (and real) devaluations and the trade balance. Following Miles’s framework, he points out that Mile’s specification test is incorrectly specified and cannot provide statistically reliable information about the quantitative effects of devaluation when applied separately to each country.

Bahmani-Oskooee (1985) introduces other variables into his model to test the J-curve phenomenon in four developing countries which have profoundly different exchange rate regimes. The world income and the level of high powered money have been added to the multiplier-based analysis of the effects of exchange-rate change or devaluation by Krueger (1983). He finds evidence of a J-curve for Greece, India and Korea and the long-run impact on the trade balance only exists in Thailand.

Furthermore, Bahmani-Oskooee and Alse (1994) test 41 developed countries and less developed countries for the existence of a cointegration effect and the J-curve effect applying the Engle-Granger two-step procedure. Noting that the level variables used by Himarios (1985) are not stationary, their results indicate that the trade balance and real effective exchange rate are co-integrated for only fourteen countries. There is some J-curve evidence found in the countries that exhibit cointegration.

Recently, increased research on the exchange rate impact on the balance of trade of developing countries, predominantly emerging Asian markets, has been carried out. Baharumshah (2001) employs an unrestricted VAR model for the bilateral trade balances of Thailand and Malaysia with the United States and Japan. His results support the traditional view that devaluation can affect the trade balance and the depreciation of the ASEAN currencies causes trade balances to improve with both the U.S. and Japan. He finds that the adjustment after the devaluation in some cases is rapid, implying no evidence of the J-Curve effect. Wilson (2001) examines the relationship between the real trade balance and the real exchange rate for bilateral trade in merchandise goods between Singapore, Korea and Malaysia with respect to the U.S. and Japan. No existence of a J-Curve is found, with the exception of the bilateral trade between Korea and the U.S.

Comprehensive cross-country empirical studies on the multiple determinants of trade are also very important. However, they are relatively scarce. Khan and Knight (1983) make a major contribution to this area. Using a panel dataset for 32 non-oil developing countries from 1973 to 1980, they find that external factors (the increase in foreign interest rates, the slowdown of economic growth in developing countries, and the deterioration in the terms of trade) and internal factors (the real exchange rate appreciation and increasing fiscal deficits) are important in affecting the current account balances of the countries under review. Similarly, Marquez (1990) and Hooper and Johnson (1998) analyse the role of trade elasticities for changing economic analysis into policy recommendations. They estimate income and price elasticities for both aggregate and bilateral trade flows of the developed countries and developing countries. Their results suggest that the direction of trade is sensitive to changes in income and prices.

As suggested by the standard theories of current account determination, Debelle and Faruqee (1996) adopt two estimation approaches to capture the determinants of current account positions. They use a panel of 21 industrial countries over 1973-1993 and an

expanded cross-sectional dataset that includes an additional 34 industrial and developing countries. They attempt to explain long-term variations and short-run dynamics of the current account by specifying cross-section and panel data models respectively. The effect of fiscal policy on the current account, which is different in high debt countries from low debt countries, was investigated.

Unlike typical developed countries, most developing countries are credit constrained. Both the behaviour and response of the current account deficit to changes are likely to be different. Calderon and Chong (2000) apply the Generalized Method of Moments (GMM) estimator proposed by Arellano and Bond (1991) to investigate the determinants of the current account deficit of 44 developing countries. They identify and differentiate within-country and cross-country effects, namely the effects due to changes over time in the explanatory variables and those derived from cross-country differences in the same variables. Their results indicate that the domestic output growth rate has a positive effect on the current account deficit and the growth rate of industrial countries contributes to reduce the current account deficits of developing countries. Also an appreciation of the real exchange rate or a worsening in the terms of trade generates an increase in the current account deficit.

Other studies, e.g., Chinn and Prasad (2003) explore a wider range of static and dynamic specifications by covering a large and heterogeneous group of 18 industrial countries and 71 developing countries. Compared to the work by Calderon and Chong (2000), their studies emphasize the roles of the medium-term determinants of saving-investment balances rather than factors influencing the short-run dynamics of the current account. They find that government budget balances, initial net foreign asset positions, and for developing countries, indicators of financial deepening are positively correlated with current account balances. Chinn and Ito (2007) update and extend their work by incorporating a potentially important factor, namely, the effect of legal and institutional developments and confirm the difference of saving behaviours between developed countries and less developed and emerging countries.

More recent studies on the current account balance aim to analyse the nature of the external adjustments for the emerging global imbalance phenomenon. Edwards (2002) points out that the large current account deficits tend not to be persistent and there is a negative effect on economic performance from current account reversals, namely, the

change of current account deficit/surplus to surplus/deficit. From a policy perspective, higher deficits increase the probability of crises and large deficits should be a cause for concern. Furthermore, Edwards (2005) uses non-parametric techniques to analyse the international evidence on current account reversals during the period 1971-2001. He finds that there is a nominal depreciation of exchange rate and a steadily increasing interest rate in the reversal period in all sample countries. Applying the panel regression technique to a dataset covering 157 countries, in all regressions the coefficients of the current account reversal variables are significantly negative, especially in large countries.

For correcting the global imbalances, Blanchard (2007) points out that the current account imbalances have steadily increased in rich countries over the last 20 years. He considers the current account deficit of these countries through a close look at the country-specific distortions and suggests that the adjustments could be achieved by the changes in exchange and interest rates. The "global saving glut" explanation (Bernanke, 2005) views excess saving from Asian emerging economies as the cause of the U.S. current account deficit. Edwards (2007) analyses the determinants of the current account balance and the mechanism through which current global imbalances are likely to be solved in 41 advanced and emerging countries. The economic and the institutional determinants, such as the degree of trade openness and the government consumption and inflation rate, are incorporated into the model. Most of the coefficients are statistically significant and have expected signs.

Key empirical studies that investigate connections between theoretical determinants and trade balance have been summarised in Table 3.2. As can be seen from Table 3.2, the empirical models have produced complex findings as different variables are set for country-specific data. However, these findings help our understanding of the merits of various theories and also draw our attention to country heterogeneity when examining the determinants of the balance of trade for a specific country.

Table 3.2 Summary of selected empirical papers on determinants of balance of trade

Author (Year)	Methodology	Explanation variables	Sample	Frequency time period	Main results
Houthakker and Magee (1969)	Time series, OLS. Export and import equations	GNP and price index	15 industrial countries	Annual 1951-1966	The income elasticity for Japan's export is substantially higher than for its imports, whereas the U.K. and U.S. are in the opposite category.
Magee (1973)	Elasticity approach	Exchange rate, domestic real income, foreign real income	US	Monthly 1969-1973	Currency contracts, pass-through and the quantity adjustment process are highlighted to examine the effect of devaluation. The long-run impact of devaluation on trade balance is favourable.
Miles (1979)	Pooled cross section and time series, SURE	Δ(Export-Import)/ GNP ΔBP/GNP	8 developed countries and 6 developing countries	Annual 1956-1972	Devaluation improves the balance of payments, but not the trade balance. No J-curve phenomenon exits.
Himarios (1985)	Time series, OLS	Growth rate of income, the ratio of high-powered money to output, exchange rate, the ratio of government consumption to output	10 developed and developing countries	Annual 1956-1972	In nine countries of the ten sample countries, devaluation improves trade balance.
Bahmani-Oskooee (1985)	Time series Almon lag structure on exchange rate	GNP, world income, high powered money and effective exchange rate	Greece, India, Korea, and Thailand	Quarterly 1973-1980	J-curve phenomenon is found in all countries except Thailand. Domestic income variable has the expected sign and is significant only in the results for Korea. The world income variable also has the expected sign and it is significant only in the results of Greece and India.

Table 3.2 (Continuation)

Author (Year)	Methodology	Explanation variables	Sample	Frequency time period	Main results
Rose and Yellen (1989)	Time series IV and OLS	Real GNP and real exchange rate	Bilateral trade between US and its six G-7 trading partners	Quarterly 1960-1985	No J-curve phenomenon is found.
Moffett (1989)	Time series Simulation	Price and quantity responses	US	Quarterly 1967-1987	Estimates of exchange rate pass-through and trade volume responses to exchange rate changes indicate that the J-shape adjustment path has not typically been experienced by the U.S.
Noland (1989)	Time series 2 SLS gamma distributed lag	Incomes in each country, the price levels, the rest of the world export price and domestic price of imports	Japan	Quarterly 1970-1985	Exchange rate changes have significant effects on the level of trade balance if these effects are felt with considerable lags.
Glick and Rogoff (1995)	Time series GLS, OLS	The per cent change in country-specific productivity and global productivity, real gross investment	G-7 industrialized countries	Annual 1961-1990	Country-specific productivity shocks are important to explain the current account behaviour.
Demirden and Pastine (1995)	Time series Vector auto-regression (VAR)	Vector of trade balance, real exchange rate, domestic and foreign income	US	Quarterly 1978-1993	Depreciation shock results in the negative response in the US balance of trade followed by a substantial and fairly long-lasting improvement in the balance of trade.
Debelle and Faruqee (1996)	Cross-sectional, panel regression	Lagged current account, budget surplus, real exchange rate change, domestic output gap, terms of trade change, dependency ratio, relative income	21 industrial countries.	Annual 1971-1993	The ratio of old exerts more of a negative influence in industrial countries while the ratio of young is more important in developing countries. Fiscal policy, real exchange rate, the business cycle, and the terms of trade are also shown to have significant impact on the current account balance.

Table 3.2 (Continuation)

Author (Year)	Methodology	Explanation variables	Sample	Frequency time period	Main results
Kollmann (1998)	Two-country real business cycle model (RBC)	Domestic and foreign productivity, government consumption, tax rates	Bilateral net export between US and other G-7 countries	Quarterly 1975-1991	US productivity shock is the dominant source of movement in the US trade balance.
Baharumshah (2001)	Time series Vector correction model (VECM)	Exchange rate, domestic and foreign income	Bilateral trade balances of Malaysia and Thailand with US and Japan	Quarterly 1980-1996	Depreciation of the ASEAN currencies causes trade balances to improve. The income-reducing policy may help to reduce the trade deficit with US but not with Japan.
Calderon (2003)	Pooled time-series and cross-country	Income, savings, exchange rate, fiscal surplus, terms of trade, capital control	44 developing countries	Annual 1966-1995	Domestic output has a positive effect on the current account deficit. An appreciation of the real exchange rate or a worsening of the terms of trade generates an increase in the current account deficit. Reductions in international real interest rates generate an increase in current account deficits in developing countries.
Chinn and Prasad (2003)	Cross-section and panel regression	Government budget, relative income, relative dependency ratio, financial deepening, terms of trade volatility, GDP growth and openness ratio	A large sample of 18 industrial and 71 developing countries	Annual 1971-1995	Government budget and initial stocks of net foreign net are positively associated with the current balance. Financial deepening is positively associated with the current account balances and indicators of openness are negatively correlated with the current account balance.
Chinn and Ito (2007)	Panel regression	Financial openness, legal variables, and real GDP growth, national savings, corruption index	117 industrial and developing countries	Annual 1971-2003	Budget balance has a positive impact on the current account. The financial factors in developed countries are more sensitive in non-industrial countries.

3.4 Existing studies on the determinants of China's trade balance

China has emerged as the world's leading creditor nation. A distinguishing feature of China's economic ascendancy over the past quarter century is the fact of exports exceeding imports and saving exceeding investment. The interpretations of China's overall surplus fall broadly into two camps (Fischer, 2010). A "developmentalist" camp emphasises the centrality of state-led industrial policy through the reform period, which is often argued as a neo-mercantilist policy as policies such as capital controls and state control of finance are used, (see Lin *et al.*, 2003; So, 2003). The other camp has considered the sudden rise in China's trade surplus as a result of the transition from a state socialist to a market capitalist system. The policy inventions and distortions are seen as the key determining factors (Huang & Wang, 2010). While the two camps disagree on many issues, a consensus has emerged across both camps that China's surplus is the result of intervening domestic industrial policies. In the rest of this section, the review of existing literature on the determinants of China's trade balance is organised according to the three channels as shown in Figure 3.1, i.e., the supply side, the relative price effect and the demand side.

3.4.1 Supply-side explanations

The massive expansion of FDI inflows and China's export promotion policy are seen to have a positive and stabilising influence on China's external disequilibrium (Yu, 2007). He has noticed that the FDI inflows must be "export-oriented" for the self-balancing purpose of foreign exchanges by the government policy.[4] Under China's export promotion strategy, FDI inflow leads to a biased growth in exports and the accumulation of a trade surplus. There has been growing literature on the role of FDI in China's economy and its export performance (see for example Lardy, 1994; Branstetter & Feenstra, 1999; Zhang & Song, 2001; Sun, 2009; Sun, 2010; Sun, 2012). The theoretical link between FDI and host export performance has been empirically investigated (see Kojima, 1978; Markusen *et al.*, 1996; Zhang & Markusen, 1999). Their results confirm that there is considerable evidence on the FDI export linkage in China and increased levels of FDI positively affect manufacturing export performance.

[4] This policy was abolished as part of China's commitment for WTO entry in 2001.

The FDI inflows have also played an important role in the composition of China's trade commodities (Xu & Lu, 2009). China's processing trade accounted for over half of China's total exports (Figure 2.4) and exports by foreign invested enterprises (FIEs) accounted for more than half of China's exports since 2001 (Ferrantino *et al.*, 2008). Li *et al*.(2007) point out that the manufacturing industry remains as the primary sector of FDI inflows and the FDI sectoral structure has led to excess supply of China's labour-intensive exports in the global markets.

The effects of FDI on export performance and the accumulation of an external imbalance are reinforced by the role of FIEs in China's processing exports. As Bransetter and Lardy (2006) point out, the large source of FDI which comes from Asian firms tends to use China as an export platform and much of China's involvement in the international chain relies on its supply of cheap low-skilled labour. FDI from U.S. or European firms tends to build the export-oriented base in China to serve the local markets. High-technology or sophisticated intermediate goods are imported to assemble final goods for exporting (Zhang, 2001).

While much attention has been paid to the role of FDI and processing trade, direct testing for causality between FDI and China's trade imbalance is extremely rare. Reforms in tradeable sectors have improved the conformity of China's trade advantage (Yue & Hua, 2002) and induced large inflows of FDI (Liu *et al.*, 2001). In the modelling work by Wang and Wan (2008), the effects of FDI on China's trade imbalance are estimated by using aggregate and annual data from 1979 to 2007. Their results fill in the gap by adding FDI into China's trade balance model and indicate that the FDI inflows expand China's exports and contribute significantly to China's trade surplus. Similarly, Li *et al.* (2007) argue that the deterioration of China's terms of trade resulting from large FDI inflows in labour-intensive export sectors has led to a surge in its manufacturing exports.

3.4.2 Relative price effect: the exchange rate

China's exchange rate policy has been most referred to when addressing the problems of the recent global financial imbalance. Theoretically, the elasticity approach of the exchange rate suggests that a nominal devaluation is assumed to affect the real exchange rate (a relative price) and hence improve the trade balance. Therefore, China has recently been under strong international pressure to revalue its currency (the RMB). Goldstein

(2004) argues that China's undervalued currency has contributed to a growing trade surplus and also attracted large capital inflows due to the appreciation expectation. To estimate the misalignment of RMB, he applies the "underlying balance" approach and concludes that the RMB is undervalued by 15-25%. Chang (2007) estimates the equilibrium value of the Chinese currency RMB by controlling the per capita income level and finds that the Chinese currency is moderately undervalued by 22%.

So if that is the case, will the Chinese currency revaluation help correct its excessive trade imbalance? The existing empirical results remain ambiguous. The first strand shows evidence that a real exchange rate appreciation reduces the trade balance, either through exports, import or both. In contrast, the second strand finds no significant impact on the trade account.

Within the first strand, in the early studies, Brada *et al*. (1993), examine the responsiveness of the balance of trade to the real exchange rate using China's quarterly data from 1980 to 1989. They conclude that the exchange rate has a significant influence over the volume of exports and imports. Devaluation is shown to improve the trade balance, but no J-curve effect exists. Dees (2001) improves on the previous analysis by separating China's exports and imports into two categories, the processed and the ordinary. He finds that, in the long term, exchange rate appreciation decreases exports; the ordinary exports are more sensitive than processed exports to the price changes. In the short term, however, only world demand influences exports. Yue and Hua (2002) use more recent data and find a reduction in exports with a real exchange appreciation. Eckaus (2004) focuses on the bilateral trade balance between China and the U.S. applying aggregate annual data for 1985-2002. The appreciation of the RMB is found to decrease China's exports to the U.S. and the share of Chinese imports in total US imports. Their findings are consistent with the results of Groenewold and He (2007) by estimating the effect on the US-China trade balance of a revaluation of the RMB from 1987-2003. The revaluation is likely to reduce China's trade surplus. Finally, Shu and Yip (2006) estimate the impact of exchange rate movements on the Chinese economy as a whole and find that currency appreciation can reduce exports due to an expenditure-switching effect, resulting in a moderate reduction in aggregate demand.

Other studies offer a different view on how exchange rate policy may affect China's trade surplus. Zhang (1996) focuses on the dynamic relationships between the exchange rate of

the RMB and China's trade balance after the 1994 unification of the official and swap exchange rates. His result is consistent with Brada that in the short run the J-curve does not appear. His findings also indicate a bidirectional causal relationship between the movements in the real exchange rate and the price variables. Bahmani-Oskooee and Wang (2006) extend the previous work and use disaggregate data at the country level to estimate the impact of real depreciation of Chinese currency on China's major trading partners over the period 1983-2002 and their results show that only 3 partners out of 13 examined countries support the J-curve hypothesis. In recent work by Song *et al.* (2011), they argue that the misalignment of the exchange rate is unlikely to be the primary cause of China's trade imbalance. Part of the undervaluation is ascribed to the Balassa and Samuelson effect which asserts that the currency of a developing country tends to be "undervalued" by this purchasing power parity theory. Market forces make non-tradable goods relatively cheaper in developing countries, rather than deliberate currency manipulation by China's authorities. The Chinese currency appreciation is therefore likely to have a relatively small impact on rebalancing its external surpluses and the world economy.

3.4.3 Demand-side considerations

The third strand aims to explain China's external surplus from the consumption constraints based on analysing the saving motivations and behaviours. China's huge trade surplus and rapid rise in the foreign exchange reserve has been seen as the goal of "neo-Mercantilist" economic policy. The basic idea is that China's excessive surplus relies on a deliberately undervalued currency (Krugman, 2009), underpaid workers, and foreign investment in the export sector. However, Prasad and Wei (2005) argue that the mercantilist explanation is "an intriguing story, but the facts do not support it". For instance, the Chinese currency was likely to be overvalued rather than undervalued according to the black market premium for much of the past two decades up to 2001 and China chose not to devalue during the 1997-1998 Asian Financial Crisis.

Bernanke (2005) focuses on the emergence of "a global saving glut" in emerging Asian and oil-producing countries in the past decade. He argues that a key reason for the changes in the current account of developing countries, including China, is the series of financial crises those countries experienced. This argument views excess savings from China as driven by the rising savings, insufficient domestic demand and the absence of a well-developed financial system, as the cause of the U.S. current account deficit.

The subsequent empirical work by Chinn and Ito (2007) has taken the view of Bernanke (2005) and incorporated the effect of institutional development as an important factor into their saving-investment balance model and finds that there is no evidence of "excess domestic saving" in the Asian market countries. Bernanke's argument that the more developed financial markets are, the less saving a country undertakes, seems to be only valid in industrialized countries rather than emerging markets.

A few recent papers have directed much attention towards China's saving behaviours and attempted to trace the causes of China's high saving rates. Some point to a precautionary savings motive (see Ma & Tian, 2006). They attribute China's high saving rate to the imperfect social system, housing demand after the housing system reform and uncertainty of future income. Others have attributed China's high savings to different income levels, national income distribution and changing demographics (see Kraay, 2000; Modigliani & Cao, 2004; He & Cao, 2007). To help control the external imbalance, Tyers (2008) pays more attention to China's huge corporate savings rather than households. His results suggest that policies that reduce corporate saving will address the problem of the excessive current account surplus.

Some new insights into China's saving behaviours have been provided by Wei and Zhang (2009) and Du and Wei (2010). They propose a competitive saving motive as a new explanation. The competitive marriage market has induced men to raise their savings rate, and produced a rise in the aggregate saving and current account surplus. By constructing an overlapping generations (OLG) model with two sexes and a desire to marry, evidence at both cross-regional and household levels supports this hypothesis.

3.5 Summary

Reviewing the theoretical background of trade balance determinants and identifying the major channels through which these determinants operate help us understand how these determinants affect the behaviour of the balance-of-trade account in general. Productivity growth differentials across the world are seen to be the root cause of trade imbalance. Price distortions in countries with export-led or import substituting growth strategies are considered to be another main contributor. But only getting prices right will not be sufficient to correct the imbalances.

Research on China's excessive trade surplus has been extensive but results of such studies remain controversial. The exchange rate has been widely considered as a key factor that affects China's trade balance but the existing empirical findings on the signs and magnitudes of the coefficients are inconsistent. It stems from different models with different variable selections. Without a thorough theoretical discussion, these findings generated by such models could be biased. In addition, the country-specific determinants, such as FDI and labour costs, are crucially important to explain China's trade surplus but there is a lack of empirical evidence looking into these determinants. Without taking a multi-factor approach, it would be difficult for the empirical tests to pin down the relative importance of some important factors in their impact on China's external surplus.

Additionally, existing studies mostly only investigate the impact of economic factors or quantifiable variables on the balance of trade. Examining economic factors only may be not sufficient to explain the whole story of China's trade surplus problem and an examination of non-economic factors such as social, cultural and political factors is also necessary. In the next chapter we will develop an analytic framework that enables us to include more possible determinants of trade balance into analysis in this thesis.

Chapter 4 Research Methodology

This chapter addresses issues concerning research methodology for this study. Section 4.1 presents a multi-channel and multi-perspective conceptual framework developed for identifying possible factors that could have impacted on China's trade balance. Sections 4.2 and 4.3 deal with econometric modelling, data, and estimation strategies required for empirical analysis later in this thesis.

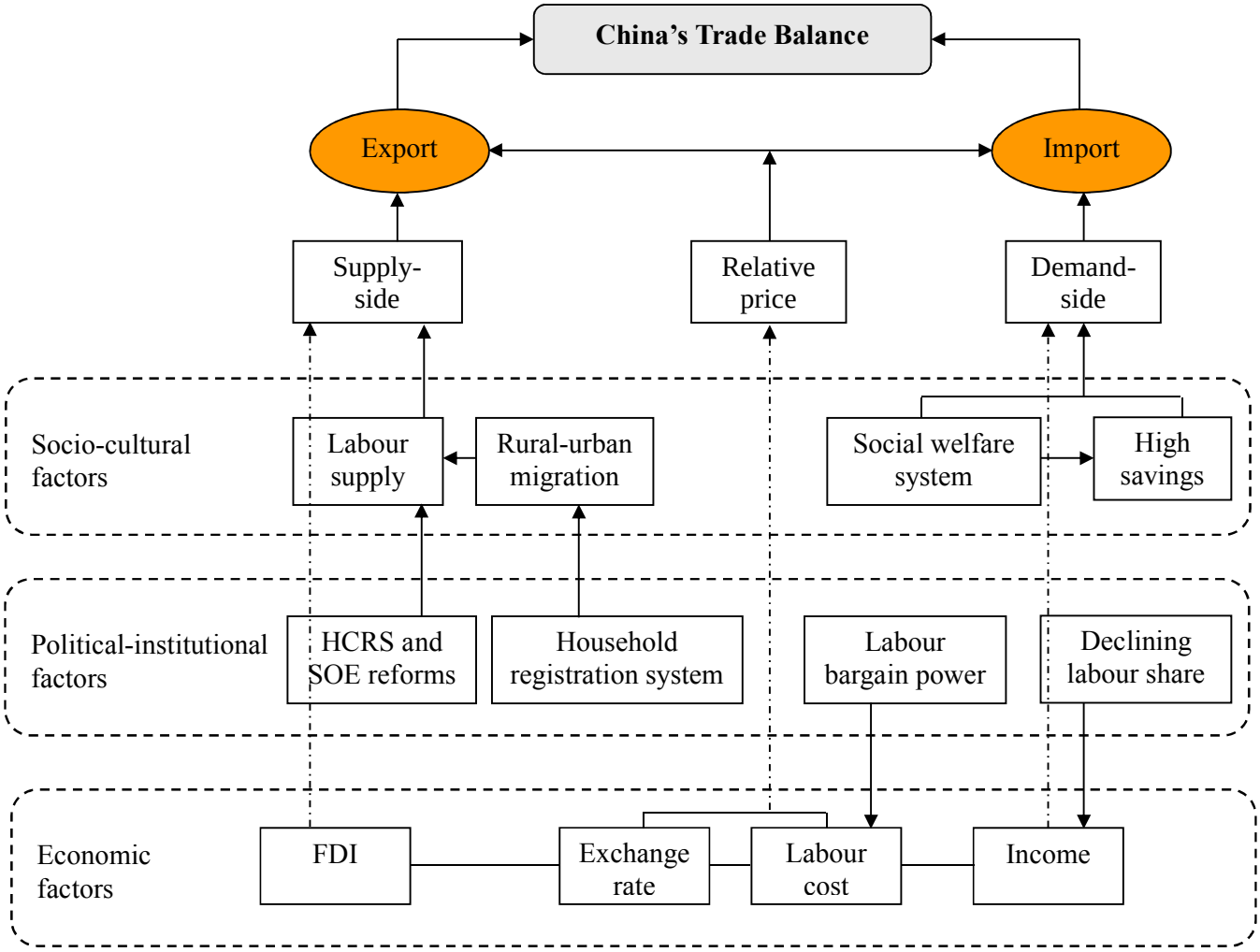
4.1 Research framework

A conceptual framework can help provide a mechanism for exploring the likely factors affecting China's trade balance. Existing theories as presented in Chapter 3 suggest that a country's trade balance can be affected by diverse factors. For developing countries like China, some peculiar factors may also have to be taken into consideration when evaluating possible determinates of trade balance. As such, a multi-channel and multi-perspective conceptual framework is proposed for this study (see Figure 4.1).

The review of the literature in Chapter 3 clearly shows that a country's trade balance can be affected by factors not merely form one channel but from several channels; i.e., supply-side channel, demand-side channel and the relative price effects. Focusing on any single channel of these three is likely to lead to biased results. Further, available studies tend to have largely focused on examining some economic factors. However, in some countries, especially developing countries like China, economic factors may not be the only important ones that affect the trade balance, and some other non-economic factors may also have crucial influence. For example, China's one-party political regime restricts labour union's ability to defend workers' interests; Chinese workers lack the consciousness to defend their own well-being due to Confucian influence. Such factors can have fundamental impact on wage levels in China, which in turn affects China's trade performance. Such factors have to be included in the analysis of determinants of China's trade balance. Admittedly, quantitatively assessing the impacts of such factors can be a challenge due to data availability and other resource constraints. Nonetheless, some discussion and analyses of such factors are essential in understanding the factors that affect China's trade balance. Hence, the conceptual framework developed for this study includes factors not only from economic perspective but also from social, cultural and

political perspectives. It is believed that all the possible key factors that affect China's trade balance should be examined, and in an integrated manner, rather than separately or independently.

Figure 4.1 An integrated multi-channel and multi-perspective framework for exploring key determinants of China's trade balance



*Abbreviation HCRS means "Household Contract Responsibility System" and SOE means "State Owned Enterprises".

Further elaborations follow as to why factors affecting China's trade balance need to be evaluated using a multi-channel and multi-perspective approach. From the supply-side, production factors such as labour, capital and technology are assumed to have a direct effect on export capacity. The institutional settings and transformations, such as the Household Contract Responsibility System (HCRS) and the State Owned Enterprises

(SOEs) reforms and household registration system (or hukou), are considered to have significant impacts on the accumulation of the “freeing labour” supply. After China's opening up in the early 1980s, FDI has not only brought valuable capital to invest in China, but also led to important transfers of technologies into China’s industries.

The exchange rate, which measures the relative price of the currency level between countries, is widely accepted as an important trade balance determinant in the literature. The relative labour cost is also considered to be a more accurate indicator for comparing long-term price levels across countries (Officer, 1982). Under the one-party political regime, the collective contract usually does not include wage negotiations. Wage and employment decisions of enterprises are constrained by guidelines issued by local governments and party authorities (Clarke *et al.*, 2004). The labour bargaining power must have been weakened. Clearly, this helps business owners to “save” money in their operations and hence products can be sold cheaply.

Higher domestic income positively affects the demand for foreign goods and services (which are imports) and subsequently exerts a negative impact on trade balance. The income of majority of Chinese ordinary workers is not high. Many of them barely survive with their income. Even worse, many of them have to save to protect them from unexpected events due to lack of adequate protection from social security. Thus, what has happened in China in the past couple of decades is that while domestic consumption is sluggish, residents’ savings have been fast rising. As such, China’s sluggish domestic consumption can have an important impact on the rise of its trade surplus.

The above discussion shows that those factors that can potentially affect China’s trade balance are complex and entwined. Some social, cultural and political factors may have very important impacts on China’s trade balance, though perhaps not all directly but indirectly through some economic factors; e.g., the deliberate discrimination against rural population through the institutional barrier of the household registration system leads to lower income of rural people which in turn contributes to the low domestic consumption. Chapter 5 is devoted to have a more comprehensive analysis of all those major social, cultural, political and economic factors that are likely to have an important impact on China’s trade balance. Limited by the availability of data on some non-economic factors (e.g., the cultural value that reflects saving preferences and the impact of political power on labour wage), it was not feasible to empirically evaluate the impacts of those identified

non-economic factors. Collecting such data through surveys and other kinds of field work is possible but requires many more extra resources, which is beyond the scope of this study. However, it is possible to econometrically verify those major economic factors so that their impacts on China's trade balance, the magnitude and direction, can be established. Before such empirical work is reported in Chapters 6 and 7, presented first in the next two sections are issues concerning the models, data, and estimation strategies to be used for the econometric analysis.

4.2 Econometric modelling

4.2.1 The standard model of trade balance

A commonly-used model of trade balance (Krugman & Baldwin, 1987; Rose & Yellen, 1989; Bahmani-Oskooee, 1991; Baharumshah, 2001) is derived as

$$M_{ij}^{d} = M_{ij}^{d}(RP_{mi}, Y_i) \tag{4.1}$$

where M_{ij}^{d} is the domestic demand for imports by country i from country j , RP_{mi} is the relative price of imported goods to domestically produced goods, and Y_i is the domestic real income.

A basic idea of this model, suggested by Johnson (1974), is that exports and imports can be viewed as "a real phenomenon governed by real incomes and relative prices operating through spending propensities and price elasticities of demand for exports and imports". Accordingly, the demand for imports by country i from country j depends upon the relative price and domestic real income, see Equation 4.1.

Let ER_{ji} be the nominal exchange rate, defined as the price of one unit of domestic currency in terms of foreign currency. Thus, a decline in ER_{ji} denotes a depreciation of the domestic currency. The relative price of imported goods can be expressed as:

$$RP_{mi} = \frac{P_{xj}}{ER_{ji} * P_i} = \left(\frac{P_j}{ER_{ji} * P_i}\right)\left(\frac{P_{xj}}{P_j}\right) = (RER_{ji})RP_{xj} \tag{4.2}$$

where P_{xj} is the original foreign currency price of foreign exports; P_i and P_j are the domestic (country *i*'s) price indices and foreign (country *j*'s) price indices of all the goods respectively; RER_{ji} is the real exchange rate, defined as $RER_{ji} = [(1/ER_{ji})(P_j / P_i)]$; RP_{xj} is the relative price of foreign (*j*'s) exports of foreign produced goods (the ratio between foreign currency price of exports and foreign price indices of all the goods). Substituting RP_{mi} from Equation (4.2) into Equation (4.1) gives the following equation:

$$M_{ij}^{d} = M_{ij}^{d}(RER_{ji} * RP_{xj}, Y_i) \tag{4.3}$$

Similarly, the foreign country's demand for imports depends upon the domestic relative export price and foreign real income Y_j :

$$M_{ji}^{d} = M_{ji}^{d}(RP_{xi} / RER_{ji}, Y_j) \tag{4.4}$$

Given that domestic exports equal foreign imports and vice versa, that is, domestic (*i*) country's supply of exports to foreign (*j*) countries X_{ij}^{s} equals demand for imports by foreign (*j*) country from domestic (*i*) country M_{ji}^{d} and vice versa:

$$X_{ij}^{s} = M_{ji}^{d} \tag{4.5}$$

$$X_{ji}^{s} = M_{ij}^{d} \tag{4.6}$$

Following Bahmani-Oskooee (1991; 2006), the balance of trade of country *i* with country *j* can be expressed as the ratio of exports over imports. The ratio of exports over imports or its inverse has been commonly used in empirical work because the ratio is not sensitive to the unit of measurement. In addition, the ratio can be logged regardless of whether there is a trade surplus or not. Therefore, the domestic balance of trade (*TB*) as the dependent variable can be expressed as:

$$TB_{ij} = X_{ij}^{s} / M_{ij}^{d} = M_{ji}^{d} / M_{ij}^{d} = M_{ji}^{d}(RP_{xi} / RER_{ji}, Y_j) / M_{ij}^{d}(RER_{ji} * RP_{xj}, Y_i) \tag{4.7}$$

Assuming the values of RP_{xi} and RP_{xj} are constant or stationary, Equation (4.7) can then be written as:

$$TB_{ij} = TB_{ij}(RER_{ji}, Y_j, Y_i) \tag{4.8}$$

Assuming a Cobb-Douglas functional form and taking natural logarithms of both sides, we obtain the following standard model of trade balance which consists of three explanatory variables, real exchange rate RER_{ji}, real foreign income Y_j and real domestic income Y_i:

$$lnTB_{ij} = \alpha_0 + \alpha_1 lnRER_{ji,t} + \alpha_2 lnY_{j,t} + \alpha_3 lnY_{i,t} + \varepsilon_t \tag{4.9}$$

where ε_t is an identically and independently distributed (i.i.d.) normal error term.

4.2.2 An extension of the standard model

In the standard TB model, the vectors of three explanatory variables are assumed to capture the effects of the macroeconomic variables on trade balance in a model. The real foreign income Y_j and real domestic income Y_i measure both the productive and absorption capacity of a country while the real exchange rate RER_{ji} represents the relative price. In this study, the standard TB model is extended to include two new variables, FDI and the unit labour cost, because these variables can better measure the productivity of China and the relative price effect.

The FDI variable is a potentially important determinant of China's trade surplus. It is expected to have positive impact on China's trade balance. Chinese FDI inflows are seen to be "export-oriented" and lead to a biased growth in exports and the accumulation of a trade surplus (Yu, 2007). The processing trade accounts for the largest part of China's trade surplus as the foregin firms set up their export bases in China to serve international demand. The positive link betwwen FDI and Chinese export have been empricially tested (see Liu *et al.*, 2001; Zhang & Song, 2001; Wang & Wan, 2008), but the literature on the direct link of FDI and Chinese trade surplus is rare. In addition, from the supply-side consideration, inward FDI directly affects the export capacity by increasing the factor supply; and indirectly it raises the productivity of the domestic capital stock associated with changing technology. Hence, the FDI variable is incorporated into the trade balance model to better measure the supply-side impact.

The unit labour cost is another important determinant we intend to incorporate into the econometric model. In the standard model, the real exchange rate is the only variable to capture the relative price level of two trading partners (see Equation 4.8). It fits well with

the Heckscher-Ohlin (H-O) theorem for trade pattern (Ohlin, 1933). However, it is unlikely that the real exchange rate fully captures the relative price difference. In a range of publications, attention has been focused on the unit labour cost as an important contributor to the price level (see for example Mehra, 1993; Arora & Blackley, 1996; Sbordone, 2002). Motivated by Houthakker (1962), the relative unit labour cost is taken into account in this study in order to determine the relative price effect and to reflect long-run prices (Officer, 1982). A number of authors including the International Monetary Fund have been using labour costs in addition to real exchange rates (Krugman, 1992; Desruelle & Zanello, 1997) to capture the relative price effect. There also have been some studies, carried out mainly by the central banks' economists, using or calculating unit labour costs in relation to competitiveness and exchange rates (see Salowski, 1982; Bart *et al.*, 2005). Indeed, the unit labour cost has been widely used for international comparison of price levels. For example, according to the IMF's explanation, a real effective exchange rate index can be calculated as a nominal effective exchange rate index adjusted in unit labour cost terms instead of price movements in the home country.

Aggregate Model

We specify an aggregate model based on the standard model of the trade balance (Equation 4.8) as follows. The estimation of this aggregate model uses China's overall trade balance data with the rest of the world.

$$lnTB_{ij,t} = \alpha_0 + \alpha_1 \ln REER_{i,t} + \alpha_2 lnY_{j,t} + \alpha_3 lnY_{i,t} + \alpha_4 lnFDI_{i,t} + \varepsilon_{ij,t} \qquad (4.10)$$

where $TB_{ij,t}$ denotes the trade balance of country i with the world in the year $t = 1,...,T$; j denotes the world; as the data on the unit labour cost of the world is not available, the real effective exchange rate based on the relative unit labour cost, namely, $REER_{i,t}$ is adopted to represent the relative price between China and the world; $Y_{j,t}$ and $Y_{i,t}$ are the income variables, which represent the production and absorption capacity of the world and China respectively; $FDI_{i,t}$ is FDI inflows in country i; $\varepsilon_{i,t}$ is i.i.d. random variables with zero mean and constant variance.

Disaggregate Model

At the disaggregate level, the relative size of a country compared to its trading partner, rather than the absolute economic factors, is expected to better determine the balance of bilateral trade. Hence, extending Equation (4.8) by incorporating the relative unit labour cost and FDI and using relative income instead of income variables, we obtain the following disaggregate model:

$$lnTB_{ij,t} = \alpha_0 + \alpha_1 lnRER_{ji,t} + \alpha_2 lnRLY_{ij,t} + \alpha_3 lnFDI_{ij,t} + \alpha_4 lnRLC_{ij,t} + \varepsilon_{ij,t} \qquad (4.11)$$

where $TB_{ij,t}$ indicates the bilateral trade balance of country *i* with its trading partner country *j* in the year $t = 1,...,T$; $RER_{ji,t}$ denotes the real exchange rate, defined as $RER_{ji} = [(1/ER_{ji})(P_j / P_i)]$; $RLY_{ij,t}$ denotes the relative income per capita of country *i* over its trading partner country *j* ; $FDI_{ij,t}$ denotes the utilized FDI inflows in country *i* from its trading partner country *j*; $RLC_{ij,t}$ denotes the relative labour cost, which is the ratio of the average labour cost per hour between country *i* and its trading partner country *j* ; $\varepsilon_{ij,t}$ is a random disturbance term.

China's bilateral trade balance data with its major trading partners are used in the estimation of this disaggregate model.

4.2.3 Variable construction and data acquisition

The data used for this analysis involves China and the rest of world (aggregate) and China and its major trade partners (disaggregate). Here we briefly describe how we construct the variables used in Equations (4.10) and (4.11).

TB is the dependent variable for both equations. The difference is that $TB_{ij,t}$ in Equation (4.10) represents country *i*'s overall trade balance with the rest of the world while in Equation (4.11) $TB_{ij,t}$ represents the bilateral trade balances between country *i* and each of its trading partners country *j*. The trade balance is measured as the ratio of export value to import value.

In the aggregate analysis (Equation 4.10), $REER_{i,t}$ is a weighted average of the exchange rates of home and foreign currencies, with the weight for each foreign country equal to its share in trade. $Y_{j,t}$ and $Y_{i,t}$ is proxied by GDP per capita of the world and GDP per capita

of China, respectively. FDI is inward FDI in China. The left panel in Table 4.1 shows the sources form which these data are acquired.

Table 4.1 Variables and Data Source

Variables for aggregate analysis	Data source	Variables for disaggregate analysis	Data source
$TB_{iw,t} = EX_{iw,t} / IM_{iw,t}$		$TB_{ij,t} = EX_{ij,t} / IM_{ij,t}$	
$EX_{iw,t}$	UNCOMTRADE	$EX_{ij,t}$	UNCOMTRADE, CEIC
$IM_{iw,t}$	UNCOMTRADE	$IM_{ij,t}$	UNCOMTRADE, CEIC
		$RER_{ji,t} = P_{i,t} * NEX_{ji,t} / P_{j,t}$	EIU Country Data
		$P_{i,t}$, $P_{j,t}$	EIU Country Data
$REER_{wi,t}$	EIU Country Data	$NEX_{ji,t}$	EIU Country Data
		$RLC_{ij,t} = ULC_{i,t} / ULC_{j,t}$	
		$ULC_{i,t}, ULC_{j,t}$	EIU Country Data
$Y_{w,t}$, $Y_{i,t}$	EIU Country Data	$RLY_{ij,t} = Y_{i,t} / Y_{j,t}$	
		$Y_{i,t}$, $Y_{j,t}$	EIU Country Data
$FDI_{i,t}$	CEIC	$FDI_{ij,t}$	CEIC

Source: UN COMTRADE, CEIC Macroeconomic Databases for Emerging and Developed markets, and EIU (Economist Intelligent Unit) Country Data.

For the disaggregate analysis, the real exchange rate is defined as $P_i * NEX_{ji} / P_j$, where P_i is the price level (measured by the CPI index) in country *i*; P_j is the price level (measured by the CPI index) in country *j*; NEX_{ji} is the bilateral nominal exchange rate (period average) defined as the number of *j*'s currency per unit of country *i*'s currency. $RLY_{ij,t}$ is the ratio of per-capita income between country *i* and country *j*, which is measured by real GDP per capita. The variable $RLC_{ij,t}$ is the ratio of unit labour cost between country *i* and country *j*, which is measured by the average labour cost per hour. The right panel of Table 4.1 shows the constitution of the variables and where the data are sourced.

4.3 Estimation strategies

To estimate Equations (4.10) and (4.11), the estimation process is as follows: (i) a detailed unit root test of the time-series data is undertaken to examine the stationarity of the data series and determine the order of integration, from which we check the validity of the regression estimation and perform the subsequent cointegration analysis; (ii) to test the presence of cointegration among the variables and ascertain whether the coefficients of the cointegration vector could be estimated; (iii) if the variables are cointegrated, the long-run and short-run elasticities are estimated.

Aggregate Analysis

Estimating Equation (4.10) involves using time series data. Before carrying out the estimations, it is necessary to choose the appropriate estimation techniques for the model and test for the characteristics of specification. Nelson and Plosser (1982) argue that almost all macroeconomic time series have unit roots. The presence or absence of unit roots helps to identify some features of the underlying data generating process of time series. A frequently used method to test for the unit roots is the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981).

The ADF test is based on the following model with intercept and time trend (Enders, 2010):

$$\Delta y_t = \mu + \beta t + \alpha y_{t-1} + \sum_{i=2}^{k} c_i \Delta y_{t-i+1} + \varepsilon_t \qquad (4.12)$$

where Δ denotes the first difference, y_t is the time series being tested for unit root, t is the time variable, and k is the number of lags added to the model to ensure that the residual (ε_t) is white noise, namely ε_t has zero mean, constant variance and uncorrelated with ε_s for $t \neq s$. The Schwarz Bayesian Criterion (SBC) is used to determine the optimal lag length (k) in Equation (4.12). The ADF model is primarily concerned with the estimation of α. The null hypothesis of the test is $\mathrm{H}_0 : \alpha = 0$ with the alternative being $\mathrm{H}_1 : \alpha < 0$. Under the null hypothesis, y_t contains a unit root. Therefore failing to reject the null hypothesis implies that the time series is non-stationary.

If the data series are non-stationary, they will be differenced appropriately to achieve the stationarity, which then can be analysed by a regression approach. The drawback of this

method is the possibility of losing the long-run information present in the variables. These problems can be overcome by applying the cointegration technique, which is able to estimate the long-run equilibrium relationship between two or more non-stationary series. A bounds testing approach or the autoregressive distributed lag (ARDL) model to cointegration developed by Pesaran *et al.* (2001) is adopted to analyse the long-run and short-run relationship between the trade balance and related variables.

The bounds testing is formulated by Pesaran *et al.* (2001) in a general vector autoregressive (VAR) model of order *p*, in z_t:

$$z_t = \alpha_0 + \beta t + \sum_{i=1}^{p} \theta_i z_{t-i} + \varepsilon_t, \quad t = 1,2,3,\cdots,T \tag{4.13}$$

where α_0 corresponds to a vector of drift (intercept) and β represents a vector of trend coefficients. z_t is a vector of variables that permits its elements to be purely I(1), purely I(0) or mutually cointegrated and ε_t is a vector normally distributed as $\varepsilon_t \sim N(0, \sigma^2 I)$, where σ^2 is the variance and I is an identity matrix. For simplicity, let z_t be the vector which consists of both y_t and x_t, where y_t is the dependent variable that must be I(1) and x_t is a set of regressors to form a vector matrix which can be either stationary in level I(0) or stationary in the first difference I(1).

In order to test the existence of cointegration among the variables, we extend Equation (4.13) to perform a conditional vector error correction model (VECM) as Equation (4.14):

$$\Delta y_t = \alpha_0 + \beta t + \delta_{yy} y_{t-1} + \delta_{xx} x_{t-1} + \sum_{i=1}^{p} \lambda_i \Delta y_{t-i} + \sum_{i=0}^{q} \ell_i \Delta x_{t-i} + \varepsilon_t, \quad t = 1,2,3,\cdots,T \tag{4.14}$$

where Δ is the first-difference operator. In this formulation, coefficient δ_{yy} and δ_{xx} contain the long-run multiplier, while coefficient λ_i and ℓ_i consists of the short-run dynamic of the VECM.

The cointegration test under the bounds framework of Pesaran *et al.* (2001) involves the comparison of the *F*-statistics against the critical values, which are generated for specific

sample sizes. The F-test statistic tests the joint significance of the coefficients on the one-period lagged levels of variables in Equation (4.14), that is, $H_0 : \delta_{yy} = \delta_{xx} = 0$.

Assuming that the cointegration among the variables exists, the long-run relationship model for y_t established in the conditional ARDL (p, q) can be expressed as follows (see also for example Duasa, 2007):

$$y_t = \alpha_0 + \beta t + \sum_{i=1}^{p} \lambda_i y_{t-i} + \sum_{i=0}^{q} \ell_i x_{t-i} + \varepsilon_t, \quad t = 1, 2, 3, \cdots, T \tag{4.15}$$

And the long-run and short-run dynamic parameters are obtained by establishing an error correction model associated with the long-run estimates:

$$\Delta y_t = \alpha_0 + \beta t + \upsilon ecm_{t-1} + \sum_{i=1}^{p} \eta_i \Delta y_{t-i} + \sum_{i=0}^{q} \mu_i \Delta x_{t-i} + \varepsilon_t, \quad t = 1,2,3, \cdots, T \tag{4.16}$$

where υ is the parameter of error correction term (*ecm*). In this model, the coefficients of the first-differenced variables $(\Delta \cdot)$ capture the short-run effect. Pesaran *et al.* (2001) suggest that for the limited annual data, the dynamic lags structure (*p, q*) is duly determined to a maximum of 2.

To ascertain the goodness of fit of the ARDL model, diagnostic and stability tests can be conducted. The diagnostic test examines the serial correlation, functional form, normality and heteroscedasticity associated with the model. The structural stability is conducted for testing the stability of regression coefficients.

Disaggregate Panel Analysis

In Equation (4.11), the analysis is based on China and its major trading partners which formed a balanced panel dataset that includes country, year, the bilateral trade balances, the real exchange rate, relative income, relative labour cost and FDI.

In estimating the model, we could face the problem of spurious regression for the non-stationarity of variables. To ensure valid results are produced by model estimations, we need first to check whether the variables are non-stationary and are integrated of order zero or otherwise. As discussed in the last section, the traditional unit root tests or cointegration tests (e.g., ADF or residual-based cointegration tests) suffer from the low

power problem for non-stationary data in a small sample size. In order to improve the power of the test, the number of observations should be increased. However, it is not feasible to find a longer time span for the variables of our interest for all the countries. Applying the panel data enables us to increase the number of observations, and subsequently the power of the tests. The tools for detecting the non-stationarity of the panel data are the panel unit-root tests developed by Levin *et al.* (2002) [LLC, hereafter], Maddala and Wu (1999) [MW, hereafter], Choi (2001) and Im *et al.* (2003) [IPS, hereafter]. We implement two panel unit root tests: the LLC and IPS tests. The LLC test starts from the following pooled ADF test regression:

$$\Delta y_{it} = a_i + \eta_i y_{it-1} + \delta_i t + \sum_{k=1}^{K_i} \theta_{ik} \Delta y_{it-k} + \varepsilon_{it}, \varepsilon_{it} \sim i.i.d.(0, \sigma_\varepsilon^2), i = 1,...N, t = 1,...,T \qquad (4.17)$$

The test allows for some degree of heterogeneity by including the country fixed effects a_i and country-specific deterministic (time) trends $\delta_i t$. The coefficients η_i are obtained by running a pooled OLS regression, $\eta_i = \eta$ for all the variables. We see that the LLC test is restrictive under the alternative hypothesis by assuming that the series follows the same autoregressive process for all cross units. This "drawback" is addressed by the IPS test, which is a group-mean test. To construct the IPS test, η_i is estimated for each cross unit individually before a group-mean test statistic and $\bar{t}$ is obtained through averaging the individual *t*-statistics. The IPS test results will be considered to be more important because this test allows for heterogeneity in the lag structure across the panel members while LLC assumes the homogeneous autoregressive root under the alternative.

Accordingly, to make sure that regression of the model is not spurious, the results of the panel cointegration tests need to be checked prior to the estimation. Based on the methods of Engle (1987), Kao (1999) proposes a residual-based test for the null hypothesis of cointegration in the panel data which allows for varying slopes and intercepts across units. The study of Pedroni (1997) is similar but also considers the individual specific constants and trends as well as the heterogeneous short-run dynamics. A weakness of their tests is that they assume the cointegrating vector to be unique for the long- and short-run adjustment processes. Their tests may suffer from the superimposed problem of the common factor restriction. To overcome this problem, Westerlund (2007)proposes four new tests with a null hypothesis of no cointegration by testing whether the error

correction term in a conditional error correction model (ECM) is equal to zero. The tests are more efficient than residual-based tests because they do not impose any common factor restrictions. The new cointegration tests are developed by using a basic error correction model as follows:

$$\Delta y_{it} = \delta_i' d_t + \alpha_i (y_{it-1} - \beta_i' x_{it-1}) + \sum_{j=1}^{p_i} \alpha_{ij} \Delta y_{it-j} + \sum_{j=0}^{p_i} \gamma_{ij} \Delta x_{it-j} + e_{it}, i = 1,...N, t = 1,...,T \qquad (4.18)$$

In this regression, the vector d_t contains the deterministic components (a constant and a linear time trend) and the parameter β_i is the cointegration vector which defines a long-run equilibrium relationship between x_{it} and y_{it}. Any deviation from this equilibrium leads to a correction by a proportion which is referred to as the error correction parameter α_i. If $\alpha_i < 0$, then there is error correction which implies that y_{it} and x_{it} are cointegrated. In our empirical analysis, imposing an invalid common factor restriction may result in this procedure having very low power in our sample. Therefore, we apply the error correction tests developed by Westerlund (2005) which are able to produce more powerful tests.

The last step in the estimation process is to determine the appropriate panel estimators. The dynamic ordinary least square (DOLS) and Fully Modified ordinary least square (FMOLS) estimators are adopted to estimate the long-run relationships among the cointegrated variables. The two specific estimators are chosen for two reasons. Firstly, they provide consistent estimates of the average cointegration slopes even if the slopes are in fact different across countries (2000; Pedroni, 2001). Kao (1999) studies a spurious regression in the panel data and shows that the ordinary least square (OLS) estimator is consistent for its true value, but the t-statistic diverges and its standard errors (SEs) are not valid. In order to construct valid t-statistics, several alternative estimation procedures such as FMOLS and DOLS estimation have been designed. Secondly, as the FMOLS and DOLS techniques control for potential endogeneity of the regressors and serial correlation, asymptotically unbiased estimates of the long-run relationship can be obtained (Banerjee, 1999). In this study, we employ between-group panel FMOLS and DOLS tests from Pedroni (2000; 2001). An important advantage of the between-group estimators is that the form in which that datum is pooled allows for great flexibility in the presence of heterogeneity of the cointegrating vectors.

Consider the original regression as follows:

$$y_{i,t} = \alpha_i + \beta_i x_{i,t} + \mu_{i,t} \tag{4.19}$$

where $x_{i,t}$ and $y_{i,t}$ are the variables that are said to be cointegrated with β_i which may or may not be homogeneous across *i* (Pedroni, 2000). The test statistics constructed from the within-group estimators are designed to test the null hypothesis $H_0 : \beta_i = \beta_0$ for all *i* against the alternative hypothesis $H_1 : \beta_i = \beta_A \neq \beta_0$, the value β_i is the same for all *i*. The test statistics constructed from the between-group estimators are designed to test the null hypothesis $H_0 : \beta_i = \beta_0$ for all *i* against the alternative hypothesis $H_1 : \beta_i \neq \beta_0$. That is, when the slope coefficients are heterogeneous, group mean estimators provide consistent point estimates of the sample mean of the heterogeneous cointegration vectors, while pooled within-group estimators do not. In our case there is no reason to believe that the cointegrating vectors are homogenous across China's major trading partners.

DOLS has been introduced by Saikkonen (1991) and Stock and Watson (1993) and extended to panel analysis by Kao (1997). In the DOLS framework, the long-run regression is augmented by lagged differences of the explanatory variables to control for endogenous feedback. The lagged differences of dependent variables is to account for serial correlation. A DOLS regression can be written as:

$$y_{it} = \alpha_i + \beta_i x_{it} + \sum_{j=1}^{p_i} \delta_j \Delta y_{it-j} + \sum_{j=0}^{q_i} \gamma_j \Delta x_{it-j} + e_{it}, i = 1,...N, t = 1,...,T \tag{4.20}$$

Equation (4.20) is run for the *i*-th panel member. Standard errors are computed using the long-run variance of cointegration residuals. Mark and Sul (2003) extend the single equation DOLS method and hypotheses testing for a cointegrating vector to the panel data context. The panel data DOLS estimator is obtained using a two-step procedure. First, the cointegration vector is estimated by applying the model with fixed effects, heterogeneous time trend and common-time effects. Then, the residuals are stacked and a pool regression is applied.

In the FMOLS case, the following cointegrated system for a panel of $i = 1,...N$ members is considered:

$$
\begin{aligned}
y_{i,t} &= \alpha_i + \beta x_{i,t} + \mu_{i,t} \\
x_{i,t} &= x_{i,t-1} + \varepsilon_{i,t} \\
\xi_{i,t} &= (\mu_{i,t}, \varepsilon_{i,t})'
\end{aligned}
\tag{4.21}
$$

where, $\xi_{i,t} = (\mu_{i,t}, \varepsilon_{i,t})'$ represents the vector error process which is conditioned to the long-run covariance matrix of the joint residual process; $x_{i,t}$ and $y_{i,t}$ are the variables that are said to be cointegrated for each member of the panel, with the cointegrating vector β if $y_{i,t}$ is integrated of order one; α_i denotes the term that allows the cointegrating relationship to include member specific fixed effects.

The group mean panel FMOLS estimator for Equation (4.21) can be written as:

$$
\hat{\beta}^*_{GFM} = \frac{1}{N} \sum_{i=1}^{N} \left[\frac{\sum_{t=1}^{T} (x_{i,t} - x_i) y^*_{i,t} - T\hat{\gamma}_i}{\sum_{t=1}^{T} (x_{i,t} - \overline{x}_i)^2} \right]
\tag{4.22}
$$

where, $y^*_{i,t} = (y_{i,t} - \overline{y}_i) - \frac{\hat{\Omega}_{21,i}}{\hat{\Omega}_{22,i}} \Delta x_{i,t}$ and $\hat{\gamma}_i = \hat{\Gamma}_{21,i} + \hat{\Omega}^0_{21,i} - \frac{\hat{\Omega}_{21,i}}{\hat{\Omega}_{22,i}} \left(\hat{\Gamma}_{22,i} + \hat{\Omega}^0_{22,i} \right)$

Here $\hat{\Omega}_i = \hat{\Omega}^0_i + \hat{\Gamma}_i + \hat{\Gamma}_i'$ is the estimated long-run covariance matrix of the stationary vector consisting of the estimated residuals from the cointegration regression and the differences in regressors. $\hat{\Omega}^0_{21,i}$ is the long-run covariance between the stationary error terms ($\varepsilon_{i,t}$ in Equation (4.17)) and the unit root autoregressive disturbance distances. $\hat{\Omega}^0_{22,i}$ is the long-run covariance among the difference in x_i. $\hat{\Gamma}_i$ is a weighted sum of the autocovariances. More details can be found in Pedroni (2001).

4.4 Summary

Having dealt with research methodological issues, the next three chapters report findings of this study. Presented first in Chapter 5 are some important determinants identified with the aid of the conceptual framework proposed in this chapter. The effects of some key economic factors on China's trade balance, empirically evaluated with aggregate analyses, are shown in Chapter 6); those with disaggregate analyses are presented in Chapter 7.

Chapter 5 Determinants of China's Trade Balance – a Multifaceted Perspective

This chapter identifies the key determinants of China's trade balance, from socio-cultural, political and economic perspectives. Section 5.1 discusses economic factors. Socio-cultural factors are discussed in Section 5.2, followed by the discussion of political-institutional factors in Section 5.3. Lastly, Section 5.4 concludes the chapter.

5.1 Economic factors

The theory of trade balance as well as the literature concerning economic determinants of trade balance in Chapter 3 point out that possible economic determinants of trade balance can be identified through three major channels: the supply-side channel, the relative price effect and the demand-side channel. Possible factors of trade balance affecting China's trade balance are examined along these three lines, i.e., (1) supply-side: accumulation process of production factors; (2) demand-side: income; and (3) relative price effect: exchange rate and labour wage.

5.1.1 A supply-side explanation

In this section, the supply-side factors behind export expansion are discussed. Since the late 1970s, economic reforms have reshaped the economic structure. Markets for production factors such as labour, capital and technology have also emerged and developed since then.

Labour supply, export capacity and trade surplus

Firstly, China's export expansion was assisted by the large supply of low-cost labour. China has entered into the world economy by exporting a massive range of labour-intensive products. Before the reform, China barely had any labour-intensive low-valued production. Following the Soviet model, heavy industries were promoted by price distortion and other administrative measures; limited capital could only be channelled to a few of such industries. During the 1970s, the success of rapid labour-intensive industrialization in its Asian neighbours provided incentives for China to rely on exports as the engine of economic growth and poverty reduction.

Because of the large supply of low-cost labour, there have been greater opportunities for output expansion through exporting goods that are intensive in unskilled labour. As Japan, South Korea, Taiwan and Hong Kong had become highly industrialized in the late 1970s, there were labour shortages, increasing land prices and the emergence of environmental protection that served to raise the cost of production in those economies. The relocation needs from these economics have made China a favourite site. China is also quite close to Hong Kong, Taiwan, South Korea and Japan. These regions areas also share a common Confucian cultural heritage.

China has shifted to a "comparative-advantage-following strategy" (Lin *et al.*, 2003) as a policy guide. A series of economic reforms led to the "freeing" of labour and increased agricultural productivity. A large unemployed labour force also emerged in non-agricultural sectors. As labour was relatively abundant, enterprises chose to use cheap labour instead of expensive capital (Lin *et al.*, 2003). A massive growth has been seen in China's assembly operation in the 1980s and 1990s, especially in recent years. China has strengthened its position as "the factory of the world", to which it imports parts and materials, processes or assembles them with high labour content, and then exports the final products.

Secondly, the potential supply of low-wage labour has largely eased the upward pressure on wage rates. The well-known Lewis model predicts that there will be a period of constant real wages of unskilled workers until surplus labour has been exhausted in agriculture. For illustrative purposes, we compare changes of China's rural population between 1960 and 2008 with other four economies in Table 5.1.

Table 5.1 Rural population changes

	Rural population (thousands)			Rural percentage (%)		
Year	1950	1980	2010	1950	1980	2010
China	485765	792851	681049	88.2	80.6	50.8
Brazil	34457	42030	30537	63.8	34.5	15.7
India	308484	538360	845839	83.0	76.9	69.1
Korea	15109	16212	8223	78.6	43.3	17.1
Thailand	17211	34762	45807	83.5	73.2	66.3

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2010 Revision and World Urbanization Prospects: The 2011 Revision.

At the start of the reform period, 81% of the total Chinese population remained in agriculture while the Soviet Union had 75% employed in industry at that time (Walder, 1996). The "household responsibility system" and land-contracting system introduced in the reforms have released farmers from the commune system (Howard, 1988). The surplus labour in rural areas was extracted to finance the industrial development in urban areas.

However, there is a restriction of labour migration, i.e., *hukou* system of household registration since the 1950s. The high industrial growth in China has not led to parallel growth of the urban population as it has in other countries. Compared to major increases in urbanization in Brazil and Korea, there was only moderate urbanization in Mainland China during the period 1950-2010. In 1950, the economies of China, Brazil, India, Korea and Thailand had more than half their populations in rural areas and the differences were relatively small. By 2010, when the rural population in Brazil and Korea was under 20%, rural population in China still exceeded 50%. Therefore, there is still a potential large labour supply in rural areas.

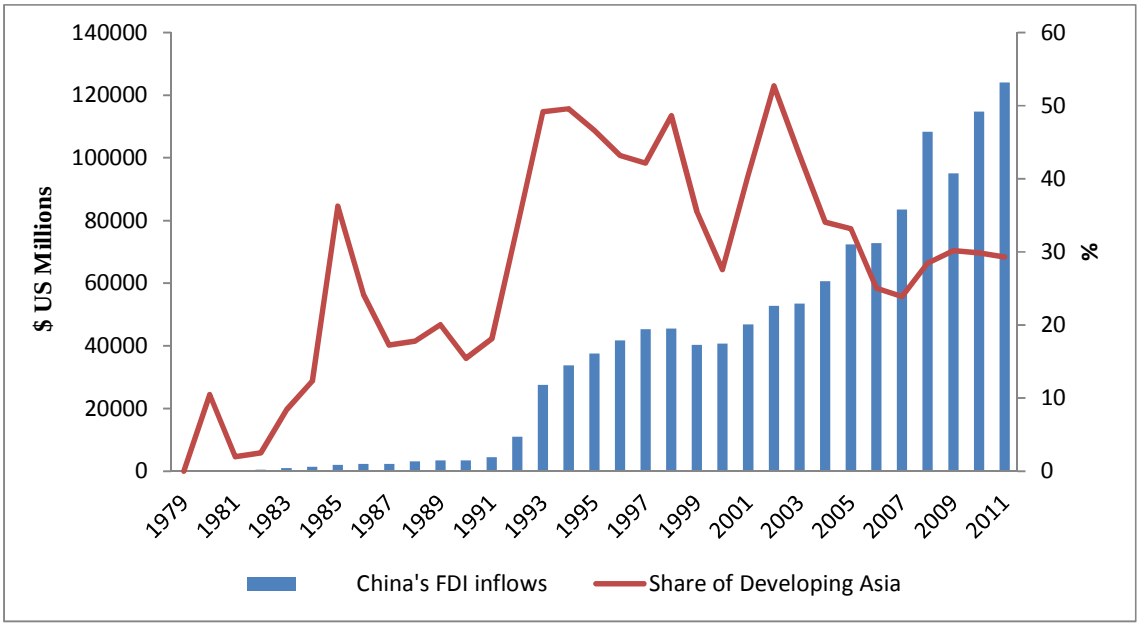
In addition, China's labour force grew from 443 million workers in 1980 to 813 million workers in 2009, according to EIU statistics. Since the late 1980s, there has been a sharp rise in the working-age population. Between 2005 and 2010, the working-age labour force stood at over 70%, and is favourable to sustaining a seemingly infinite labour supply.

Clearly, urban labour market reforms and rural-urban migration has added to the pool of labour supply. The potential labour supply, which has lowered the production cost and eased the upward pressure on wage rates, would have contributed to an improvement in export capacity and a growing trade surplus for China.

FDI inflows and trade balance

Since China launched the economic reforms and called for foreign capital participation in its economy in 1979, the country has attracted considerable international direct investment inflows. The abundance of low-cost labour and geographic advantage have made China very competitive when foreign investors consider relocating assembly productions. According to an OECD report (2000), actual FDI inflows into China from 1979 to 1999 amounted to US$306 billion, which is equivalent to 10% of direct investment worldwide and about 30% of the investment amount for all developing countries. Since the late 1990s, China has become the second largest FDI recipient country in the world and the largest among developing countries. China's share of developing Asia FDI rises from an annual average of 10% during the 1990s to 45% during the 2000s (see Figure 5.1).

Figure 5.1 China's FDI inflows and the share of developing Asia FDI



Source: UNCTAD (United Nations Conference on Trade and Development) Statistics Reports.

The question that we seek to answer is whether FDI inflows can shed light on the large increase in China's export capacity and thus trade surplus which has occurred in the past decade. Firstly, China's export expansion is accompanied by the increase in FDI and growing trade by foreign invested enterprises (FIEs) which have three main forms: equity joint ventures (EJV), cooperative joint ventures (CJV), and wholly foreign-owned subsidiaries (WFOS) (Huang, 2003).

Generally, FDI may affect the host country's exports through two channels. One is foreign investors utilizing local resources in the host country and searching for exports to other countries. The other is aimed at penetrating the local market (Demekas *et al.*, 2007). The former increases the host country's exports while the latter is less likely to export and FDI has little direct effect on the host country's exports. In China's case, FIEs are more engaged in export-processing. In the 1990s, the processing trade increased much faster than ordinary trade (Figure 2.4, Chapter 2). Over that period, FIEs have taken a major part in the rapid growth of processing trade. FIEs were responsible for 70% of China's import for processing and for 66% of its processed exports, due to their access to technology and experience in organizing labour-intensive production for re-export. Compared to domestic firms, FIE firms are more biased towards labour intensive industries and concentrated in export-oriented industries. For example, in the manufacturing sector, FIE firms have shown an apparent tendency to export. On average, nearly 40% of the FIE firms' sales were exported while less than 10% of the Chinese domestic firms' sales were exported.

The data presented in Table 5.2 indicate that FIEs have been responsible for over half the improvement in China's trade performance. During the early 1980s, the share of FIEs in export was negligible. Since the mid-1980s, the contribution of FIEs in export expansion increased dramatically. In the 1990s, trade by FIEs accelerated and their share in China's total export enlarged rapidly; reaching 16.8% in 1991 and 45.5% in 1999. This share further increased to 50.1% in 2001 and 52.4% in 2011.

Table 5.2 China's total trade and trade by FIEs (US$ billion, %)

Year	Total Trade		Trade by Foreign-Invested Enterprises			
	Export	Import	Export		Import	
			Amount	Share %	Amount	Share %
1980	18.1	20.0	0.01	0.1	0.03	0.1
1981	22.0	22.0	0.03	0.1	0.11	0.5
1982	22.3	19.3	0.05	0.2	0.28	1.5
1983	22.2	21.4	0.33	1.5	0.29	1.4
1984	26.1	27.4	0.07	0.3	0.40	1.5
1985	27.4	42.3	0.30	1.1	2.06	4.9
1986	30.9	42.9	0.58	1.9	2.43	5.7
1987	39.4	43.2	1.21	3.1	3.12	7.2
1988	47.5	55.3	2.46	5.2	5.75	10.4
1989	52.5	59.1	4.91	9.3	8.80	14.9
1990	62.1	53.3	7.81	12.6	12.31	23.1
1991	71.9	63.8	12.05	16.8	16.91	26.5
1992	84.9	80.6	17.36	20.4	26.37	32.7
1993	91.7	104.0	25.24	27.5	41.83	40.2
1994	121.0	115.6	34.71	28.7	52.93	45.8
1995	148.8	132.1	46.88	31.5	62.94	47.7
1996	151.0	138.8	61.51	40.7	75.60	54.5
1997	182.8	142.4	74.90	41.0	77.72	54.6
1998	183.7	140.2	80.90	44.0	76.72	54.7
1999	194.9	165.7	88.63	45.5	85.88	51.8
2000	249.2	225.1	119.44	47.9	117.27	52.1
2001	266.1	243.6	133.24	50.1	125.86	51.7
2002	325.6	295.2	169.99	52.2	160.25	54.3
2003	438.2	412.8	240.31	54.8	231.86	56.2
2004	593.3	561.2	338.61	57.1	324.57	57.8
2005	762.0	660.0	444.18	58.3	387.46	58.7
2006	969.0	791.5	563.83	58.2	472.62	59.7
2007	1220.5	956.1	695.37	57.0	559.79	58.5
2008	1430.7	1132.6	790.49	55.3	619.43	54.7
2009	1201.6	1005.9	672.07	55.9	545.40	54.2
2010	1577.8	1396.2	862.66	54.7	737.74	52.8
2011	1898.6	1743.5	995.65	52.4	864.81	49.6

Source: General Administration of Customs, China.

Secondly, FDI inflows have led to important transfers of technology which has a major impact on a country's productivity. Productivity growth, as a supply-side factor, is likely to have a positive impact on the balance of trade. Direct technology transfer from

Multinational Corporations (MNCs) to local FDI-receiving firms enhances overall industry performance (Egger & Pfaffermayr, 2001). The presence of Multinational Corporations (MNCs) also generates spillovers to the host country firms through the market competition (Caves, 1974; Sun, 2009). The importance of FDI on China's productivity growth and economic performance since the implementation of its open-door policy has been extensively discussed in the empirical literature (Kueh, 1992; Chen *et al.*, 1995; Egger & Pfaffermayr, 2001; Liu, 2002; Wei & Liu, 2006; Sun, 2010; Sun, 2012). By transferring new technologies and know-how to Chinese domestic firms, the intensity of FDI inflows is positively correlated with labour productivity; however, Western and Japanese invested firms seem to play a greater role in productivity spillovers than overseas Chinese firms from Hong Kong, Taiwan and Singapore regions. Western and Japanese investments have their brand names and sophisticated technology. The continuous refinement of their products, markets and shorter product cycles has created more technology and market access spillovers. Therefore, average labour productivity and technical efficiency in Western and Japanese invested firms are higher than those in overseas Chinese invested firms in China (Huang, 2004). However, as early entrants into the Chinese market, overseas Chinese investors have taken advantage of cultural familiarity and social ties, greatly shortening the learning process and assimilation of new technology and managerial know-how.

Beginning in 1992, further reforms were taken that led to a surge in FDI inflows. The pattern of FDI inflows has also undergone significant change (Zhang & Zheng, 1998). Some researchers note that some MNCs have initiated a structural adjustment in the form of reallocation of resources from labour-intensive to more capital-intensive sectors. For example, Taiwanese SMEs (small and medium enterprises) have shifted from traditional sectors, such as garments and footwear, to informatics industries and electronic goods, particularly personal computer components and peripherals (Smart & Hsu, 2004). The presence of FIEs with higher capital intensity has indicated higher technology content in the production process.

Thirdly, FDI inflows have directly contributed to capital formation of China's export-processing industries and also greatly influenced local industrial structure. A major proportion of FDI has gone into the manufacturing industry for export processing, taking up almost 71.0% of the total utilized FDI by 2004. Through Greenfield investment, the

entry of MNCs has immediately increased the number of firms in this industry. Before 1978, the State adopted the accumulation strategy of developing heavy industry which was in conflict with China's reality, with its scarce capital and abundant labour. Since the 1980s, the increasing participation of foreign capital has been an important element in the development of China's industry. With practically no presence before 1978, foreign-funded enterprises accounted for over 20% of total industrial outputs between 2000 and 2010.

The pattern of FDI inflows from different origins also helps explain how China's trade surplus accumulated. Based on different types of foreign investment motivations, the efficiency-seeking investments by Hong Kong and Taiwanese firms are mainly labour-intensive and export-oriented while market- and resource-seeking Japanese investments tend to be of higher value-added (Fetscherin *et al.*, 2010). Western transnational corporation (TNC) investment is more likely to concentrate on gaining access to the domestic market. On the import side, FIEs from Asian countries mainly import intermediate goods which are to be processed and re-exported. The importing commodity composition does not reflect their capacity to enter the domestic market but the fact that China has become a production base for parent companies to relocate segments of production. In contrast to FIEs from Asia, FIEs from EU and North America mainly follow a strategy aimed at the local market, as they have only a relatively small share of China's imports and their products are more capital intensive.

Therefore, FDI inflows, which directly increase capital supply and indirectly bring technological spillovers, have greatly improved the production capacity of labour-intensive export industries and thus would have most likely contributed to China's widening trade surplus.

5.1.2 Relative price effects

Many researchers argue that China's growing trade surplus originates in its exchange rate policy, which artificially depresses the value of the Chinese currency. Others assert that the surplus of rural labour supply has largely eased the upward pressure on wage rates. The labour supply allowed China to develop with an "unlimited" labour supply for a much longer period than other Asian countries. This section discusses the relative prices of exports and imports, taking into account the exchange rate and labour wages.

Exchange rate and trade balance

China's exchange rate is tightly managed by the government. Since 1978, in line with its foreign trade reforms, China's foreign exchange reforms have aimed to favour export through a dual-exchange rate system and devaluation of the Renminbi (RMB). These reforms were a means of promoting exports and the balance of trade in the 1980s and early 1990s. At the beginning of 1994, the unification of China's two exchange rates in the country's exchange rate regime led to a "more flexible" exchange rate system. In 2005, the government switched from the dollar peg to a basket peg, allowing the currency to float more freely.

This heavily managed exchange rate system has been criticized for maintaining an undervalued currency to promote exports. The revaluation of the exchange rate is expected to correct China's trade imbalance, to some extent at least (see Goldstein, 2004; Chang, 2007). So far, there have been numerous studies evaluating the impact of the exchange rate on China's trade balance, but their empirical results remain mixed. Further study is clearly warranted to add our understanding about the impact of the exchange rate on China's trade balance and the likely effectiveness of exchange rate appreciation to rebalance China's trade surplus.

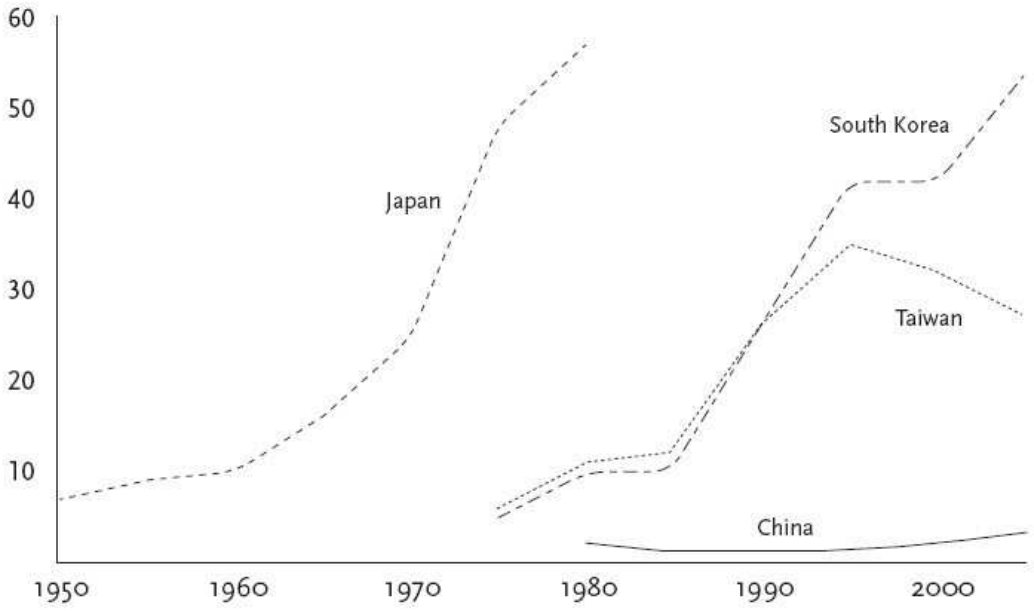
Stagnant labour wage and trade balance

The abundant labour supply leads to a low equilibrium wage rate in the labour market, which in turn results in higher profits, *ceteris paribus*. Higher profits attract further domestic and international investment, leading to a rising cycle of expanded production and higher exports, contributing to the rise in trade surplus.

Clearly, higher production would lead to higher demand for labour. Hence, it is likely that there will be some upward adjustment of exports, contributing to the rise in trade surplus. However, current labour supply situation plus the efficiency of some other policies do not favour workers in wage bargaining, as will be further discussed in Section 5.3.3. Figure 5.2 presents a comparison of labour wages between China and other East Asian economies. The manufacturing wage rate has remained at 1% of the US wage rate for the past three decades, whereas the manufacturing wage rate has risen sharply in Japan, Taiwan and South Korea within a decade or two during earlier phases of manufacturing-

led industrialization. The stagnant labour wage lowers production costs, compared with other countries, and therefore improves trade balance.

Figure 5.2 Manufacturing wage as a percentage of US wage: China and other East Asian economies



Source: US Bureau of Labour Statistics, Foreign Labour Statistics (Japan and Asian Tigers), China Statistical Yearbook (Hung, 2009).

5.1.3 Demand-side considerations: consumption constraints

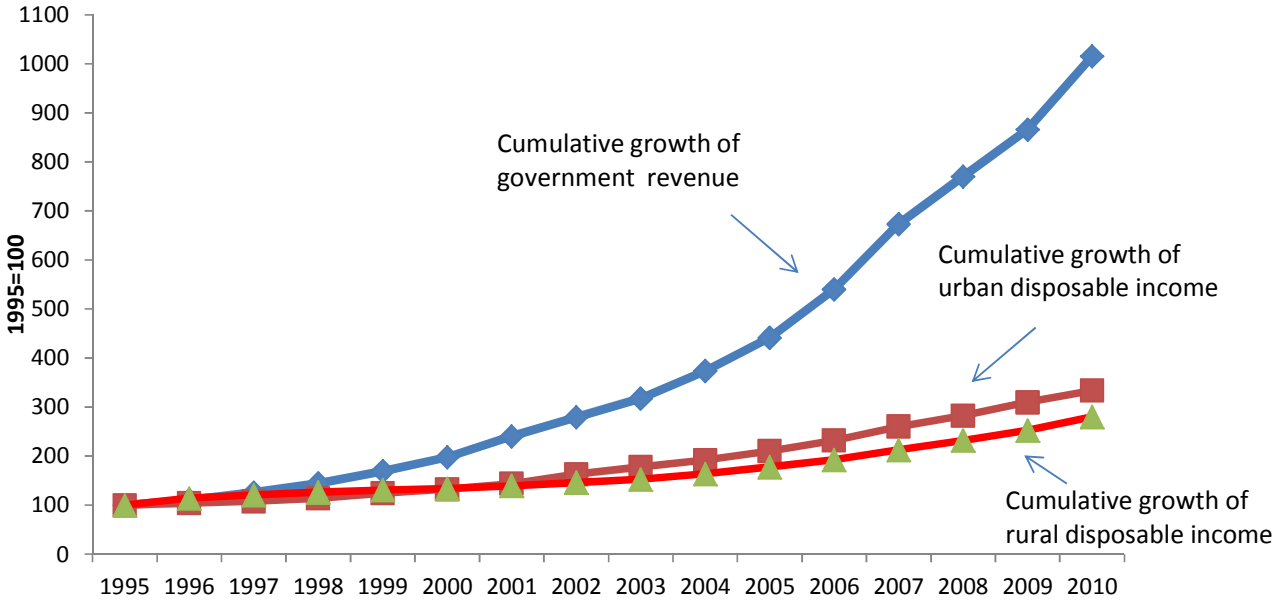
Although China's import demand has been growing rapidly in the past decades, growth is not as fast as export expansion. As a result, China's trade surplus has maintained at a high level of over $20 billion dollars in recent years. The Chinese authorities have called for rebalancing the trade account and the economy towards greater reliance on domestic consumption. Domestic consumption is expected to be the main driver of growth and a way to reduce the country's exposure to future external shocks (Yu, 2011). However, there is a trend of continuing decline in the share of private consumption in GDP. The statistics shows that China's private consumption as a share of GDP has declined from 50.8% in the early 1980s to 34.9 % in 2010. Government consumption, labour share of income and income inequality are likely to have the biggest impact on declining private consumption.

Government consumption crowds out household consumption

The total output is consumed by three sectors: public sector (government), corporate sector and households. Household consumption is generally expected to account for a major share. However, not properly controlled government consumption is likely to crowd out household consumption and private investment. The negative response of private consumption to government consumption has been predicted by the Real Business Cycle (RBC) model (Aiyagari *et al.*, 1992; Baxter & King, 1993; Edelberg *et al.*, 1999) and the New-Keynesian dynamic general equilibrium (DSGE) model (Coenen & Straub, 2005).

In China's case, to finance growing government consumption, the government has had to increase revenue through measures such as raising the tax rate, which can be easily implemented in a one-party political regime. The government's revenue collection inevitably decreases disposable income in the private sector. According to official statistics from NBS (National Bureau Statistics), China's fiscal revenue grew 24.8% year-on-year to hit a record-high 10.37 trillion yuan (1.64 trillion U.S. dollars) in 2011, compared with 9.2% growth in its GDP. Calculated by Chen (2012), inflation-adjusted government fiscal revenue increased 5.7 times from 1995 to 2010 (see Figure 5.3). In contrast, over the same period, the cumulative increase was 1.6 times for urban residents' per capita disposable income and 1.2 times for rural peasants' per capita income. These data indicate that a substantial amount of the GDP has been consumed by the government. The significant increase in government consumption has contributed to a rising aggregate demand. However, the government revenue has taken a larger share of GDP and crowded out the household consumption and private investment. This is clearly does not help increase China's domestic consumption and does not help reduce the pressure to export.

Figure 5.3 Government revenue, urban and rural per-capita disposable income



Source: Chen (2012).

Declining labour share of income constrains private consumption

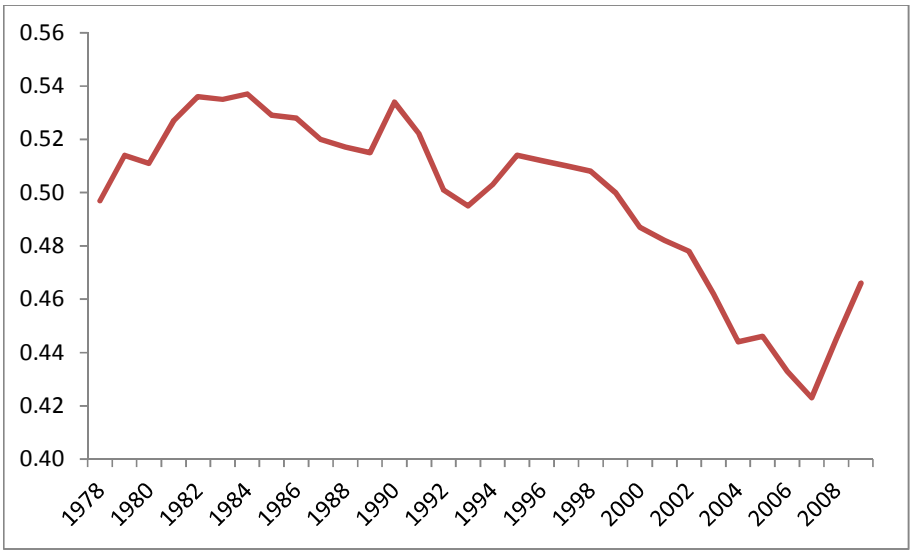
The share of household disposable income in GDP has fallen sharply in recent years. Since labour income (wages, salaries and benefits) is the main source of China's household income, the failure of workers to capture productivity gains and the decline in the labour share of income may help explain the declining household income share of GDP, which in turn lead to consumption declining.

Typically in most countries, the distribution of income between labour and capital is relatively stable over time. This stylized fact has been expressed in the textbook of Barro (1995) as "*The shares of labour and physical capital in national income are nearly constant*". If we take the United States as an example, the share of the economic pie going to workers has been fluctuating around a long-run value of approximately two-thirds in the post-war period (Subramanian, 2008). As Young (2010) points out, the long-run offsetting shifts in goods industry versus service industries have led to relatively stability in aggregate labour's share of national income.

However, since China's opening up, the labour share of national income has been declining. Figure 5.4 plots the movement of labour share, which is the ratio of labour

compensation to gross national income (GNP). From 1978 to 1984 the labour share increased slightly, then fluctuated but decreased dramatically from 1995 to 2007. Although the trend has been arrested since 2008, it is still way below the earlier levels. Therefore, the declining labour share of national income presents a significant constraint on domestic consumption.

Figure 5.4 China's labour share of national income, 1998-2009



Source: based on estimates from Qi (2011).

Effects of income disparity on private consumption

Wealth inequality is considered to have a negative effect on both household consumption and national consumption growth rates (Ravallion, 1998). There is an inverse "U-shape" relationship between marginal propensity of consumption and disposable income (Yang & Zhu, 2007). China's economic expansion implies a rise in income for all households, but not by an equitable manner. Income allocation has a significant impact on China's private consumption.

Firstly, the market economy has not only brought with it the income redistribution effect, but also significant income inequality among individuals. The transition from planned to market economy has resulted in a shift in wage bargaining power among different groups of workers. During the transition, the political position has been an important asset in raising personal income and/or the value of firms. In rural areas, local officials are at advantage for acquiring the land, approving contracts and operating private businesses for

profit. Economic expansion has provided two sources of political advantage that the cadres can obtain: cadre salaries and bonuses, and the ability of cadres to obtain high-salaried positions for their family members. Compared to "ordinary" households that are primarily engaged in agriculture, cadre advantages are substantial. The income of rural cadres has kept the pace with high levels of economic expansion. Moreover, positions with high salary are monopolized by cadres, cadre household members or their relatives and friends (Walder, 2002).

In the urban economy, managers of state-owned enterprises who possess business resources and government support had fared better. The disbursement of government investment has created enormous opportunities for such people who are able to "rent seeking", giving rise to the wealth gap in urban China. The high income group is estimated to earn up to 65 times more than the low income group, and "grey income" (a term that describes gains above normal earnings) is the main reason that such a huge difference appeared (Wang, 2007). The concentration of hidden income in high-income groups demonstrates that income distribution disparity is not simply caused by market reform but also by institutional problems, as grey income is largely obtainable only by government officials with power.

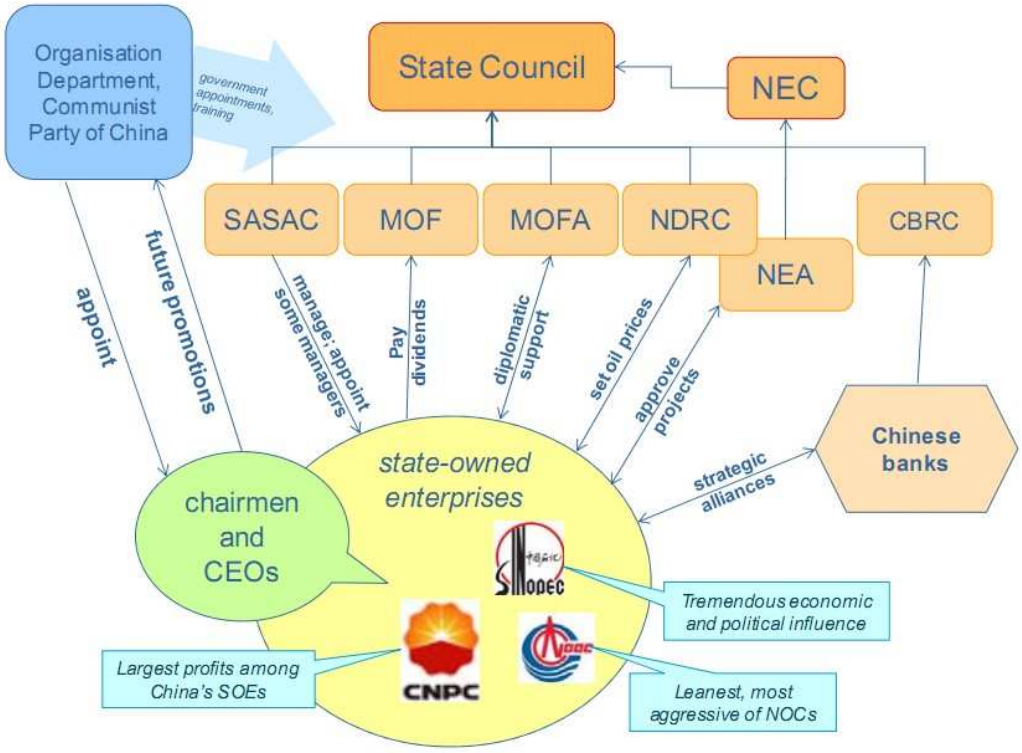
Secondly, urban-rural income disparity has played a critical role in depressing aggregate demand. The persistent urban-bias policies, e.g., the *hukou* system which restricts labour mobility, agricultural price policy and procurement policy, have fostered a segmented labour market. Although many developing countries have a clear urban-rural income division, China's urban-rural income inequality is much more serious. In the past decade, the intra-rural Gini and intra-urban coefficients have been below 0.38 and 0.34, respectively. However, the average national Gini coefficients estimated are 0.46 in the 2000s (Chen *et al.*, 2010). The national Gini coefficient is much larger (more than 10%) than either intra-urban or rural groups. Urban-rural income inequality has been regarded as a key reason for China's sluggish domestic consumption and especially the still very low level of rural income, leading to more products being exported at low prices, contributing to trade surplus.

Thirdly, the government owned enterprises make up a high proportion of the national economy. Taking political advantages, the economic role of SOEs remains large, especially in "strategic industries". They are granted monopolies or oligopolies, with

private sector participation prohibited by policy. While remaining relatively inefficient, their expansion, especially in the aftermath of the global financial crisis, has further squeezed the space of non-state sectors and significantly contributed to the high level of income inequality (Tong & Huang, 2012).

The Chinese government continues to exert significant influence over the operations of SOEs. The State Assets Supervision and Administration Commission (SASAC, Figure 5.5), which hold shares of these SOEs, supervises and manages the behaviour of SOEs. In certain sectors, e.g., oil, telecommunication and transport equipment, both CNPC and Sinopec are at the ministry level in the Chinese government's bureaucratic ranking system. The Communist Party of China directly appoints the top executives of the National Oil Companies (NOC) who hold vice-ministerial rank (Jiang & Sinton, 2011). The executives of these SOEs are party members first and company "people" second. They care more about pleasing their party bosses than about business operations. Meanwhile, the "red princelings" (the descendants of prominent and influential senior officials of China), taking the political legacy from their parents, have occupied important positions of SOEs, e.g., Li Xiaopeng, the son of the former Premier and ex-Politburo member Li Peng, is the chairman of *Huaneng* Power Group; Li Xiaolin, the daughter of Li Peng, is president of China Power International; Zhu Yunlai, the son of the former Premier Zhu Rongji, is the executive director of China International Capital Corporation Limited (CICC). As such, a large sum of economic rent has been obtained by a small number of those SOEs with monopoly power.

Figure 5.5 Relations between SOEs and government in China



Notes: NEC = National Energy Commissions; SASAC = State Assets Supervision and Administration Commission; MOF = Ministry of Finance; MOFA = Ministry of Foreign Affairs; NDRC = National Development and Reform Commission; NEA = National Energy; NOC = National Oil Companies.

Sources: Naughton (2008) and Jiang and Sinton (2011).

In addition, SOEs have long benefited disproportionally from policy stimulus and are crowding out private enterprises. Lower tax rates are applied to reward such firms for undertaking investment, procuring goods and services, and performing other activities that market incentives alone would not support. Many SOEs and subsidiaries are beneficiaries of preferential tax rates. For example, the amount of premium tax for Sinopec Corp. and China Telecom in 2010 were RMB 1.5 billion and RMB 47 million, respectively (Sozamosszege & Kyle, 2011). The government also provides certain SOEs with preferential access to low-cost capital. State-owned and controlled banks, the Big Four commercial banks, namely, the Bank of China (BOC), the China Construction Bank (CCB), the Agricultural Bank of China (ABC), and the Industrial and Commercial Bank of China (ICBC), and three policy banks, namely, the State Development Bank, the Agricultural Development Bank, and the Import Export Bank, have provided significant

benefits to central and sub-national SOEs (Sozamosszege & Kyle, 2011). The SOEs, despite some of them having low levels of profitability and being less productive, still enjoy access to financial resources at favourable interest rates.

Hence, taking the political advantages, the SOEs obtained monopolies in highly profitable industries. Retained profits by SOEs only benefit managers and employees in these firms, not the general public who are their true owners. To boost domestic consumption, it is essential to address such bias in income distribution between SOEs and households. Collecting dividends from SOEs to fund social welfare systems or direct income transfers to low-income families will reduce gross national saving rate and boost the private consumption, thus, helping correct the excessive trade surplus.

5.2 Socio-cultural factors

Socio-cultural factors play a significant role in shaping the process of economic activities, institutional changes and policy making. To understand the causes of China's trade surplus, some important socio-cultural factors and their influence on (1) the accumulation process of production factors (labour and FDI) which contribute to export capacity; and (2) the saving and consumer behaviour that leads to consumption constraints are analysed in this section.

5.2.1 Social ideology, social structure and labour supply

For over 2000 years, China adhered to a system for maintaining the order of a hierarchical society, in which subordinates were required to do the bidding of their superiors according to Confucian tradition standards. As stated by Ogden (2003), "*the Chinese people seem to have been more willing to make sacrifices for the strength of the national community rather than for their own individual freedom*". Equality for a Confucian is "*expressed through complementarity and harmony*" (Moody, 1988). Since the ethical sacrifices to the collective in Confucian heritage have taken root in Chinese belief, the Chinese do not easily grasp the Western democratic notion of "all men are created equal". Even in Mao's era, Confucian values dominated. Ordinary people are more likely to seek collective recognition, and an individual's value is derived from the value of the national community. Social networks were highly developed in the collective working units, *danwei,* which organized China's urban population or in communes for workers in rural areas. The state-party exerted control over social ideology and lives of individuals

(Guthrie, 2006). Individuals relied heavily on the collective work units within which most of their social interactions occurred.

With the coming of economic reforms and de-collectivisation, the structure of China's society has been changing, transforming from a traditional agrarian society into an industrial society (Skinner, 1964). China's old social fabric described by Hsiao (2003) as "*a top-down centralized chain of command from the party hierarchy to each work unit and down to the family and the individual*" has substantially changed. In rural areas, the household contract responsibility system (HCRS) brought an end to the rural commune system established in Mao's era (Wan *et al.*, 1988). Under the new system, the household was restored to function as the basic producing and accounting unit of decision-making within a collective structure of land ownership (Patnaik, 1987). The farmers are provided with more economic opportunities and choices than obtained in the pre-reform era. They are able to make their own economic decisions and migrate to other areas to find new employment when necessary. In urban areas, under Maoist ideology, the SOEs were intended to be not merely an organization for production but an economic community that provided most of the social services its members needed. That the state and the SOEs were seen as having such responsibility has been a core social value and the Chinese people have also developed deep collective expectations (Lee, 2000). As reforms intensified and accelerated, the phenomenon called "Xia Gang", sudden layoffs of urban workers, occurred in those bankrupted, merged or closed-down SOEs. A large number of workers have been laid off since the 1990s. The surplus workers have, in effect, been released from the SOEs to the labour market.

5.2.2 Social networks and FDI inflows

Economists typically assume that China's low-cost labour, favourable government policies and large market potentials have attracted a large number of foreign investors and foreign-invested enterprises (FIEs) that concentrate on export-intensive activities. But in the real FDI activities, especially during the early reform period when China took on a high level of risk and strategic ambiguity, *guanxi* or social relationships also played a key role.

During this era of the 1980s and the early 1990s, the early overseas Chinese investors were portrayed as not only pursuing profit, but also motivated by patriotism and

obligation. Cultural similarity and social connections have largely reduced the problems posed by China's contradictory political goals and strategic ambiguity (Hsing, 1998; Chen, 2000). On the other hand, to attract investment from overseas Chinese, special economic zones (SEZs) were located in areas that are close to Hong Kong, Macau and Taiwan.

Because of cultural similarities (shared culture and language), social connections (ability to form trustworthy relationships) and geographic advantage, more than half of the total FDI inflows are from ethnic Chinese outside Mainland China: Hong Kong, Macau, Taiwan, and overseas Chinese in Southeast Asia and elsewhere. Hong Kong and Macau have been part of the People's Republic of China (PRC) since 1997 and 1999 respectively, but they are still administered as Special Administrative Regions under the 'one country, two systems' policy.

According to Ministry of Commerce statistics, utilized FDI inflows between 1979 and 1999 amounted to a total of $307.6 billion, of which Hong Kong accounted for $154.8 billion, half of the total, and Taiwan for $23.86 billion, nearly 8%. Hong Kong has remained the most important source for FDI inflow in Mainland China. The share of Hong Kong investment utilized in total FDI inflows decreased during 2002-2006, but increased to 44.8% during 2007-2010 (Table 5.3). In 2010, the actual utilized FDI from Singapore has become the second largest overseas investment source to China, ranking only behind Hong Kong.

Table 5.3 Utilized FDI in China by major source economies (US$ millions, %)

Source Countries	Year 1997-2001		Year 2002-06		Year 2007-10	
	Amount	Share	Amount	Share	Amount	Share
Asia	**147534**	**67.5**	**175096**	**56.1**	**236699**	**60.4**
Hong Kong	87720	40.1	92741	29.7	175381	44.8
Taiwan	14080	6.4	14753	4.7	8029	2.1
Singapore	12969	5.9	10869	3.5	16653	4.3
South Korea	8862	4.1	22520	7.2	12206	3.1
Japan	17964	8.2	25823	8.2	15304	3.9
North America	**22516**	**10.3**	**24046**	**7.7**	**15039**	**3.8**
United States	20171	9.2	19490	6.2	11133	2.8
Canada	1723	0.8	2644	0.8	2436	0.6
Europe	**22794**	**10.4**	**24474**	**7.8**	**21264**	**5.4**
United Kingdom	6293	2.9	4122	1.3	3134	0.8
Germany	5357	2.5	6352	2.0	3740	1.0
France	3459	1.6	2834	0.9	2936	0.7
Netherlands	3240	1.5	3992	1.28	3135	0.8
Total	**218632**	**100%**	**311999**	**100%**	**391633**	**100%**

Sources: Ministry of Commerce, China, CEIC database. Percentages are calculated by the author.

In the context of policy and regulatory uncertainty, overseas Chinese investors have more knowledge to respond to changes in market demand and minimize production costs (Smart & Hsu, 2004). Unlike the market-seeking FDI from Western transnational corporations, the efficiency-seeking investments by Hong Kong and Taiwanese firms are mainly labour-intensive and export-oriented (Fetscherin *et al.*, 2010). Because of the cultural familiarity and social connections, overseas Chinese investors are more likely to negotiate at the lower level of the government hierarchy and operate the enterprises in the countryside with lower production costs.[5]

[5] A typical example is the investment from Foxconn, a Taiwan-based company. All iPhones and iPads sold in the global market are assembled by Foxconn. To secure contracts with Apple and lower production costs, this Taiwanese company has gradually relocated most of its labour-intensive assembly lines to Mainland China. The parts and components used for i-product are produced in Japan, the U.S. and other countries and then shipped to China for assembling and processing into final products.

5.2.3 Demographic structure, social welfare system and saving behaviour

Since 1989, the household saving rate has been rising steadily. High savings rates lead to trade surplus. China's saving rate continued to increase over the last decade and this is another major factor underlying the Chinese trade surplus.[6] In 2009, household savings has surpassed 27% of GDP. This figure is high compared to the international experience (12.4% in Japan and 10.8% in EU), and is also high in comparison to China's savings rate in earlier periods. Some cultural factors, such as personal thriftiness, the extent of risk-aversion, family traditions that raise savings for their son in response to rising pressure in the competitive marriage market (Wei & Zhang, 2009), partly explain China's high savings. We would like to suggest that the key to this saving puzzle is a combination of demographic structure changes and the social security system.

Demographic factors and household savings

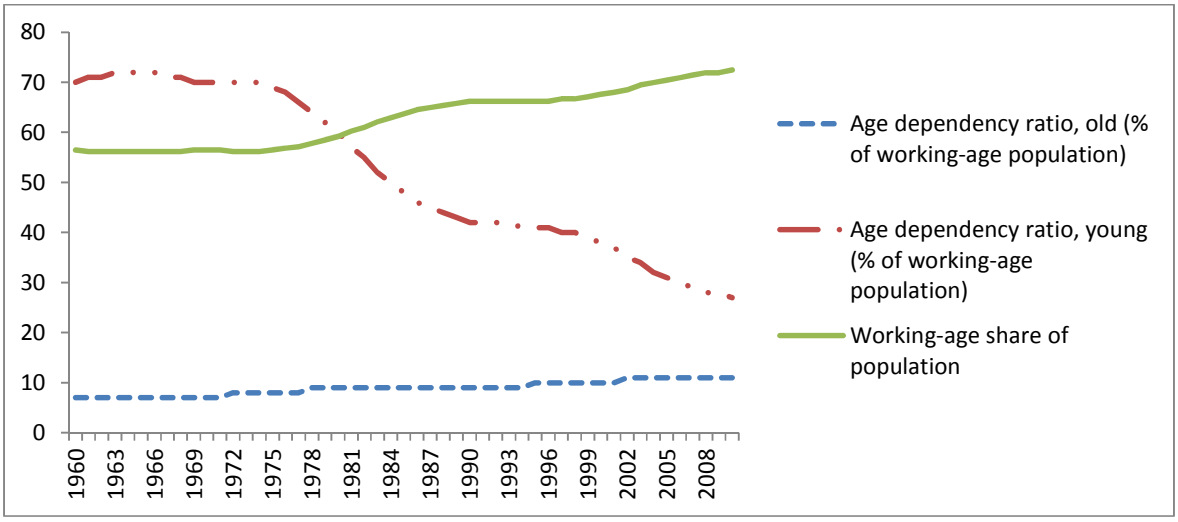
China has long relied on social networks by family and clan connections to provide mutual support among members. People are all considered to be members of families. The traditional legacy of *xiao* or filial piety has been a primary principle in Confucian ideas. Children are expected to obey, support and respect their parents and elders. Elders rely on their adult children for their livelihoods and support. In rural areas, most elderly people live with their married children. Even without co-residence, grown-up children still provide financial support, health care and housework to parents and visit them frequently. The importance of the family can be seen from some old sayings as "Men rear sons to provide for old age"; "they plant trees now because they want shade later". The value of raising children, especially male children, has long been considered one form of social insurance and investment (Wong *et al.*, 1998).

As shown in Figure 5.6, there has been a sharp decline in the young-age population (age < 15) and an increase in the old-age population (age > 65) between 1960 and 2010. Young age dependency, the ratio of young-age population (age < 15) to working population (15 ≤

[6] Discussions on corporate savings behaviours are not included. There are three reasons: (1) household saving as a share of GDP has experienced the highest growth among households, enterprises and the government. Household saving as a share of GDP has climbed from 6-7% in the late 1970 to 22.2% in 2007. In contrast, the combined savings by government and enterprises stay roughly the same at 30% of GDP for this period (Kraay, 2000); (2) the Chinese corporate savings rate is only modestly higher than other countries (by 2 percentage points above the global average savings rates (Tyers, 2008); (3) the rise of company savings is really a global phenomenon (IMF, 2005), and differences in corporate savings are unlikely to be a big part of cross-country differences in national saving rates (Wei and Zhang, 2011).

age ≤ 65), has consistently declined over the past 40 years, from 0.64 in 1979 to 0.27 in 2010. While young age dependency is declining, old age dependency, the ratio of old-age population (age > 65) to working population (15 ≤ age ≤ 65), is increasing. Comparing the 1960s and the 2000s, old age dependency has increased from 7% to 11%. Increasing longevity and declining fertility have driven China into an ageing society. Hence, facing weakening family support and the expected burden of an ageing population, the current working-age population tend to save now for consumption for their retirement, but reducing current consumption.

Figure 5.6 China's demographic transition from 1960 to 2010



Source: World Developments Indicators (online), World Bank. The young age dependency ratio is the share of young (age < 15) population of working-age population (15 ≤ age ≤ 65); the old age dependency ratio is the share of old (age > 65) population of working-age population (15 ≤ age ≤ 65); and the working-age share of population is the share of working-age population (15 ≤ age ≤ 65) of the total population.

Social welfare system, household savings and trade balance

A well established and functioning social welfare system is likely to help increase household consumption by decreasing the need for precautionary saving. However, China's current existing social security system does not seem to be adequate to look after those citizens that require its service.

The economic reforms have brought drastic changes to people's life in many aspects. Especially, by the mid-1990s, a large-scale restructuring of SOEs have increased uncertainties of many SOE workers. There has been a lack of welfare provisions for rural

people. In the meantime, the system of family support to elderly people has been weakening in both rural and urban areas. Subsequently, the propensity to save has been high by many low-income households. The lack of a properly developed more equitable and accessible social security system must be largely responsible for such precautionary saving behaviours. Such high rates of precautionary savings depress current consumption, and contribute to the rise of China's large trade surplus.

5.2.4 "Shanzhai" products crowd out imports

The term *Shanzhai*, or literally, "mountain village", originally referred to a bandit stronghold outside government control, but today more commonly refers to the market of imitation or pirated brands and goods. Although each *Shanzhai* company is different, they often have common characteristics. Starting illegally from copying or imitating famous brand products, these companies target mass consumers, focus on satisfying local demand, pursue speedy large-scale production and capture market share from brand products.

Compared to imported goods, *Shanzhai* products always have a much cheaper price. Although Chinese consumers have shown an increasing interest in foreign products and prefer foreign products to local ones, most face financial constraints due to their relative lower income. The *Shanzhai* products at least satisfied the needs of some consumers who are not able to afford to the higher-priced genuine products.

Shanzhai products are not only cheaper but their features and functions are tailored to local requirements. Capitalising on the advantage of their understanding of local needs, successful *Shanzhai* companies may quickly capture emerging opportunities and evolve into legitimate businesses with their branded products through adjustments to local culture and needs. Hence, *Shanzhai* products "substitute" the needs of imports to some extent, contributing to China's trade surplus in some way.

5.3 Political-institutional factors

The previous section identified the socio-cultural factors affecting China's trade imbalance. However, there are also political-institutional factors that come into play: (1) the segmented labour markets; (2) strong incentives for government officials to attract inward FDI; and (3) weak trade unions. These factors would have weakened labour bargaining power and contributed to the growing trade surplus through their impact on the labour cost.

5.3.1 Segmented labour markets

Due to the government's urban-biased development model, China has formed segmented labour markets. The population is sharply divided into rural peasants and urban workers by the household registration system (HRS). During economic reforms, as a fast growing developing country, China's urban industries experienced rapid structural changes and required more labour force, resulting in a large number of rural workers moving into urban areas to work. Although today rural migration to city is not officially prohibited but the *hukou* system still exists and increases the barriers and costs for rural workers to live in cities (Cai *et al.*, 2008). Under the urban-bias system, rural migrant workers do not have the same rights as urban residents. They are discriminated against in education, welfare, and health care.

In addition, lay-offs of redundant workers from state-owned enterprises (SOEs) in urban areas add to high unemployment, further diminishing rural workers' bargaining power. Migrant workers often have to accept lower wages (Zenglein, 2008).

5.3.2 Strong incentives of local officials to attract inward FDI

Local governments have strong incentives to attract FDI. All chief officials at all levels of government are assigned targets for FDI attractions. The amount of FDI is one important measurement of their work (Yu, 2011). At the early developing stage of the reform, it is common practice in China for all the chief officials at all levels of governments to attract inflow FDI. "*Those who attract the largest amount of FDI are the most likely candidates for further promotion*" (Yu, 2011) no matter whether the returns generated by such investments are high or not. As a result, local governments are just keen for creating a favourable environment for foreign investment, such as low-cost land use, cheap labour

and improving local infrastructure (roads, water and electricity, etc). To achieve these objectives, Chinese officials are inclined to sacrifice the labour's benefits to attract more FDI inflows.

5.3.3 Weak labour trade unions

China is a communist state ruled by the Communist Party of China (CPC) since 1949. Although other minor political parties exist, they operate under the controls of the CPC and are essentially powerless. Under this authoritarian regime, Chinese trade unions function differently. They are not powerful and independent institutions but largely irrelevant for workers.

The primary functions of the trade unions are to maintain labour discipline, and to administer most social welfare and benefits as a means of stimulating labour motivation (Clarke & Pringle, 2009). Unions nominally represent the interests of the entire working class and they play a protective role in the workplace. However, as Lu and Gao (2011) point out, China's trade unions could not effectively represent workers in wage negotiations as the leaders of trade unions are offered high position of enterprise management teams. Under the direct rule of the Communist Party, the trade unions are more dependent on the state. In practice, the trade unions harmonise the interests of the working class and management rather than independently represent the interests of their members. As the priority of production overruled all other considerations, standards of health and safety for labour workers made by trade unions were often overlooked (Clarke & Pringle, 2009). As a result, the collective bargaining power for contract workers has been largely weakened. If there is no protection by contract or a contract is not adequately honoured, there is unequal bargaining power between employers and employees.

There are limited experimentations with collective bargaining in China. The party-led government has focused on maintaining social and political stability by preventing mass incidents and regulating the process of collective bargaining. Accordingly, China's low labour cost is partially the consequence of the type of political regime and to some extent, artificial. Unfortunately, such artificial low labour lasts.

5.4 Conclusion

All forms of economic changes are inherently embedded in social ties, cultural practices and political context (Zukin & DiMaggio, 1990). China's trade surplus is not merely a result of economic dynamics, but a product of multiple complex-causal variables. These include socio-cultural context, political-institutional changes and economic factors.

Many economic and non-economic factors potentially can have an impact on China's trade balance. Selected to address in this chapter are only some of those likely major determinants. Based on the discussions, those key economic factors possibly include: (1) supply-side: labour supply and FDI inflows; (2) relative price: exchange rate and labour wage; and (3) demand-side: government consumption, declining labour share of income and income inequality. Non-economic factors that could possibly have an important role in the accumulation and increase in China's trade surplus include: (1) social structure changes and labour market reforms; (2) social connection and cultural similarity; (3) demographic structure changes and the social security system that affect saving behaviours; (4) *Shanzhai* phenomenon and (5) segmented labour market, efforts of local officials to attract FDI and weak trade unions.

Empirically verifying the impacts of each of these important determinants on China's trade balance should be beneficial. However, limited by resources in this thesis, only some of those major economic factors will be empirically evaluated for their impacts on China's trade balance, the magnitude and the direction. Empirical results are reported in Chapter 6 (based on aggregate analyses) and Chapter 7 (based on disaggregate analyses).

Chapter 6 Effects of Economic Determinants on China's Trade Balance – an Aggregate Analysis

In this chapter, an aggregate analysis of the relationships between economic determinants and China's trade balance is presented. Sections 6.1 and 6.2 describe the model and data. The estimated results are given in Section 6.3. The last section concludes this chapter.

6.1 Model specification and methodological procedures

As discussed in Chapter 5, various economic factors could have an impact on China's trade balance through three channels: supply-side, demand-side and the price level. In this section, four major variables with at least one variable from each "channel", namely FDI, exchange rate, domestic income, and foreign income are incorporated into an econometric model for empirical analysis, Equation (6.1). All variables in Equation (6.1) are in natural logarithmic form:

$$lnTB_{ij,t} = \alpha_0 + \alpha_1 lnREER_{i,t} + \alpha_2 lnY_{j,t} + \alpha_3 lnY_{i,t} + \alpha_4 lnFDI_{i,t} + \varepsilon_{ij,t} \tag{6.1}$$

where *TB* denotes trade balance, measured by the ratio of export value over import; *REER* denotes the real effective exchange rate; *Y* is income, measured by GDP per capita; *FDI* denotes FDI inflows; *i* denotes China, *j* denotes the rest of the world (ROW), and *t* denotes time; α parameters to be estimated and $\varepsilon_{ij,t}$ is a random disturbance term which is independently and identically distributed (i.i.d.).

Following the discussion in Chapter 4, the preliminary step of the methodological procedures is to examine the variables for the order of integration. The Augmented Dickey Fuller (ADF) test is implemented. In order to find the order of integration (I(*d*)), further unit root tests are conducted to the variables that are not stationary in levels. These variables are differenced *d* times to attain the stationarity condition, namely they are I(d). This method, however, has a drawback; that is, some valuable long-run information contained in the time series may get lost. Fortunately, this problem can be overcome by applying the cointegration technique, which can capture the long-run equilibrium relationship between two or more non-stationary series. A bounds testing approach or the autoregressive distributed lag (ARDL) model to cointegration developed by Pesaran *et al.* (2001) discussed in Chapter 4 is adopted in this study to examine the long-run and short-

run relationships between trade balance and related variables. Equation (4.13) is reproduced below:

$$z_t = \alpha_0 + \beta t + \sum_{i=1}^{p} \theta_i z_{t-i} + \varepsilon_t, \quad t = 1,2,3,\cdots,T \tag{6.2}$$

where z_t denotes the vector which consists of both y_t and x_t; y_t is the dependent variable defined as trade balance (TB); x_t is a set of explanatory variables to perform a vector matrix, i.e., real effective exchange rate (REER), real income of the world Y_j, China's real income Y_i and FDI inflows (FDI) ; t denotes a time or trend variable.

According to Pesaran *et al.* (2001), y_t must be I(1) variable, but the regressor, x_t, can be either I(0) or I(1). The advantage of this method lies in the fact that it can be applied irrespective of whether the regressors are purely I(0), purely I(1), or a mixture of both. It is relatively efficient in a small or finite sample size. It also allows for describing an equilibrium relationship in terms of long-run and short-run dynamics without losing long-run information. In order to test for the existence of cointegration among the variables, a conditional VECM in Equation (4.14) is reproduced below:

$$\Delta y_t = \alpha_0 + \beta t + \delta_{yy} y_{t-1} + \delta_{xx} x_{t-1} + \sum_{i=1}^{p} \lambda_i \Delta y_{t-i} + \sum_{i=0}^{q} \ell_i \Delta x_{t-i} + \varepsilon_t, \quad t = 1,2,3,\cdots,T \tag{6.3}$$

where y_t and x_t are the same as the variables of y_t and x_t in Equation (6.2); Δ is the first difference operator. In this formulation, coefficients δ_{yy} and δ_{xx} contain the long-run multiplier, while coefficients λ_i and ℓ_i represent the short-run dynamics of the VECM.

It is imperative that the VECM procedures described above are followed in the testing of at most one cointegrating vector between dependent variable y_t and a set of regressors x_t. Following the postulation by Pesaran *et al.* (2001) [Case III], an unrestricted vector error correction model (UVECM) with unrestricted intercepts ($\alpha_0 \neq 0$) and no trends ($\beta = 0$), is developed in Equation (6.4):

$$\Delta lnTB_{ij,t} = \alpha_0 + \delta_1 lnTB_{ij,t-1} + \delta_2 lnREER_{i,t-1} + \delta_3 lnY_{j,t-1} + \delta_4 lnY_{i,t-1} + \delta_5 lnFDI_{i,t-1} +$$
$$+ \sum_{k=1}^{p} \phi_k \Delta lnTB_{ij,t-k} + \sum_{l=0}^{q} \varphi_l \Delta lnREER_{i,t-l} + \sum_{m=0}^{q} \gamma_m \Delta lnY_{j,t-m} + \sum_{n=0}^{q} \eta_n \Delta lnY_{i,t-n} \qquad (6.4)$$
$$+ \sum_{h=0}^{q} \mu_h \Delta lnFDI_{i,t-h} + \varepsilon_{ij,t}$$

where *i* denotes China; *j* denotes the rest of the world (ROW); Δ is the first difference operator; $\varepsilon_{ij,t}$ is a white-noise disturbance term; p and q indicates the optimal lag length; the parameters δ_1, δ_2, δ_3, δ_4 and δ_5 account for the long-run relationship whereas the parameters ϕ_k, φ_l, γ_m, η_n and μ_h represent the short-run dynamics of the model.

Before Equation (6.4) is estimated by ordinary least squares (OLS), it is important to choose the lag length of the differenced variables appropriately. For annual data, Pesaran *et al.* (2001) suggest choosing a maximum of two lags. The Schwarz-Bayesian Criterion (SBC) is applied to determine the optimal number of lags to be included in the conditional UVECM.

The *F*-test statistic is conducted to differentiate the long-run relationship between the concerned variables. By imposing restrictions on the estimated long-run coefficients, the null and alternative hypotheses are as follows:

$H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ (no long-run relationship)

$H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$ (a long-run relationship exists)

The *F*-test has a non-standard distribution which depends on whether variables included in the ARDL model are I(0) or I(1), the number of regressors and the sample size (see Duasa, 2007). Two sets of critical values (CVs) which are generated for sample size of 500 and 1000 observations are reported in Pesaran *et al.* (2001). However, these CVs are based on large samples, and are not appropriate for samples with small size. Given the relatively small sample size in the present study, we apply the critical values which are calculated specific to the sample size ranging from 30-80 observations (Narayan, 2005). If the statistic value is above the upper critical value, the null hypothesis of no cointegration or no long-run relationship can be rejected. Otherwise, the null hypothesis cannot be

rejected. Finally, if the statistic value falls between the lower and the upper critical values, the result is inconclusive.

If there is evidence of a long-run relationship (cointegration) of the variables, the long-run relationship between China's trade balance and its explanatory variables can be estimated as a conditional ARDL (p, q) in the following long-run model:

$$lnTB_{ij,t} = \alpha_0 + \sum_{k=1}^{p} \beta_k lnTB_{ij,t-k} + \sum_{k=0}^{q} \delta_k lnREER_{i,t-k} + \sum_{k=0}^{q} \psi_k lnY_{j,t-k} + \sum_{k=0}^{q} \eta_k lnY_{i,t-k} + \sum_{k=0}^{q} \phi_k lnFDI_{i,t-k} + \varepsilon_{ij,t} \quad (6.5)$$

We then estimate the error correction model (ECM), which indicates the speed of adjustment to long-run equilibrium after a short-run disturbance. In Equation (6.6), ϖ_k, ω_l, ς_m, τ_n and υ_h are the short-run dynamic coefficients of the model's convergence to equilibrium and δ is the speed of adjustment.

$$\Delta lnTB_{ij,t} = \alpha_0 + \delta ECM_{t-1} + \sum_{k=1}^{p} \varpi_k \Delta lnTB_{ij,t-k} + \sum_{l=0}^{q} \omega_l \Delta lnREER_{i,t-l} + \sum_{m=0}^{q} \varsigma_m \Delta lnY_{j,t-m} + \sum_{l=0}^{q} \tau_n \Delta lnY_{i,t-n} + \sum_{h=0}^{q} \upsilon_h \Delta lnFDI_{i,t-h} + \varepsilon_{ij,t} \quad (6.6)$$

ECM_{t-1} is the short-run dynamics derived from the long-run model (6.5).

Finally, to ascertain the goodness of fit of the ARDL model, diagnostic tests including the examination of the serial correlation, functional form, normality and heteroscedasticity, are conducted.

6.2 Variable construction and data

The real effective exchange rate ($REER_{i,t}$) is a weighted average of exchange rate of home and foreign currencies, with the weight for each foreign currency equal to the share of the country's trade with China. As it measures average prices of home goods relative to those of foreign goods, we expect the sign of α_1 (Equation 6.1) to be negative. It means that a depreciation which is a decline in $REER_{i,t}$ will improve the balance of trade.

The real income, $Y_{j,t}$ and $Y_{i,t}$ is proxied by GDP per capita of the world and GDP per capita of China, respectively. To capture the relative size of a country, per capita GDP is more effective than GDP to measure the absorption capacity of both exporting and importing countries. The variable $Y_{j,t}$ positively affects the foreign demand for China's exports, and thus it is expected that an increase in the foreign income will improve China's trade balance. The coefficient of $Y_{j,t}$ is expected to be positive. $Y_{i,t}$, as the domestic income, is expected to have a negative impact on China's trade balance. The improved domestic income will result in an increased domestic consumption and thus likely increased imports.

Inflow FDI is expected to positively affect China exports. Meanwhile, FDI inflows may have positive or negative effects on China's imports. It is thus uncertain if the overall impacts of FDI on trade balance would be positive or negative.

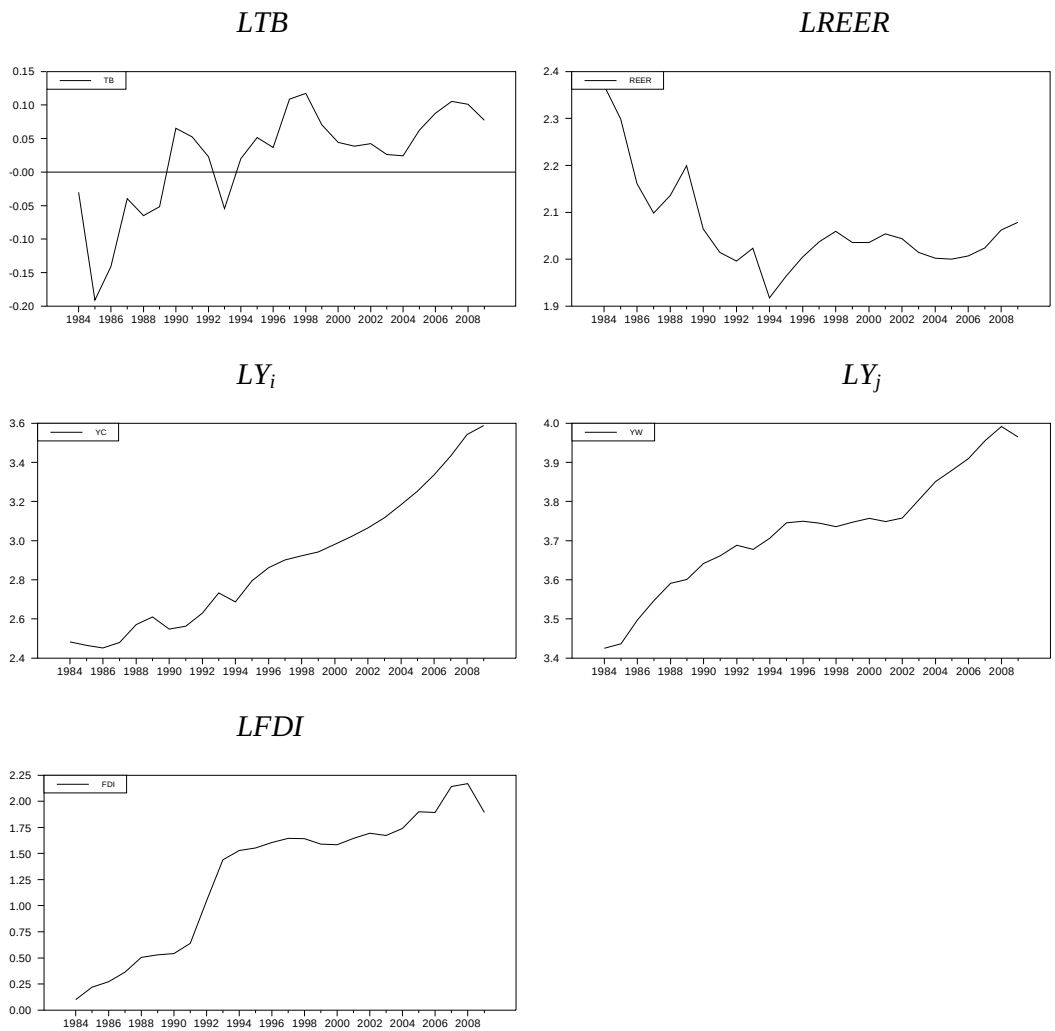
TB is the ratio of China's exports over its imports. Annual data, spanning from 1983 to 2010, are used in this study. Export and import data are available from the Direction of Trade Statistics (DOT) database at the IMF website. Data for all explanatory variables, including GDP per capita, REER and FDI, are obtained from the Economist Intelligent Unit (EIU) Country Data.

6.3 Empirical results

Unit root test results

The time plot of the variables is presented in Figure 6.1 and the result of the unit root tests is reported in Table 6.1.

Figure 6.1 Time plot of the variables



For each series, we examine its time-series properties using the Augmented Dickey-Fuller (ADF) model (Equation 4.12). The results in Table 6.1 show that there is a mixture of I(1) and I(0) of all the variables tested. Specifically, the dependent variable LTB is stationary in its first difference and LTB is integrated of order one, i.e., I(1). Therefore, the ARDL testing is appropriate.

Table 6.1 ADF unit root test results

		ADF test statistics			
Variables	**Lags**	**Level**	**Lags**	**First difference**	**Decision**
LTB	1	-2.3218	0	-4.7532***	I(1)
LREER	0	-2.9805**	-	-	I(0)
LY_i	2	1.2247	1	-4.1331***	I(1)
LY_j	0	0.9977	1	-3.3790**	I(1)
LFDI	1	-1.5685	0	-3.7377***	I(1)

*** and **, statistically significant at the 1% and 5% levels respectively.

Cointegration test results

The cointegration relationship among the variables is examined using Equation (6.4). Since the observations are annual, a maximum of two lags can be applied in the ARDL according to Pesaran *et al*. (2001). The Schwarz-Bayesian Criterion (SBC) is applied to determine the optimal number of lags to be included in the conditional ECM. In this study, the optimal lag length (p, q) that minimizes SBC is found to be p=1, q=1. The estimation is then undertaken for cointegration testing and the calculated *F*-statistic for the cointegration test is shown in Table 6.2.

Table 6.2 F-statistic of cointegration relationship test

	Statistic Value	Significance level	Bounds critical values Pesaran et al. (2001)*		Bounds critical values Narayan (2005)*	
			I(0)	I(1)	I(0)	I(1)
F-statistic	11.47	1%	3.41	4.68	4.54	6.37

* Unrestricted intercept and no trend, k=5.

The calculated *F*-statistic from restricting $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ in Equation (6.4) is 11.47. This value is greater than the upper bounds critical value provided by both Pesaran *et al.* (2001) and Narayan (2005) at the 1% significance level. We conclude that there exists a cointegrating relationship among LTB and its determinants, LREER, LY_i, LY_j and LFDI.

Long-run model

Since the cointegration exists among variables, the long-run model is estimated using Equation (6.5). The empirical results of long-run model, obtained by normalizing on trade balance, are presented in Table 6.3.

Table 6.3 Estimated long-run coefficients using the ARDL approach

ARDL (1,1,1,1,1) based on Schwarz-Bayesian Criterion

Dependent variable: LTB

Variables	**Coefficient**	**t – Statistics**	**P-Value**
Constant	-4.25	-2.43**	0.0244
LREER	0.47	1.49	0.1505
LY_i	-0.41	-2.11**	0.0467
LY_j	1.18	2.62**	0.0160
LFDI	0.08	1.48	0.1545

**, statistically significant at the 5% level.

The estimated coefficients for foreign income and domestic income are both statistically significant. Foreign income carries an expected positive sign. Hence, an increase in foreign income promotes Chinese exports, leading to an increase in China's trade surplus. Meanwhile, China's domestic income carries a negative sign, indicating that an increase in Chinese income will reduce its trade surplus. The popular expectation that the real exchange rate is an important factor affecting China's trade balance is not confirmed in the long run for China, suggesting the Marshall-Lerner condition does not hold in the long run. The estimated coefficient for FDI is also not statistically significant, suggesting the inflow FDI does not seem to play an important role on trade balance in the long run, either.

Short-run model

The short-run dynamic coefficients are estimated using Equation (6.6). The results are given in Table 6.4. The robustness of the model has been validated by several diagnostic tests. The Breusch-Godfrey (Breusch, 1978; Godfrey, 1978) test of serial correlation detects no evidence of serial correlation in the residual (providing an LM statistic of 3.1 with the p value being 0.212). The statistic value of the Bresuch and Pagan test (1979) which is 1.15 with the p value 0.847 confirms that no heteroscedasticity problem is

present in the residual. The model also passes the Jarque-Bera (1987) normality test which suggests that the errors are normally distributed. The RESET test by Ramsay (1969) detects no misspecification which indicates the model is correctly specified. Therefore, the desired econometric properties have been satisfied in this model and empirical interpretations can be drawn.

Table 6.4 Estimates of the error correction model – dependent variable ΔLTB

ARDL (1,1,1,1,1) based on Schwarz-Bayesian Criterion

Dependent variable: ΔLTB

Variables	**Coefficient**	**t – Statistics**	**P-Value**
Constant	0.04	0.94	0.3722
$DLTB_{t-1}$	0.38	0.39	0.7052
DLREER	1.31	1.80	0.1054
$DLREER_{t-1}$	0.31	0.48	0.6447
DLY_i	-1.74	-2.21**	0.0537
DLY_{it-1}	0.39	0.26	0.9930
DLY_j	1.94	2.65***	0.0265
DLY_{jt-1}	0.39	0.26	0.8039
DLFDI	0.03	0.33	0.7459
$DLFDI_{t-1}$	0.12	2.32***	0.0439
ECM_{t-1}	-0.47	-1.98*	0.0722
DW	2.34		
R^2	0.90		
Serial correlation[1] χ^2	3.10 (0.212)		
Heteroscedasticity[2] χ^2	1.15 (0.847)		
Functional form[3] *F-stat*	1.30 (0.180)		
Normality[4] χ^2	0.77 (0.847)		

*P-values are in parentheses.

[1] Breusch and Godfrey's serial correlation test

[2] Breusch – Pagan's heteroscedastiscity test

[3] Ramsay's Regression specification error test (RESET)

[4] Jarque-Bera normality test

The negative sign of DLY_i suggests that China's domestic income increase will encourage domestic consumption and consumers may demand more imported goods. This would lead to increased imports, thus reducing trade surplus. Similarly, the positive coefficient

of DLY_j suggests a positive association between foreign income and China's trade surplus. This supports the Keynesian view that income effects will help improve or worsen a country's trade balance through changes in consumption. The lag difference of FDI inflows is significant with a positive coefficient. It implies that the huge FDI inflows into China have also contributed positively to the rise of China's trade surplus.

All other coefficients in the ECM are not statistically significant. Worth particular noting is that the exchange rate does not seem to have an important impact on trade surplus in the short run either. This is rather contrary to popular perceptions held by many researchers. As such, the results of the aggregate analysis indicate that the key determinant that critically affects China's trade surplus is not the exchange rate, but importantly the income levels of consumers, and to a lesser extent, the inward FDI.

6.4 Discussion and conclusion

The relationship between China's trade balance and its major economic determinants is empirically verified in this chapter. The results suggest an existence of long-run equilibrium between trade balance and the regressors (domestic and foreign income, exchange rate and FDI inflows). In addition, the framework allows characterization of the short-run dynamic behaviour of trade balance in response to the explanatory variables. In the short-run model, the significant coefficients of foreign income, domestic income and FDI have indicated that these variables have lagged impacts even if some of them, e.g., the coefficient of FDI is not significant in the long-run model.

Consumer income, both domestic and overseas, is the most important determinant that has contributed to the rise of China's trade surplus. This may not be surprising. China itself is a huge market with almost 1.4 billion people. If the majority of the Chinese consumers have a reasonable level of disposable income, many Chinese-produced products will be consumed domestically. However, in the past years, it is an indisputable fact that the demand in China's domestic market has been weak. Many low income consumers, especially those in rural areas, are not able to consume. Consequently, many products have to be exported and exported at low prices. Low prices of exports relatively increase the income of overseas consumers. When products are exported at low prices, often the wage levels of the workers that produced these products are depressed, diminishing the

prospect for their incomes to increase and subsequently for China's domestic consumption to increase.

Much concern has been raised in recent years on the effects of the exchange rate on China's trade balance. However, the results obtained here do not seem to support these concerns. The coefficients of real effective exchange rate which represent the relative price effect are not significant in both long- and short-run estimations. On the other hand, inflow FDI has been found to have a positive impact, though lagged, on China's trade surplus increase.

In this chapter, the relationships between China's trade balance and its major economic determinants are evaluated using aggregate data. It would be academically interesting and valuable to verify such relationships using disaggregate analysis as well. The next chapter, using disaggregate data, is devoted to cross check the relationships found in this chapter with aggregate analysis.

Chapter 7 Effects of Economic Determinants on China's Trade Balance – a Disaggregate Analysis

Section 7.1 begins with a description of China's bilateral trade balances with its major trading partners; the actual levels of the bilateral trade balances are re-estimated using Hong Kong's re-export data. Section 7.2 and Sections 7.3 present the model and estimation results, respectively. The final section discusses the results and concludes the chapter.

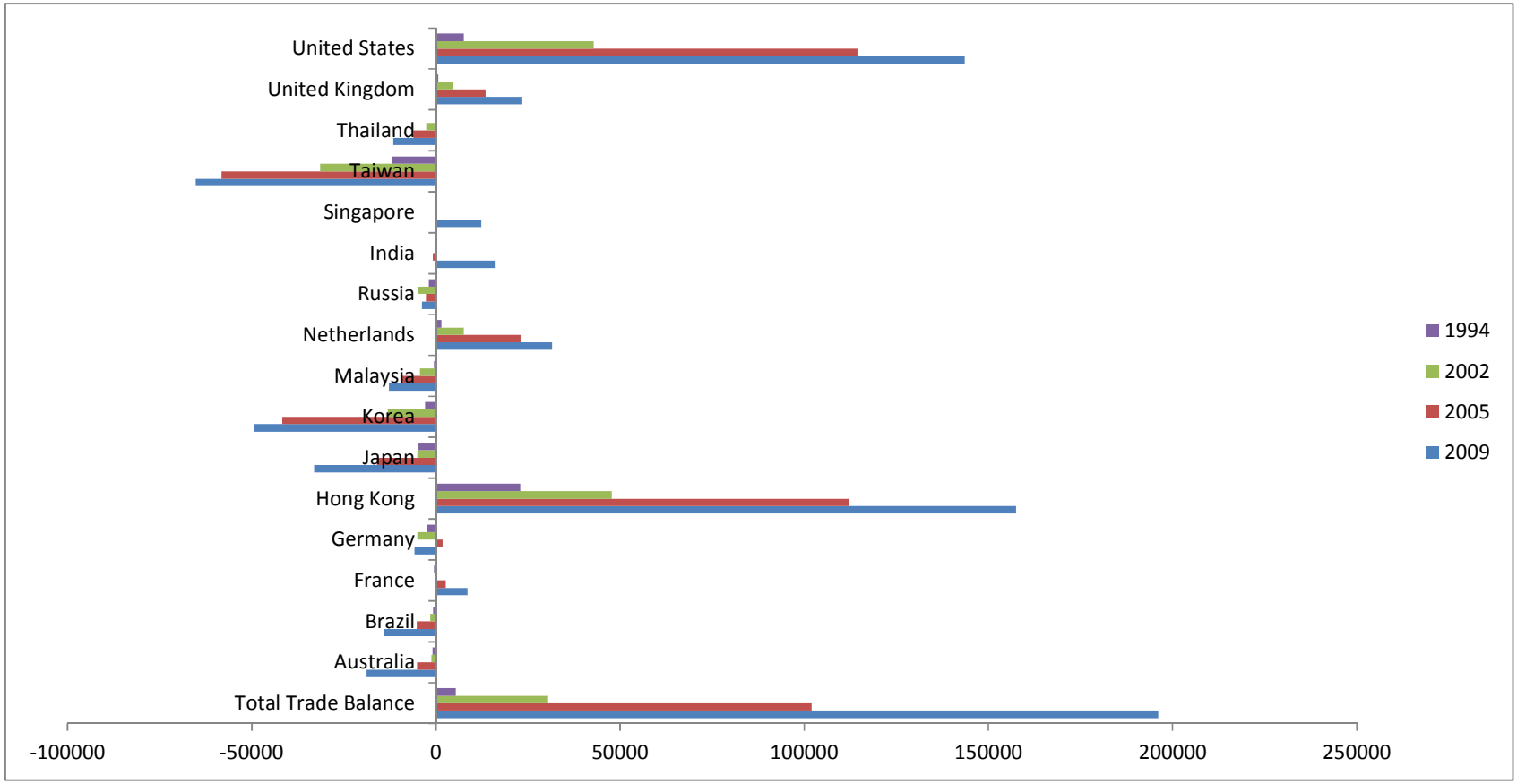
7.1 Decomposing China's trade balance

The basic idea of decomposing the aggregate trade balance into bilateral trade balance is to avoid the "aggregation bias problem". There may be a significant relationship between the exchange rate and China's bilateral trade balance with one of its major trading partners. However, such a significant relationship could be easily covered up by an insignificant relationship between the exchange rate and China's bilateral trade balances with other trading partners. Thus, to capture country-heterogeneity in the behaviour of various economic variables, it is necessary, and can be most rewarding, to investigate major determinants of trade balance using disaggregate data at the bilateral level.

Official data on China's bilateral trade (export and import) from 1994 to 2009 are reported by UNCOMTRADE and CEIC databases, from which we calculated the balance of trade (i.e., difference between export and import). Figure 7.1 shows the movements of China's total trade balance and its bilateral trade balance with its major trading partners in selected years, namely, 1994, 2002, 2005 and 2009.[7] During most of these periods, China (mainland China) ran trade surpluses with the United States, the United Kingdom, Singapore, India, Netherlands, Hong Kong (a special administrative region of China) and France while running trade deficits with Thailand, Taiwan, Russia, Malaysia, Korea, Japan, Germany, Brazil and Australia. The direction of China's trade flows reflects production specialization within Asia region. China is a final processing and assembly platform for exports originating from its Asian neighbours but destined for markets in Europe and North America.

[7] China's major trading partners are selected according to the ranking of total exports and imports in China's trade data in 2009.

Figure 7.1 China's trade balance by its major trading partners ($US million)



Source: UNCOMTRADE Database, CEIC Database; Reporter Country: China.

7.1.1 The problem

As can be seen from Figure 7.1, China's reported largest surplus in merchandise trade was recorded with Hong Kong and the U.S. during the period 1994 to 2009. The surplus value with Hong Kong reported in 2009 is $157.5 billion which is greater than the surplus with the U.S. of 143.5 billion. However, it must be noted that there is a unique trade relationship that exists between China and Hong Kong, Figure 7.2, Panel (a) shows that goods from mainland China can be exported in two ways — they can be shipped directly or they can be shipped to, and re-exported from, an intermediary, Hong Kong. In the latter case, value is generally added to the goods before they are re-exported. Similar situation exists for China's imports (Panel b, Figure 7.2).

Due to the complication of the bilateral trade channels as shown in Figure 7.2, China's exports are not correctly reported (Feenstra *et al.*, 1998; Fung & Lau, 1998). If a Chinese exporter ships goods abroad through Hong Kong, the transaction is recorded in Chinese trade statistics as they are exported to Hong Kong. Then when Hong Kong re-exports them to a final destination, China is listed as the country of origin. When the importing country receives the goods, it will record them as imports from China. Hence, when trade goes through Hong Kong, the exporter could incorrectly attribute it as trade with Hong Kong although the importer is able to determine the origin of the imported goods.

7.1.2 Data and adjustment methods

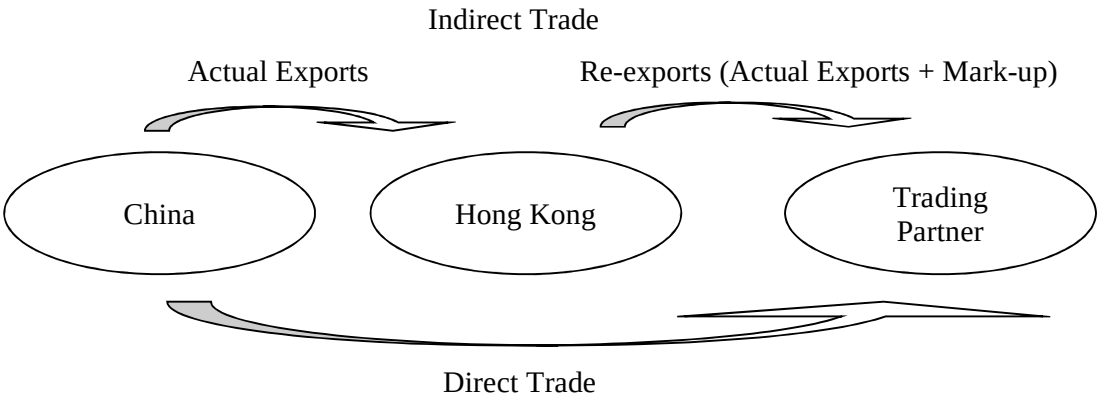
To determine the actual levels of trade, it is necessary to adjust the reported bilateral trade data by removing the re-export and the mark-ups added in Hong Kong. We collected official bilateral trade data for 12 major trading partners of China (Australia, France, Germany, Japan, Korea, Malaysia, Netherlands, Singapore, Taiwan, Thailand, the United Kingdom and the United States) from the United Nations COMTRADE and CEIC Databases.[8] In 2009, these 15 partners account for 67% of total China's trade as reported by China. This includes 68% of total Chinese exports, and 65% of total China's imports. To obtain the actual levels of re-export in Hong Kong, we use data harmonized by country of origin and country of destination from the Hong Kong Census and Statistics

[8] Hong Kong is not included based on the following consideration: because of the intermediary role of Hong Kong, Hong Kong is not the final destination or origin of most of trading goods which travel across Hong Kong. Data on Taiwan is not available in UNCOMTRADE database and we have supplemented it with data from CEIC.

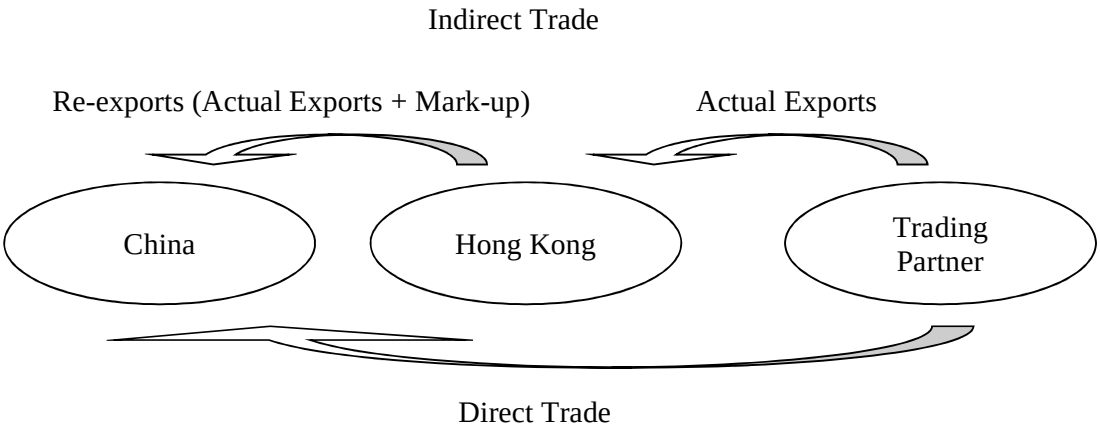
Department. Additionally, we have estimates of the average rate of re-export margin for goods travelling across Hong Kong from the Hong Kong Census and Statistics Department. These estimates are shown in line 3 and line Table 7.1.

Figure 7.2 China's trade with its partners in the presence of an intermediary

(a) China's Exports



(b) China's Imports



Source: adapted from Schindler and Beckett, 2005.

Table 7.1 Adjusted bilateral trade balance between China and the U.S.

Adjusting China's Export to the U.S.																	
($US billion)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1) China reported exports to U.S.	17.0	21.5	24.7	26.7	32.7	38.0	42.0	52.2	54.4	70.1	92.6	125.1	163.2	203.8	233.2	252.8	221.3
2) Reported re-exports from China to U.S.	21.8	25.3	27.6	29.2	31.3	30.9	32	36.5	33.3	34.3	33.5	35.5	38.3	40.1	40.3	39.7	32.7
3) Rate of re-export margin%	18.3	16.7	16.5	17.3	17.8	18.7	20.3	21.1	20.2	19.1	17.9	17.3	17.5	17	17.1	17.5	16.9
4) Value added to China's exports in HK	4.0	4.2	4.6	5.1	5.6	5.8	6.5	7.7	6.7	6.6	6.0	6.1	6.7	6.8	6.9	6.9	5.5
5) Adjusted re-exports from China to U.S. (Line 2+Line 4)	17.8	21.1	23.0	24.1	25.7	25.1	25.5	28.8	26.6	27.7	27.5	29.4	31.6	33.3	33.4	32.8	27.2
6) Adjusted China's exports (Line 1+Line 5)	34.8	42.5	47.8	50.9	58.5	63.1	67.5	81.0	80.9	97.8	120.1	154.5	194.8	237.1	266.6	285.6	248.5

Adjusting China's Imports from the U.S.																	
($US billion)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
7) China reported imports from U.S.	10.7	13.9	16.1	16.2	16.3	16.8	19.5	22.4	26.2	27.3	33.9	44.7	48.7	59.3	69.5	81.6	77.8
8) Reported re-exports from U.S. to China	3.2	3.7	5.0	5.9	6.0	5.3	5.4	6.1	6.5	6.2	6.2	5.8	6.0	6.5	6.9	8.1	7.1
9) Rate of re-export margin%	18.3	16.7	16.5	17.3	17.8	18.7	20.3	21.1	20.2	19.1	17.9	17.3	17.5	17	17.1	17.5	16.9
10) Value added to China's import via HK	0.6	0.6	0.8	1.0	1.1	1.0	1.1	1.3	1.3	1.2	1.1	1.0	1.1	1.1	1.2	1.4	1.2
11) Adjusted Indirect China's imports (re-exports are seen as import, Line 8−Line10)	2.6	3.1	4.2	4.9	4.9	4.3	4.3	4.8	5.2	5.0	5.1	4.8	5.0	5.4	5.7	6.7	5.9
12) Direct China's imports (Line 7−Line 8)	7.5	10.2	11.1	10.3	10.3	11.5	14.1	16.3	19.7	21.1	27.7	38.9	42.7	52.8	62.6	73.5	70.6
13) Adjusted China's imports (Line 11+ Line 12)	10.1	13.3	15.3	15.1	15.2	15.8	18.4	21.1	24.9	26.1	32.8	43.7	47.7	58.2	68.4	80.2	76.5
Adjusted China-US trade balance	24.7	29.3	32.5	35.7	43.2	47.3	49.1	59.9	56.0	71.7	87.3	110.8	147.1	178.9	198.2	205.4	171.9

Source: UN COMTRADE Database, Hong Kong Census and Statistics Department.

It is worth discussing the re-export data in more detail. As the re-exports goods enter Hong Kong as imports, the country of origin is identified. When they leave Hong Kong as exports, both origin and destination countries are identified. The re-export data used in the analysis is annual data from 1993 to 2009, which cover two directions of trade flows: the re-export origins from mainland China to the main destinations and the re-export origins from China's major trading partners to mainland China as the main destinations. By definition, goods for re-export cannot be subject to substantial "manufacturing process which has changed permanently the shape, nature, form or utility of the product". [9] However, this does not exclude simple processing, such as sorting, re-packaging or service activities. The re-exports activities make goods more expensive when they leave Hong Kong than when they enter. To measure the difference between the import unit value and the re-export unit value for a commodity as a percentage of import unit value, the average mark-ups are estimated based on a survey of re-export trade regularly conducted by Census and Statistics Department, Hong Kong. The re-export mark-ups or rates of re-export margin are available in Hong Kong's annual offshore trade statistics.

The methods for estimating China's actual bilateral trade balances that we adopt in this study are similar to the ones described in Feenstra *et al*. (1998) and Fung (1998). We refine their methods and apply them to the bilateral trade data between China and its 12 major trading partners. Table 7.1 summarizes the necessary calculations for adjusting a country's export and import, using data on bilateral trade between the United States and China data as an example. The work starts on adjusting export data. A country's adjusted export is consisted of two components — direct (reported) export (Table 7.1, line 1) and indirect export (Table 7.1, line 2). Since the exporting countries do not know the final destination of their indirect export, we need to add each country's indirect export to its reported exports. Indirect exports are obtained using Hong Kong's reported re-export data. The re-export data from the Mainland China as the main origin to its major trading partners as the main destinations is applied. The second component is the value added in Hong Kong, calculated by the rate of re-export margin or re-export mark-up (Table 7.1, line 4). Following a two-step calculation, we use the rate of re-export to adjust re-exports via Hong Kong and add the adjusted re-exports to reported direct exports (Table 7.1, line 6) to get the country's total actual exports with its trading partners.

[9] Re-exports are defined by the Census and Statistics Department of the Hong Kong Government, sourced from Annual Review of Hong Kong External Merchandise Trade.

Adjusting reported imports is slightly different from the process of adjusting reported exports. Each country knows the origins of its imports. Hence, the total reported imports consist of direct and indirect imports. We start with Hong Kong's reported re-exports (Table 7.1, line 8) and this allows us to break the total reported imports (Table 7.1, line 7) into direct and indirect import. The re-export data from China's major trading partners as the main origins to the Mainland China as the main destinations is applied. For direct import (Table 7.1, line 12), we get the figure by removing the re-export Hong Kong reported from the total reported imports (Table 7.1, line 7). For indirect import (Table 7.1, line 11), the re-export margin (Table 7.1, line 9) is applied to adjust the indirect import. The mark-up added in Hong Kong will be removed from indirect imports. Finally we add direct imports and adjusted indirect import to get our estimate of total actual imports (Table 7.1, line 13).

7.1.3 Adjusted trade balance

Discrepancies between reported and adjusted bilateral trade data for China with its trading partners are shown in Table 7.2, using 2009 as an example. For the bilateral trade with 12 major trading partners, China's reported total surplus was $21.3 billion in 2009 while the adjusted trade surplus was $110.2 billion — a difference of $88.9 billion.[10] The final column of Table 7.2 shows the discrepancy between the reported and adjusted trade balance between China and each of its major trading partners.

[10] By considering the intermediary role of Hong Kong, China's estimated trade surplus with the 12 major trading partners in our sample is much larger than official data with an increase of $88.9 billion. It is noted here any indirect trade that is reattributed to China or its trading partners must also be "un-attributed" from China's trade with Hong Kong. It means that the actual level of mainland China's trade surplus with Hong Kong is much lower than the reported data.

Table 7.2 Reported and adjusted bilateral trade balance, China-major trading partners, 2009[1] ($US billion)

	Reported Data			Adjusted Data			Discrepancy[2]
	Exports	Imports	Balance	Exports	Imports	Balance	
Australia[3]	20.6	39.4	-18.8	23.4	39.4	-16.0	2.8
France[3]	21.6	13.0	8.6	24.4	13.0	11.4	2.8
Germany	49.9	55.8	-5.9	57.9	55.2	2.7	8.6
Japan	97.9	130.9	-33.0	108.2	127.7	-19.5	13.5
Korea	53.7	102.6	-48.9	56.3	101.0	-44.7	4.2
Malaysia	19.6	32.3	-12.7	21.1	31.3	-10.2	2.5
Netherlands[3]	36.7	5.1	31.6	40.3	5.1	35.2	3.6
Singapore	30.1	17.8	12.3	32.7	17.4	15.3	3.0
Taiwan	20.5	85.7	-65.2	23.0	82.7	-59.7	5.5
Thailand	13.3	24.9	-11.6	17.5	24.9	-7.4	4.2
United Kingdom	31.3	7.9	23.4	37.3	7.8	29.5	6.1
United States	221.3	77.8	143.5	248.5	76.5	172	28.5
Total	677.8	656.5	21.3	755.5	645.3	110.2	88.9

Source: UN COMTRADE Database, Hong Kong Census and Statistics Department.

Notes: [1] Data for other years are available upon request from the author.
[2] Discrepancy is the difference between adjusted balance and reported balance.
[3] Data for re-export from this country to China are not available in the report of Hong Kong Census and Statistics Department. For this country, we have only adjusted the export data for exports from China to the trading partners.

Examining Table 7.2, some observations are worth noting. China reported a trade deficit with Japan being $33 billion in 2009. After removing the re-export effect, the adjusted trade deficit has narrowed down to $19.5 billion. The reduction was $13.5 billion, or almost 41% of the original reported trade data. For China's bilateral trade with Germany, the adjusted trade balance differs not only in the magnitude but also in the sign. China reported a trade deficit of $5.9 billion while the adjusted data have turned to be a trade surplus of $2.7 billion.

Among all the trade partners, China reported the largest trade surplus with the United States and the surplus amount was $143.5 billion in 2009. The discrepancy for China-United States trade surplus which is $28.5 billion is also the largest among 12 trading partners, in terms of the absolute magnitude. However, percentage wise, its re-export via Hong Kong was a relatively smaller fraction (19.9%) of its total trade with China, compared to China's bilateral trade with Japan (40.9%), Thailand (36.2%), France (32.6%), the United Kingdom (26.1%), and Singapore (24.4%). Clearly, Hong Kong played an important role as an intermediary in China's bilateral trade with Japan, Thailand, France, the United Kingdom and Singapore.

Some have suggested that the discrepancies between China's reported trade data and its actual level are the result of attempts by the Chinese authorities to understate their trade surplus. However, in our analysis, the majority of the discrepancy for China's bilateral trade data actually resulted from the intermediary role of Hong Kong. China's official data are not able to correctly attribute its re-export via Hong Kong to the final destination while in general the actual origins of a good transhipped through Hong Kong is correctly reported by the importing country. Re-estimating China's actual bilateral trade balance with its major trading partners enables us to investigate the determinants of China's trade balance with greater confidence.

Table 7.3 presents the descriptive statistics for variables used in our regression analysis. Some variables such as trade balance vary substantially across countries and, within each country over time. In contrast, other variables including relative labour cost and relative income vary markedly across countries but are relatively more stable over time within countries. The sample mean for the log value of relative labour cost and real GDP per capita are negative, indicating China has a lower level of labour cost and income per

capita compared to most of its trading partners. The positive sample mean of FDI inflows suggests that China has a persistent strong growth of FDI inflows.

Table 7.3 Descriptive statistics for the variables (in logarithms)

Variables	Observation	Mean	Standard Deviation	Minimum	Maximum
ln(trade balance)	225	0.08	0.38	-0.66	1.00
ln (FDI inflows)	189	3.01	0.47	1.69	3.81
ln (real exchange rate)	225	-0.08	0.97	-.1.18	2.29
ln (relative labour cost)	225	-1.00	0.56	-1.94	0.23
ln (real GDP per capita)	225	-0.78	0.37	-1.25	0.34

Source: UN COMTRADE Database, CEIC Database, Hong Kong Census and Statistics Department and EIU Country Data.

7.2 Model specification

At a disaggregate level, four major variables with at least one variable from each "channel", FDI, exchange rate, relative income and relative unit labour cost, are included in our econometrical analysis (Equation 7.1). All variables in Equation (7.1) are in natural logarithm:

$$lnTB_{ij,t} = \alpha_0 + \alpha_1 lnRER_{ji,t} + \alpha_2 lnRLY_{ij,t} + \alpha_3 lnFDI_{ij,t} + \alpha_4 lnRLC_{ij,t} + \varepsilon_{ij,t} \quad (7.1)$$

Where, $TB_{ij,t}$ is the dependent variable *TB*, which consists of a vector of the bilateral trade balance between China and its major trading partners, measured by the ratio of export value over import; $RER_{ji,t}$ is bilateral real exchange rate between Chinese RMB and a trading partner *j*'s currency, defined as $P_i * NER / P_j$, where P_i is the price level (measured by CPI) in China, P_j is the price level of trading partner and *NER* is the bilateral nominal exchange rate (period average) defined as the number of *j*'s currency per Chinese RMB. Thus a decrease in *RER* represents a real depreciation in the RMB; $RLY_{ij,t}$ is the ratio of per-capital income between China *i* and its trading partner country *j*; $FDI_{ij,t}$ denotes the utilized FDI inflows in country *i* from its trading partner country *j*; $RLC_{ij,t}$ denotes the relative labour cost, which is the ratio of the average labour cost per hour between country *i* and its trading partner country *j*; *i* denotes China, *j* denotes China's

major trading partners and *t*: time; α parameters to be estimated and $\varepsilon_{i,t}$ is a random disturbance term which is independently and identically distributed (i.i.d.).

7.3 Results

The LLC and IPS methods are first employed to test for the presence of unit roots, where the null hypothesis is that there exist unit roots in the data series. The LLC test assumes a common autoregressive structure while the IPS test allows for the assumption of individual unit roots for all series. The results are given in Table 7.4 where two types of tests are presented.

Table 7.4 Panel unit root results

Variable	**H_0: Common Unit Root**	**H_0: Individual Unit Root**	**Variable**	**H_0: Common Unit Root**	**H_0: Individual Unit Root**
(in levels)	**LLC**	**IPS**	**(in difference)**	**LLC**	**IPS**
ln*TB*	-2.2590** (0.0119)	-0.4458 (0.3279)	**Δln*TB***	-5.3801*** (0.0000)	-4.2676*** (0.0013)
ln*FDI*	-2.8519** (0.0022)	-0.6494 (0.2580)	**Δln*FDI***	-6.0697*** (0.0000)	-4.0887*** (0.0018)
ln*REX*	-2.8124*** (0.0025)	-1.9052 (0.1284)	**Δln*REX***	-4.0677*** (0.0000)	-2.3691*** (0.0012)
ln*RLC*	-0.0446 (0.4822)	-1.6310 (0.8939)	**Δln*RLC***	-4.4890*** (0.0000)	-3.0080*** (0.0000)
ln*RLY*	-0.5501 (0.2911)	0.9107 (0.8188)	**Δln*RLY***	-4.7898*** (0.0000)	-3.2252*** (0.0006)

Notes: ** and *** denote rejection of the null at the 5% and 1% levels. Figures in parentheses refer to P-values.

The Bayesian information criterion is used for automatically selecting the lag numbers in the LLC and IPS tests (preset from 0 to 3, in view of the small sample). Both tests assume asymptotic normality. In our panel unit root tests, the evidence from the levels of ln*TB*, ln*FDI* and ln*REX* is somewhat mixed. We opt to rely more on the specification of the IPS *t*-bar test which does not restrict the number of lagged terms to all the cross-sections. These results indicate that almost all the variables are non-stationary. In order to find the order of integration (I(*d*)), a further unit root test is conducted over differenced variables, and all the variables reach stationary condition in their first difference. It is concluded that both dependent variable log trade balance (ln*TB*) and explanatory variables, log FDI

(ln*FDI*), and log real exchange rate (ln*REX*), log relative labour cost (ln*RLC*), log relative income per capita (ln*RLY*) are integrated of order 1, namely, I(1).

Having ascertained that the variables selected into our model are all non-stationary and intergrated of order 1, I(1), the tests suggested by Pedroni (1999) and Westerlund (2007) are employed for panel cointegration. Due to the short and narrow panel dimension, no Johansen-related system-based tests are conducted as they are likely to be distorted here due to the size of the sample. The Pedroni test extends the Engle and Granger two-step residual-based strategy to panels on the ADF and PP principles, while Westerlund proposes four new panel tests for the null hypothesis of no cointegration that are based on error correction tests rather than residual dynamics. The seven panel test statistics suggested by Pedroni and four new panel test statistics developed by Westerlund are reported in Table 7.5.

Table 7.5 Panel cointegration test results

Pedroni's Test	**Statistics (without time effects)**	**Statistics (with time effects)**	**Westerlund's Test**	**Statistics**
Panel variance ratio	0.0688	-1.4826		
Panel ρ	0.5624	1.4488	G_τ	-2.2476** (0.0343)
Panel PP	-3.4594***	-5.2700***	G_α	-0.5763 (1.0000)
Panel ADF	-3.1891***	-3.6460***	P_τ	-7.2254** (0.0213)
Group ρ	2.2229	3.0434	P_α	-0.8182 (0.9716)
Group PP	-3.2373***	-4.4179***		
Group ADF	-5.0047***	-4.4114***		

Notes: ** and *** denote rejection of the null at the 5% and 1% levels. Figures in parentheses are P-value..

In the results of Pedroni's test, four out of seven test statistics reject the null hypothesis of no cointegration at the 1% significance level. Banerjee *et al.* (2004) show that for sample sizes below 100 periods of observations, the parametric panel and group ADF-statistic tests perform best while the group ρ performs worst. As all the panel and group *t*-statistics (labelled as panel ADF-stat and group ADF-stat in the table, respectively) are significant, we conclude that there is evidence of cointegration. Among the tests of

Westerlund, we can see that the statistics of G_τ and P_τ which generally perform best with relatively small distortions reject the null hypothesis of no cointegration at the 5% level of significance. Hence, the overall conclusion is that the five variables (trade balance, FDI, real exchange rate, relative labour cost and relative income per capita) in the estimation model are panel cointegrated. The estimation coefficients can be viewed as representing the long-term equilibrium relationship between the variables.

Finally, we estimate the cointegrating vector using two methods: the group-mean FMOLS and DOLS estimators. The between group estimators have a useful interpretation in the event that the true cointegrating vectors are heterogeneous. Specifically, point estimates for between-group estimators can be interpreted as the mean values for the cointegrating vectors. We consider two cases: without time dummies and with time dummies. Common time dummies are included to capture certain forms of cross-sectional dependency across countries. All variables in our model tend to be driven by a common external disturbance, e.g., the international business cycle and thus these variables are correlated across countries. Common time dummies are effective in accounting for this form of cross-sectional dependence.

Results (country-specific and overall) are displayed in Table 7.6.[11] The panel consists of 15 yearly observations of China's bilateral trade balance with its 12 major trading partners, FDI inflows (FDI), relative labour cost (RLC), bilateral real exchange rate (REX) and relative income per capita ratio (RLY) for which the data exist uninterruptedly from 1995 to 2009. The explanatory variables included in our model are FDI which represents the supply-driven shock (productivity capacity), REX and RLC which represent the relative price effect through supply side to demand side and RLY which represents the import level driven by the demand-side factors (absorption capacity). The coefficient estimations using individual FMOLS and DOLS estimators and *t*-statistics for $H_0 : \beta_i = 1$ are reported respectively in Table 7.6. At the bottom of the table, results for SUR, FMOLS and DOLS without and with common time dummies are reported.

[11] Before panel estimations, since "exogeneity" is fundamental to most econometric modelling, we carry out the Hausman test and confirm that there is no existence of feedback effects between *TB* and independent variables.

Table 7.6 FMOLS and DOLS estimation results

Trading Partners	FDI		REX		RLC		RLY	
	FMOLS	DOLS	FMOLS	DOLS	FMOLS	DOLS	FMOLS	DOLS
Australia	1.49 (0.35)	-1.21 (-0.56)	1.04 (0.03)	-4.63 (-1.53)	-1.99*** (-2.73)	2.02*** (0.36)	2.25 (1.10)	-1.22 (-0.90)
France	0.27** (-2.02)	0.10* (-1.75)	0.27** (-2.50)	-0.66*** (-3.32)	-0.49*** (-6.24)	0.71 (-0.60)	0.65 (-1.44)	-0.59*** (-3.40)
Germany	1.34 (0.28)	1.30 (0.40)	0.84 (-0.12)	1.08 (0.09)	-1.63** (-2.10)	-2.13*** (-3.59)	1.38 (0.27)	2.29 (1.29)
Japan	- 1.16*** (-3.43)	-1.45*** (-3.11)	0.85 (-0.39)	0.58 (-0.50)	-0.68*** (-3.52)	-0.44* (-1.77)	0.18 (-1.47)	-0.09 (-1.17)
Korea	-1.51*** (-3.36)	-0.82*** (-3.07)	-0.94*** (-3.01)	-0.18** (-2.05)	0.52 (-0.76)	-0.31** (-2.21)	-0.32 (-2.09)	0.64 (-0.58)
Malaysia	2.03 (0.68)	2.38 (0.74)	-1.63*** (2.70)	-3.73*** (-3.80)	1.00 (-0.01)	2.11 (1.42)	-0.98*** (-3.66)	-1.62*** (-4.66)
Netherlands	1.45** (1.44)	0.98 (-0.02)	0.20** (1.76)	-0.20 (-1.33)	-0.93*** (-4.81)	-0.50* (-1.79)	1.15 (0.30)	0.83 (-0.19)
Singapore	4.94** (2.19)	6.71** (2.35)	-0.94** (-2.18)	-2.59** (-2.96)	0.02* (-1.78)	1.03 (0.03)	-0.14 (-1.10)	-2.28 (-1.61)
Taiwan	-2.94*** (-3.19)	-2.68*** (-4.80)	0.58 (-0.62)	-0.35** (-2.06)	-0.07** (-1.97)	0.80 (-0.27)	-0.61 (-1.60)	-1.68** (-2.19)
Thailand	-0.29*** (-2.82)	-1.25** (-2.35)	0.01*** (-3.67)	0.26*** (-4.16)	-0.01*** (-4.27)	-0.28*** (-6.21)	0.03** (-2.30)	0.27 (-1.41)
United Kingdom	0.22 (-0.69)	1.73 (0.48)	1.09 (0.13)	1.33 (0.30)	-1.54*** (-4.00)	-1.28*** (-2.63)	1.68 (1.26)	1.65 (0.76)
United States	-2.20*** (-3.63)	-3.30*** (-3.70)	-0.90*** (-6.06)	-1.17*** (-5.31)	-0.31* (-1.83)	-0.02** (-1.92)	-0.46*** (-3.23)	0.06 (-1.42)
Panel results								
Between (without time dummies)	0.34*** (-4.76)	0.21*** (-4.44)	-0.01*** (-8.61)	-0.86*** (-7.69)	-0.34*** (-11.41)	-0.15*** (-5.53)	0.26*** (-5.64)	-0.15*** (-4.47)
Between (with time dummies)	0.16*** (-5.02)	0.53*** (-3.30)	-1.25** (-13.99)	1.16*** (-2.70)	0.13 (-1.67)	-1.41*** (-4.03)	-0.79*** (-7.20)	3.12 (-1.88)
SUR	0.36*** (8.56)		-0.22*** (-3.90)		-0.27*** (-6.28)		-0.15*** (-6.19)	

Notes: *, ** and *** denote rejection of the null at the 10%, 5% and 1% levels, respectively. Figures in parentheses refer to t-stat which is for $H_{0:}\ \beta_i = 1$, see Equation (4.19) and (4.20).

Among the individual tests, the results are somewhat mixed. For FDI, the estimated coefficients by FMOLS and DOLS are significantly negative for Japan, Korea, Taiwan, Thailand and the United States. The negative figure shows that the increase in China's FDI inflows from these countries will decrease the bilateral trade balance (export to import ratio). We also find FDI exerts a positive impact for France, Netherlands and Singapore.

Before drawing further conclusions at this point, we have to reconsider the role of FDI based on the country/region-specific analysis. China's major trading partners have mixed motivations for market seeking investment, while focusing on the size of the Chinese economy and being export-oriented driven mostly by cost considerations. The latter dominates FDI into China in the first stage. For example, China's FDI inflows from Japan have primarily oriented more to investing in production facilities for export purposes (Masuyama, 2004). Japanese-invested firms have strengthened their links with local firms and increased local procurements (imports). The negative relationship between Japan's FDI and the bilateral trade balance between China and Japan indicates that Japan's production-oriented investment has stimulated more Chinese imports from Japan (intermediate supplies) than the export capacity to the home country. The limited R&D localization by Japanese firms may be part of the reason.

In contrast to FDI motivated by export-orientation, the positive impact of FDI on China's bilateral trade balance with countries such as France, Netherlands and Singapore is noted. These countries tend to be market-oriented, and thus more committed to China's domestic market than to exporting. The multinational companies have taken their investments in China as a core part of their globalization strategy rather than processing products. The FDI firms are making effort in localization and technology transfer. When the local demand is more stratified with domestically produced goods, it will decrease the demand for imported products. Thus, the increase of FDI inflows from these countries exerts a positive impact on the bilateral trade balances.

The determinant RLC has a strong impact on TB as most of the estimated coefficients are significant. Almost all the coefficients are negative only with a few exceptions. The estimated results confirm our prior expectation that the low labour cost affects the trade balance significantly more than the relative price effects. Evidence for the other determinants REX and RLY are mixed. The respective point estimates for REX vastly

differ as the estimated coefficients range from -3.73 for Malaysia to 0.27 for France. For RLY we find significant results for four countries/regions. In the case of France, Malaysia, Taiwan and the United States, the negative relationship between RLY and TB lends support to the notion that an increase in income leads to increased consumption and thus reduces the trade surplus.

For the panel tests, FDI has a positive impact on the dependent variable TB as all reported tests of FDI reject the null hypothesis of insignificance at the 1% level. The coefficient of FDI ranges from 0.16 to 0.53, depending on the model specifications. For REX, all the estimated coefficients are significant at the 1% level. The negative impact of REX on TB is observed as almost all the coefficients of panel results are negative except DOLS with time dummies. All the estimated coefficients of RLC that are significant at the 1% level have reported a negative sign. The panel FMOLS estimates the coefficient as being -0.34 with a t-statistic of -11.41 without time dummies, and the coefficient with time dummies being not significant. For the DOLS estimations, the coefficient is estimated to be -0.15 with a t-statistic of -5.53 with time dummies, and -1.41 with a t-statistic of -4.03 without time dummies. The signs of the RLY coefficients are mixed and the results of the FMOLS and DOLS are not in agreement. The coefficient for RLY estimated by SUR is -0.15 with a t-statistic of -6.19 at the 1% level.

Summarizing the country-by-country and panel results, the labour costs, FDI and the exchange rate, the relative income per capita are all determinants of China's trade surplus. However, the statistical evidence for the determinant RLC is the most significant in the sense that almost all the signs of panel coefficients are consistent with the results obtained in the country-by-country analysis. RLC exerts greater influence than REX as the price effect on the dynamics of TB. The impact of FDI on TB is also significant as the estimated coefficients reported in the panel results are all significant at the 1% level.

7.4 Discussion and conclusion

This disaggregate model investigates the role of the determinants of China's trade balance by applying a model of bilateral trade balance. The indicators such as the bilateral exchange rate, the relative income per capita and relative labour cost between China and its major trading partners, which better measure the relative size of the country in terms of absorption capacity, production capacity and price effect, are included in the model. By

decomposing China's total trade balance into the bilateral trade balances with its 12 major trading partners and applying the "between group" FMOLS, DOLS and SUR panel estimation methods, we are able to overcome the limitation of the existing literature and empirically test the determinants based on both the country-by-country results and panel estimates. Hong Kong re-export data are used to make adjustments to the bilateral trade balances between China and its major trading partners. Applying the adjusted data of bilateral trade balance, the disaggregate data analysis yields a long-run equilibrium relationship between trade balance, relative income, real exchange rate, relative labour cost and FDI inflows.

With the panel data analysis presented above, the exchange rate is found to be an important determinant of China's trade balance which is not in agreement with the results of aggregate analysis. The results of relative income per capita suggest that there is an existence of significant relationships between income and balance of trade with negative signs of coefficients in most cases. The result also reveals two new significant determinants of China's trade balance: low labour wages and FDI. The low labour cost has a much greater impact on China's trade surplus, followed by FDI.

Hence, using disaggregate data, the impact of the exchange rate is important but not as critical as many others have claimed. To reduce China's trade surplus, China could adopt policies that increase labour wage. Increased labour income will result in increased domestic consumption, which in turn increases imports and reduces exports. Given that China has huge international reserves, it probably no longer makes any sense for China to attract more FDI in labour-intensive industries. Instead, China should devise policies that will discourage FDI inflows but encourage investments in overseas markets. Further, the revaluation of exchange rate should be taken into account in policy making. The Chinese yuan should be allowed to more freely float against other currencies, letting the market forces have a major play in determining the role of the yuan. This will in the longer term benefit China's economy.

Chapter 8 CONCLUSIONS

This final chapter is organised as follows. Section 8.1 summarises key findings of the study and draws conclusions. In Section 8.2, the significance and contributions of the study are highlighted. This is followed by a discussion on the implications of the findings of the study in Section 8.3. Finally, in Section 8.4, the limitations of the study are discussed and recommendations are made for future research. .

8.1 Findings and conclusions

Presented below are key findings and conclusions derived from this study.

- China's foreign trade reforms, trade performance and trade balance

Chapter 2 presents an overview of China's foreign trade and trade environment with a focus on current trade balance. Trade reforms are found to accelerate China's integration into the world economy. China's recent trade expansion has been facilitated by a global reduction in trade barriers and growing intra-regional trade in Asia. The large FDI inflow from Asian and Western multinational firms is significantly contributing to the rapid expansion of processing exports and the import of intermediate goods. The processing export sector has performed better than other exports, accounting for more than one half of China's total exports while the imports for processing have lagged behind the ordinary imports. Hence, a detailed analysis of the commodity composition has revealed that the processing trade surplus has accounted for the largest part of China's trade surplus.

- China's economic structure and trade balance

China's export-led growth is rooted in its structural change and its comparative advantage of an abundant labour supply. The share of agriculture in the economic structure is found to have declined from 50.4% of GDP in 1952 to 10.1% of GDP. As productivity increases, there becomes less demand for labour in the agricultural sector and this labour force can be released to the industrial sector. Taking advantage of low-cost labour, there has been an unbalanced growth between different sectors. This study discovers that the trade surplus has been propelled by a sharp rise in the manufacturing sector surplus.

- Economic determinants of the trade balance

Supply-side factors and trade balance

From a supply-side view, the study finds the accumulation of production factors, such as low-cost labour, FDI inflow and improvements in technology, exert a positive impact on the growing trade surplus: (1) a large volume of low-cost labour is accumulated for industrial development; (2) the abundance of low-cost labour has attracted a large part of international direct investment flows. The foreign investment and foreign-invested enterprises are found to improve export capacity as they are more biased towards labour intensive industries and export-oriented industries; (3) foreign investment has led to important transfers of technology which positively affect the productivity level of domestic firms. The technology transfer from MNCs to these local FDI-receiving firms has not only greatly improved the productivity level of FDI-receiving firms, but also generated positive productivity spillovers to other domestic firms (Buckley *et al.*, 2002), which subsequently changed their export behaviour. In China, significant positive productivity and export spillovers from FDI have been found by a number of previous studies (see for example Sun, 2009; 2011).

Relative price effect and trade balance

The relative price effects are captured by two main indicators: the exchange rate and the relative labour cost. (1) A depreciated currency leads to lower export prices but higher import prices and therefore improves the trade balance. (2) The stagnant labour wage and weakened labour bargaining power contribute to China's low labour cost which makes export cheaper, and thus leads to an improvement in export capacity and a trade surplus.

Demand-side factors and trade balance

This study finds that the declining private consumption is an important contributor to trade surplus. Large government consumption/expenditure, the decline in consumer disposable income, the low labour share of income, and income inequality are identified to have led to declining private consumption.

- Socio-cultural factors and trade balance

Unlike previous studies that focus primarily on economic factors to explain trade balance, this study also takes into account social and cultural factors: (1) social structure and social ideology transformations have facilitated the labour accumulation; (2) social connections and cultural similarities have played a key role on China's FDI inflows; (3) demographic factors have weakened the family support expectation and the current working-age population tends to save more; (4) the lack of social welfare system generates more life uncertainty and affects saving behaviour; (5) the "Shanzhai" cultural phenomenon and "Shanzhai" products crowd out the share of imported goods and have a positive impact on trade surplus. Overall, the conclusion reached is that the social and cultural factors identified in the Chinese context played a very influential role in affecting the trade balance. These social and cultural factors, despite the fact that their effects were not quantified in this study, deserve increased attention from researchers and government officials in their efforts to combat China's excessive trade surplus.

- Political-institutional factors and trade balance

In addition to the social and cultural factors, this study also finds that, in China's case, the following political and institutional factors are of crucial influence on China's current trade balance position:

- Segmented labour market
- Strong incentives for local officials to attract inward FDI
- Labour trade unions under a one-party political regime

China's segmented labour market formed by the urban-biased policy, strong incentives by local officials to attract inward FDI for promotion and the weak labour trade unions under the authoritarian regime have largely weakened the labour bargaining power and led to a stagnant labour wage. This study believes these factors affect the economic factors such as the labour market, FDI and labour wage significantly, which then affects the trade balance.

- Empirical findings: the relationships between some key economic factors and the trade balance

Out of all those economic, social, cultural and political factors that have been identified as having impact on China's trade surplus, only some of them, chiefly, economic factors can be empirically verified in this study, due to resource constraints. The effects of some key economic factors, especially the signs and magnitude of the effects of those factors, are econometrically examined at both the aggregate and disaggregate levels. At the disaggregate level, as the bilateral trade data are adjusted before investigating the determinants, the empirical results generated by disaggregate analysis tend to reveal more country-specific characteristics. It is better to sum the outcomes from the micro equations to get the aggregates in evaluating changes of policy impact rather than relying on the aggregate variables to generate aggregate outcomes.

Aggregate results

In the aggregate analysis, it was hypothesised that the changes of trade balance depend on four variables the real effective exchange rate, domestic income, foreign income and FDI inflow. Data from 1983 to 2010 are used for the analysis. Both the long-run equilibrium and the short-run impacts of these four independent variables are examined.

This study finds that there exists a long-run equilibrium between the trade balance and its regressors which consist of domestic income, foreign income, real effective exchange rate and FDI inflows. The estimation results confirm prior expectation. The results for the long-run estimations show that the changes in China's trade balance are dominated by income movements at home and abroad. Foreign income is found to have a positive impact on China's trade balance. An increase in foreign income will promote China's exports, leading to an increase in China's trade surplus. Meanwhile, China's domestic income is found to carry a negative sign. It indicates that an increase in Chinese income will reduce its trade surplus. However, the coefficients of real effective exchange rate and FDI are not statistically significant.

From the results of short-run impact, most of the coefficients are significant, except for the real effective exchange rate, and the lag first difference of domestic income and foreign income. Therefore, the analysis with aggregate data finds that the exchange rate is not significant in the short-run which is consistent with the result in the long-run. The

positive sign of the coefficient of foreign income and the negative sign of the coefficient of domestic income support the Keynesian view that income increases will increase the demand. Thus, the increase of foreign demand improves the trade balance while the increase of domestic demand deteriorates the trade balance. FDI has a positive and statistically significant impact on the trade balance, however, the impact could only be observed in the short run.

Disaggregate results

The initial motivation of disaggregate analysis is to avoid the "aggregation bias problem". The country-specific results can be reflected at the disaggregate level (China's bilateral trade balances with its major trading partners). Indeed, by decomposing China's overall trade balance into bilateral trade balances with its major trading partners, the disaggregate analysis reveals a significant data problem. The reported bilateral trade data are found to only reflect direct trade without taking account of the intermediary role of Hong Kong. Any trade with Hong Kong, whether it involves re-export or not, is reported as trade with Hong Kong. To remedy the data problem, this study re-estimated the actual bilateral trade between China and its major trading partners, by accounting for the re-export via Hong Kong.

The adjusted bilateral trade data are then used to investigate the determinants of China's trade balance at the disaggregate level. The econometric specification hypothesises that the balance of trade depends on FDI inflows, relative labour costs, the bilateral exchange rate and relative income per capita.

Applying the "between group" FMOLS, DOLS and SUR panel estimation methods, this study finds that there is a stable relationship between the variables: relative income, relative cost, FDI inflow, the bilateral exchange rate and the trade balance. Among the individual tests, the results are mixed. The determinant RLC has a strong impact on TB in the sense that most of the estimated coefficients are significant. Almost all the coefficients are negative. The estimated results support our prior expectation in Chapter 5 that the low labour cost has a greater influence on the trade balance through the relative price effect. For FDI, the estimated coefficients by FMOLS and DOLS are statistically significant negative in Japan, Korea, Taiwan, Thailand and the United States. FDI is found to exert a positive impact on the bilateral trade balances between China and France, China and

Netherlands, and China and Singapore. Evidence for the other determinants, REX and RLY, is mixed. The point estimates for REX differ vastly for different countries, with the estimated coefficients ranging from -3.73 for Malaysia to 0.27 for France. For RLY we find statistically significant results for five countries/regions. In the case of France, Malaysia, Taiwan and the United States, the negative relationship between RLY and TB lends some support to the notion that an increase in domestic disposable income leads to more private consumption and thus reduces the trade surplus.

Among the panel results, FDI has a significantly positive impact on the trade balance as all the reported tests using three panel estimation methods reject the null hypothesis of insignificance at the 1% level and all the coefficients are positive. For REX, all the estimated coefficients are significant at the 1% level. The negative impact of REX on TB is observed as almost all the coefficients of panel results are negative except DOLS with time dummies. We tend to conclude that there is a negative impact of the exchange rate on the balance of trade, that is, a depreciation of Chinese currency can improve the aggregate balance of trade. Or, conversely, an appreciation of the Chinese currency will help reduce its trade surplus. The signs of the RLY coefficients are mixed and the FMOLS and DOLS report contrasting estimates. The magnitudes of coefficients estimated for RLY by SUR are relatively smaller in comparison with the magnitudes of RLC and FDI.

8.2 Significance and contributions

This study makes a significant contribution to the trade balance literature, to methodological approaches in identifying the determinants of trade balance, and in particular, to the understanding of the determinants of China's trade balance.

- Contribution to the balance-of-trade literature

The study contributes to theoretical development in trade balance literature. As noted earlier in Chapter 3, there is no standard or general framework for identifying the determinants of the balance of trade. Different approaches offered by existing theories often provide conflicting or inconclusive results, suggesting that the identification of the determinants of trade balance will depend on how the models are structured and specified. Rather than simply following an existing approach, this study proposed a mechanism that

helps explore all major economic factors that affect the balance of trade. Based on this mechanism, three channels are identified to capture the main factors and investigate their contribution to the balance of trade, i.e., the supply-side channel, the demand-side channel and the relative price effect.

Hence, the causal relationships between the factors and the balance of trade changes can be grounded on how these factors behave and how their changes affect the trade balance performance. This thesis, therefore, contributes to the advancement of knowledge on ways that can better identify the determinants of trade balance and analyse the problems of trade imbalance issues, particularly for developing countries such as China. In fact, this thesis is one of the few studies that empirically examine the role of various determinants in the trade balance changes and possibly the first that attempts to construct a comprehensive framework to examine China's trade surplus issue.

- Contribution to research methodology

Earlier studies tend to examine the effects of some key determinants on the balance of trade only at the aggregate level. To deal with "aggregation bias" problem and capture the potential impact of the country-specific effect on the relationship between the variables under investigation, this study has been conducted at both the aggregate and disaggregate levels. What is more significant is that this study re-estimates the actual level of China's bilateral trade with its major trading partners by accounting for the role of Hong Kong re-exports and uses the "corrected" data for the disaggregate analysis. There are discrepancies between results from the aggregate and disaggregate analyses. The possible reason is that the aggregate analysis neglects the heterogeneity among micro units. The disaggregate analysis is likely to be more accurate in identifying the determinants of the trade balance for China. It is necessary to estimate China's actual bilateral trade balance with its major trading partners using Hong Kong's re-export adjusted data and such data are used for trade balance-related studies for China.

- Contribution to policy debate

Previous studies focused more on the role of economic factors, but made limited efforts to understand the influence of country politics and socio-cultural factors on trade imbalance issues. This study contributes to a more comprehensive identification of the determinants of China's trade imbalance by taking into consideration of the role and contribution of

non-economic factors. The processes in which non-economic factors are involved in generating trade surpluses, such as the political influence on the declining labour share of income, labour bargaining power, the saving and consumption behaviour in the socio-cultural context and the role of institutional reforms in accumulating the production factors are all important. Such findings point to the strong need for broader policy and institutional reforms when dealing with China's excessive trade surplus problems rather than just focusing attention on some economic policy modifications.

8.3 Implications

- Government policy

The findings of this study have valuable implications for government policy reforms. Our findings suggest that only adjusting some key economic variables, such as, the exchange rate, would not be sufficient to combat China's excessive trade surplus. Instead, broader approaches are needed. Highlighted below are a few important policy reforms that could take place soon.

(a) Dismantling policies in favour of inward FDI

During the early stages of China's growth, the massive FDI inflow has contributed to improved technology, fixed assets investment and the transition of the entire economic structure. Attracted by China's low-cost labour, FDI inflow focuses on labour-intensive industries which contribute to the large share of China's expanding trade surpluses. As the empirical findings of this study suggest, there is a significantly positive impact of FDI inflow on the trade balance performance. As such, it perhaps no longer makes sense for China to use policies that just generally encourage any FDI inflows. Instead, if any policy incentives are used to attract inward FDI, they need to target technologically intensive foreign investments, so to help China to protect its environment, develop renewable energy, and advance to produce high-valued products.

(b) Increasing investment in the social security system

On the one hand, domestic private consumption demand is sluggish. On the other, China has excessive savings. Cultural factors can only partly explain China's high savings. Instead, the lack of social security protection is the determining factor. The increasing

life uncertainty is not well addressed by social security reforms. As a result, people have to save more for retirement, medical care and their children's education in the future. Increased investment must be made to strengthen the social security system. The coverage of the social security system has to be extended to more diverse social groups, such as private business employees, migrant workers and those self-employed workers. An effective social security system can transfer the traditional obligations of supporting the aged from families to the society and lead to more equitable income distribution among different social groups, and thus help to stimulate domestic demand for consumption.

(c) Rebalancing through labour wage improvement

The productivity growth has risen substantially over the past decades but the hourly compensation of the typical worker has seen only modest growth, especially of the non-skilled workers. The declining labour share of income and weakened labour bargaining power are found to be the main causes for low worker wages. The trade unions in China behave differently from unions in many other countries and in most cases are unable to protect workers' interest. Policy efforts need to focus more on how to increase labour wages through the market-oriented reforms for production factors and liberalisation of the labour market. Since the labour wage is the main component of household income, China's trade surplus will reduce when China's labour income is allowed to increase along with productivity improvements.

(d) Reforming the exchange rate policy

A revaluation of the Chinese currency RMB offers one option for China to reduce its trade surplus. Empirical findings in this study confirm the existence of long-run equilibrium relationships between the exchange rate and the trade balance. The disaggregate analyses also reveal that there is a negative and significant relationship between the exchange rate and China's trade balance. However, China's heavily managed exchange rate regime and tight controls over foreign exchange have made it difficult for the exchange rate to play its role for external balance adjustment. In addition, the heavy control over the exchange rate has also hindered the effectiveness of monetary policy. It would be beneficial for China to allow the exchange rate of its currency to move more freely, and eventually let the market forces have a major a role in determining the value of the yuan.

(e) Removing export subsidies

The use of export subsidies to encourage exports helps maintain employment levels and ease social tensions. However, export subsidies, while distorting, also indulge inefficiency. To address the severe external imbalances, removing export subsidies would be useful.

- Research methodology

This study finds that diverse factors affect a country's trade balance. Focusing on the impact of one factor or one particular economic aspect on a country's trade balance is likely to lead to biased or misleading findings. Hence, the "integrated multi-channel and multi-perspective" framework was developed for a better understanding of China's trade imbalance issues. This framework is applicable to the analysis of trade balance determinants not only for developing countries where peculiar circumstances exist like China but also for any other developed countries. It is anticipated that the use of this framework will improve our understanding of trade balance issues in various countries.

8.4 Limitations and future research

China's large external imbalances are not only reflected to its trade account (goods and services), but also to other parts of the current account and the capital account. In this study, only the determinants of trade balance (goods and services) are investigated. Some issues that are more so related to other parts of the current account and capital account are not taken into consideration. Future research that looks into these areas should be useful to provide a more comprehensive understanding of a country's external imbalance issues.

The lack of accurate identification of determinants of a country's external imbalance is a major problem across countries in their efforts to combat external balances. In this study, although a new framework for identifying the determinants of a country's trade balance was developed, it was only applied to China for empirical investigation due to resource constraints for this study. However, there are differences in cultural practices, political and legal systems, historical background and economic capabilities between countries which may have important impacts on trade balance for these countries. Further research

that applies this framework to multi-country is likely to generate useful comparisons, revealing more interesting information.

Constrained by resource availability, this thesis only carried out econometric analysis of the impacts of some factors on China's trade balance. Various factors would have an impact on China's trade balance. Some factors may also have an impact on the "outcome" of other factors. This thesis primarily focused on some of the economic factors. There were no empirical verifications on the effects of socio-cultural and political-institutional factors on China's trade balance. Hence, some conclusions drawn on such factors were not based on empirical tests. They should be treated as preliminary and should be read with caution. It should be most valuable and warranted that further research is carried out to empirically analyse the impacts of these political, social and cultural factors on China's rising trade surplus.

Although the cointegration results suggest the existence of long-run equilibrium between trade balance and the exchange rate, the coefficients of the exchange rate variable are not statistically significant using aggregate-level analysis. Generally, it would be expected that variations in exchange rates would lead to some observable changes in trade balance. In China's case, it could be due to the fact that the income effect for overseas consumers resulting from China's low-priced exports is quite substantial. Should this be the case, the exchange rate variations could have affected the size of trade balance but would have been "muted" in the modelling process because much of the income effect may have been captured by the "foreign income" variable. If this is proven to be the case, then, such a finding can have significant implications for China's strategy to combat its persistent trade surplus. That is, variations in its exchange rate may be helpful but will not be a most powerful policy instrument. Instead, China should focus more on correcting the export prices by paying workers the true wage as they deserve rather than depressing their wage income in order to sell cheaply overseas. Hence, empirical verification of this proposition is warranted and likely to be rewarding.

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