Understanding China’s foreign trade: a literature review (I)

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(Received 23 March 2014; accepted 28 April 2014)

With the objective of gaining a better understanding of China’s foreign trade, this paper provides a literature survey based on recent research output published in major economic journals. It covers topics on the general features and characteristics of China’s trade described at the country level and industry level, the impacts of China’s foreign trade on economic growth and technology progress, and the performance of Chinese firms engaging in international trade. We also provide some critical summaries and comments on the existing studies for each topic.

‘We will make it a strategic priority to upgrade exports and promote the balanced growth of foreign trade. ... We will foster a new open-economy system and advance a round of opening-up to embrace the international market. This will lead to deeper reforms and structural adjustment and enable us to enhance China’s capacity to compete internationally.’ – Premier Li Keqiang in 2014 Government Work Report (March 5, 2014)

1. Introduction

In 2013, China’s combined imports and exports rose to USD 4.16 trillion, replacing the US to become the world’s largest trading country in merchandise for the first time. Recently, Premier Li Keqiang lowered the annual target of trade growth to 7.5% for 2014. ‘We will keep export policies stable, accelerate reform to facilitate customs clearance and extend trials of cross-border e-commerce. We will implement policies to encourage imports and import more products in short supply in China’ (Premier Li Keqiang, 2014 Government Work Report).

The success of future reforms crucially depends on what we have done in the past and what the present situation is. A key question is how much do we know about China’s trade in addition to the aggregate statistics such as the value of imports and exports in each year. Through this survey, we hope to acquire a comprehensive and systematic understanding of China’s foreign trade based on existing studies.

The corpus of literature on China’s foreign trade is huge.1 Like any survey article, ours is highly selective in a number of dimensions. First, we focus on the most recent articles. More specifically, we only include research papers from 2000 onwards, with more emphasis on the most recent years. This is because others may have already done literature surveys on China’s trade before 2000. More importantly, China’s trade has undergone rapid changes in the past two decades or so, and thus we need to have a systematic picture about recent developments and the present situation. Second, we only select articles already published (or forthcoming) in academic journals. There is no doubt

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that many recent working papers are potentially good publications in the near future and they can strengthen (or have already strengthened) our understanding about China’s trade, but we have to leave them for the next survey. Third, our survey is strongly biased towards research papers published in English journals. We also include publications in four China-based journals, which are the Economic Research Journal, China Economic Journal, China Economic Quarterly, and Frontiers of Economics in China. This selection has no implication on our views about the quality of journals, especially those based in China but not included. Fourth, this survey covers papers belonging to the following three categories: (i) China’s trade structure and developments, at the country and industry level; (ii) the impacts of trade on economic growth and the other aspects of the economy; and (iii) firm-level trade. This means that we have left out many other important topics such as China’s trade policies and their impacts, China’s engagement in regional trade agreements and the WTO, and China’s intellectual property right protection.\textsuperscript{2} We leave these important topics for the next survey. Finally, it is true that by nature almost all research on China’s trade is empirical. A few papers, including some covered in this survey, have some theoretical analyses, but with the primary purpose of understanding their empirical findings. Pure theoretical papers on China’s trade are even fewer.\textsuperscript{3} Thus, this survey mainly covers empirical papers.

There are some common features in all of the papers discussed in this survey. First, most of the papers adopt methodologies developed in the existing literature of international trade. Hence, our discussion will focus on the results from their applications to China’s trade data. While a few papers do include some theoretical models or introduce new methods of analysis, we leave them for readers to study if they are interested. Second, many papers conduct their empirical analysis using the same sources of data on China’s trade and manufacturing. To avoid repetition, instead of mentioning the data source of each paper later, we list some common sources here. They include China Statistical Yearbooks, China Customs General Administration Dataset, Survey Data of Chinese Industrial Firms from National Bureau of Statistics of China, China Business Yearbook, China’s Foreign Economic and Trade Yearbook, the UNCTAD and WDI database of the World Bank, the IMF Financial Statistic Yearbook, and UN Comtrade Database. However, we still mention some data that are uniquely compiled and constructed by the authors.

The rest of the paper is organized as follows. Section 2 provides a general picture of China’s trade, described based on country- and industry-level data. Section 3 reviews the impacts of trade in China. Section 4 discusses papers on the performance of Chinese firms engaging in international trade and features of China’s trade based on firm-level data. We include some concluding remarks in Section 5.

2. China’s Trade Structure and Development: Country and Industry Levels
We divide this section into two parts. First, we survey articles about China’s trade characteristics and developments. Second, we search for possible explanations.

2.1. Characteristics of China’s Trade
To get the big picture about China’s trade, one needs to ask a few questions. What factors determine China’s pattern of trade? Is it mainly determined by comparative advantages as suggested by traditional trade theory, or by the new trade theory based on increasing returns to scale and imperfect competition? What are the important features of China’s trade?
Yue and Hua (2002) calculate China’s revealed comparative advantage (RCA) for the period of 1980–2000 and conclude that China’s export pattern is congruent with its factor-endowment-based comparative advantage. It indicates that China’s economic reform has shifted its exports from capital-intensive sectors to labor-intensive sectors. Sanidas (2009) divides 14 industrial sectors into four groups and then ranks the largest 100 countries in the world by their revealed comparative advantages (RCAs), which are calculated by the International Trade Centre (ITC) using data for 2004, for each sector group. Results show that China has a relatively high RCA in the group including clothing, leather, and textile goods, with a rank of four among all 100 countries. Yang, Yao, and Zhang (2009) investigate the technological upgrading of Chinese exports. They divide all products into four groups, i.e., primary, low-tech, medium-tech and high-tech products. They find that the RCA index of the high-tech products rose dramatically from 64 in 1994 to 170 in 2006. The RCA index of medium-tech goods slightly increased, but the RCA index of primary and low-tech products deteriorated.

Chen, Pan, and Xie (2008) focus on one type of factor, energy, embedded in China’s trade. They measure energy embodied in the goods of China’s exports and imports from 2002–2006. The primary energy consumption data are obtained from the International Energy Agency. Their results indicate that China is a net exporter of energy embodied in its internationally traded goods. In 2002, the embodied energy in China’s exports was around 410 million tons of coal and the embodied energy in imports was 168 million tons of coal, meaning the net export of embodied energy is equivalent to nearly 240 million tons of coal. Compared with 2002, net export of embodied energy increased by over 162% in 2006.

The factor-endowment comparative advantage theory suggests that China’s export should be more labor intensive, but many researchers are interested in examining the technology and product sophistication aspects of China’s exports, mostly inspired by the work of Rodrik (2006). Based on the assumption that products exported by higher-income countries are more sophisticated, Rodrik (2006) finds that the product sophistication of China’s exports in the 1990s is exceptionally high, much higher than a ‘normal’ country at China’s income level.

Du and Wang (2007) calculate the technology index of China’s exports from 1980 to 2003, a period different from that of Rodrik (2006), and find that the general technology level of China’s exports has greatly improved since its economic reforms even though it is still lower than the average level of developing countries. They also show that the proportions of high-tech and low-tech goods in China’s total exports are both decreasing. In 2003, the middle- and middle-to-low-technology products took the largest share in China’s exports. In contrast, Fan, Kwan, and Yao (2006) develop a methodology to measure the revealed technological value-added (RTV) of traded goods. They further develop four indexes, which are Competitiveness-Complementarities Index, Competitive Stress Index, Technology Index and Classification Index. They find that over the period 1999–2003, China imported relatively high-technology goods and exported relatively low-technology products; China faced severe competition from the EU in middle- and high-technology sectors; China’s exports have been increasing over this period of time, with the share of low-technology goods decreasing by nearly 16% from 1995 to 2003, even as the share of high-technology goods increased by 3%, which contradicts the finding of Du and Wang (2007). Wei, Wang, and Li (2011) also study the technology content of China’s trade but reach different results.
Schott (2008) examines Chinese exports by comparing China’s exports to the US market with the exports to the US market by other countries, especially OECD countries. The paper compares the breadth of manufacturing product categories that China exports to US with the breadth of manufacturing product categories exported by OECD and shows that OECD’s share of US manufacturing imports dropped from 83% in 1972 to 48% in 2005, while the US market share of China has gradually increased from almost 0% to 19%. The authors also measure the within-product competition between China and developed OECD economies by comparing their export prices (unit values) within manufacturing product categories. Regression results indicate that China’s export prices are consistently lower than the export prices of other US trade partners that have a similar level of development as China. China’s export prices were shown to be 8% lower in the 1970s and 48% lower in the 2000s, holding GDP per capita constant. This paper interprets export price gaps within product categories as quality gaps. Xu (2010) finds that China’s export product sophistication is not that special if we also consider the product quality and China’s export capability.

These studies do not give a clear conclusion on whether Chinese exports on average have higher technology embedded than normal developing countries, but they show a trend of increasing sophistication.

Global Supply Chain

China plays an exceptionally important role in the global supply chain. For a long period of time, processing trade took up about 50% of China’s total trade. An important question related to this phenomenon is how much China benefits or contributes to the global supply chain, or how much domestic value added (DVA) is included in China’s exports? Chen et al. (2012) examine this issue using an extensive input-output table. They find that for every 1000 US dollars Chinese exports in 2002 (2007), the total DVA was US$466 (US$591). From 2002 to 2007, DVA greatly increased. They also find that non-processing exports lead to higher total DVA in all sectors than processing exports. Specifically, labor-intensive manufacturing exports, like textiles and garment products, are found to generate higher total DVA than high-tech exports such as electric and machinery equipment. Koopman, Wang, and Wei (2012) obtained similar results. They found that from 2002–2007, the share of DVA in Chinese manufacturing exports rose from 51% to 60%; Chinese low-skilled labor-intensive sectors like apparel exhibited remarkably higher shares of domestic content than sophisticated or high-skilled intensive sectors, such as computers, electronic and communication equipment. In addition, they also found that the share of embodied DVA in the exports of foreign-invested enterprises was relatively low. Upward, Wang, and Zheng (2013) use firm-level data to compute DVA in Chinese exports. Their results show that the share of DVA in China’s manufacturing exports increased from slightly above 50% to 60% from 2003–2006. Moreover, processing trade firms, foreign firms and firms that locate in coastal regions tend to have significantly lower shares of DVA in exports.

Johnson and Noguera (2012) measured the value added content in trade for 94 countries using I/O tables and bilateral trade data in 2004. They found that in general, value added exports represented about 73% of gross exports. However, the ratio of value added to China’s gross export decreased substantially from 0.70 to 0.59 after adjusting for processing trade. In the US—China case, value added trade deficits for the US is 20% (34%) lower than gross trade deficits without (with) processing trade adjustment.

With regard to the engagement in processing trade, Zhu and Yang (2009) examine the difference between two export-oriented regions, namely the Yangtze River Delta and the
Pearl River Delta, from 1997 to 2005. Results show that the foreign trade structures of two regions are quite different, with the Pearl River Delta greatly focusing on low value-added processing with imported inputs, while the Yangtze River Delta mainly engaging in ordinary trade and assembling. At the firm level, foreign-owned firms have replaced state-owned enterprises in dominating foreign trade in both regions.

Given the prevalence of processing trade in China, it is important to understand the organization of processing trade. Fernandes and Tang (2012) take the property-right approach to analyze this issue. They first observe that foreign firms have different degrees of vertical integration with Chinese assembly plants, and Chinese assembly plants can have pure-assembly (materials imported for processing mainly determined by the foreign firms) and import-assembly (materials imported for processing mainly determined by the assembly plants). The model predicts that the prevalence of a firm’s integration in processing trade is largely determined by its headquarter’s control over imported inputs for assembly. Their empirical results based on firm- and product-level data at HS 6-digit in 2005 support the theoretical prediction: trade share of vertically integrated plants in total processing exports is positively associated with intensity of inputs, such as skill, capital and R&D, provided by headquarters when Chinese assembly plants have control over input purchase (import-assembly), consistent with the property-rights theory of intra-firm trade; under a pure-assembly regime, no positive correlations between headquarter intensity and the exports of vertically integrated plants are observed.

■ Summary and Additional Comments.

Most of the research focuses on China’s exports and show much less interest on imports. This is a clear imbalance. While the older literatures (say before 2000) deal with comparative advantages a great deal, in contrast, the current literature pays a lot of attention to the domestic value added of China’s exports and the technological content of China’s exports. This reflects the literature’s increased interest in the global supply chain.

2.2. Explanations for China’s Trade Development

Although most of studies on the features of China’s trade are related to domestic value added of exports, many researchers explore the explanations for China’s trade growth. This is due to the fact that China has had the fastest growth in trade for a long period, and thus, people are very interested in knowing the reasons.

■ Export Growth

There is no doubt that China’s export growth is phenomenon. This inspires researcher interest in discovering explanations for the rapid growth. We have seen a large variety of explanations.

Earlier, we pointed out that Yue and Hua (2002) calculated the comparative advantage of each province in China. They also concluded, based on data from 1990–1998, that provinces following comparative advantage in their international trade will achieve more exports and higher growth of exports. Li and Wang (2010) also used provincial level data to examine the factors of trade growth through comparison. Based on incomplete contract theory, contract enforcement greatly influences productivity, and then generates crucial impacts on the comparative advantages of one country (or region). They hypothesize that
regions with a high degree of contract enforcement efficiency will export more products, especially contract-intensive goods. Data of contract enforcement efficiency for 30 Chinese provinces were collected from the China Business Environment Report 2008 of the World Bank. Their empirical results from TSLS regression confirm theoretical predictions. However, they also find that contract efficiency improvement tends to depress China’s exports in human-capital-intensive industries. Their further analysis reveals that different degrees of market integration across industries mainly accounts for this surprising result. Feenstra et al. (2013) used the same dataset to analyze the same issue. They used the Nunn index to measure degree of contracts. They hypothesize that the impact of institutional quality is larger for the types of trade that rely more on contract enforcement. Their empirical study based on data from 1997 to 2008 supported their hypothesis. In particular, they find institutional quality is a significant factor in determining Chinese provincial export patterns and it matters more for processing trade and for foreign firms’ trade because these types of trade rely on contracts more.

Jiang (2008) examined China’s export growth using industry-level data (HS4-digit) from January 2000 to April 2005 (monthly). The empirical result shows that the capital—labor ratio has a significant negative effect on the export growth rate, which is congruent with comparative advantage theory. The coefficient on the capital—profit ratio is negative and significant, implying a positive effect of intensifying market competition (lower profits) on export growth. In addition, both the US import growth rate and output growth rate of foreign-funded firms exert a positive effect on China’s export growth rate. In sum, comparative advantage, market structure and global integration penetration are the three most important determinants of China’s export growth rate and export structure.

Wu and Liu (2010) argue that a conventional gravity equation with macro-level determinants is insufficient to explain the rapid growth of China’s trade over the past three decades. Based on their theoretical model, they hypothesize that China’s trade expansion is mainly due to the vertical outsourcing of multinational corporations (MNCs) and the intra-product specialization of Chinese enterprises. Using time-series data from 1978–2007, they find that transportation, processing trade, capital per capita and vertical disintegration of production all significantly influence China’s trade volume, congruent with the theory. Moreover, production disintegration is found to be the Granger causality of China’s trade volume growth. Jiang (2007) examined eight factors that potentially have an impact on China’s export growth and product structure upgrading. The paper finds that comparative advantage, domestic industrial foundation and domestic market structure, and participation in the global division of labor are the three main factors.

Qian and Xiong (2010) decomposed China’s trade into intensive margin (increasing trade volume or value) and extensive margin (increasing exporting firms, destinations or products) and found that China’s export growth is mainly driven by intensive margin. The relative economic size of foreign trade partners to China significantly promotes China’s intensive margin but blocks the trade expansion in extensive margin. They reach this conclusion based on the period of 1995–2005 and using Tobit and the Poisson pseudo-maximum likelihood estimation approach to conduct the empirical analysis.

Shi (2011) goes one step further to decompose intensive margin to quantity margin and price margin in order to see whether the change in intensive margin is due to quantity or quality (price). Using HS6-digit export data of China to 140 trade partners in 2002 and 2007, the author shows that quantity margin is the main source of China’s export growth. Specifically, quantity, price and extensive margin respectively account for 69.18%, 15.67% and 15.14% of China’s export growth between 2002–2007.
Focusing on China’s exports to the US market, Schott (2008) found that the extensive margin (new products) accounted for 45% of China’s export growth from 1972 to 1988, but only 6% from 1989 to 2005.

Increasingly people pay more and more attention to the impact of financial development on trade. To explore this effect, Bao and Yang (2007) make use of panel data of 30 Chinese provinces from 1990 to 2003. They adopt four indicators of regional financial development in China, which include one financial efficiency indicator and three financial scale indicators. They find that financial institution efficiency, using a saving-investment transformation ratio as a proxy, generates more significant positive effect on provincial foreign trade, especially manufactured products trade, than financial scale indicators.

Liao, Shi, and Zhang (2012) examine the impact of exchange rate shock on China’s trade taking into account the vertical structure of China’s trade. The empirical study is based on a dynamic general equilibrium model of a small open economy. The content of imported intermediate goods in exports is shown to crucially determine how exports respond to exchange rate shocks. Due to vertical trade, China’s exports may benefit from the currency depreciation of East Asian intermediate goods suppliers due to implied lower input costs, given that prices for intermediate inputs are not very sticky and share of intermediate goods in exports is high. In addition, they also calibrate the currency shocks of the Asian Financial Crisis and find that China’s exports increase by 0.93% during crisis, with vertical trade explaining nearly 60% of the total export increase.

### Trade Imbalance

What explains China’s trade imbalance? Zhang and Wan (2005) explore possible reasons for the fluctuation of China’s trade imbalance from 1985–2000. Utilizing Chinese quarterly data from 1985–2000, they empirically estimate their VAR model and find China’s trade balance fluctuations are mainly driven by real shocks. Especially, relative demand shock explains over 70% of trade balance fluctuations. The impact of the nominal exchange rate shock on China’s trade balance is limited. So they conclude that China’s trade imbalance, which is greatly driven by structural factors, could not be effectively reduced by monetary policy instruments.

Yang (2012) provides an extensive survey on factors affecting external imbalances in China. His analysis focuses on the impact of high aggregate savings in China. He also points out that China’s trade surplus and current account surplus are predominantly driven by trade-promoting policies, like self-balancing regulations, export tax rebates and special economic zones, as well as import-restraining policies and exchange rate policy.

Ju et al. (2012) focus their analysis on the bilateral trade imbalance between China and the US. They present some stylized facts. The share of US imports from China in its total imports increased substantially from 1989–2008. Meanwhile, the share of China’s imports from US has declined from 10% to 6%. They empirically examine the impact of comparative advantage factors on US-China trade structure using panel data from 1989–2008. Panel fixed-effects regressions reveal that China’s relative labor productivity has a positive and significant effect on China’s exports to US, controlling for the industrial GDP of China and the US, tariffs, transportation costs and capital intensity. However, the relative labor productivity of the US exhibits negative but insignificant effect on its exports to China.
Xu and Lu (2009) empirically test the hypothesis that China’s more and more sophisticated export structure is mainly explained by foreign direct investment (FDI) and processing trade. They utilize US import data at HS 10-digit to compute the across-product (export structure) and within-product (export prices) sophistication of Chinese industrial exports from 2000–2005. They find that the overall presence of foreign-funded firms and processing trade share seem to have no significant effects on both across-product and within-product export sophistication of Chinese industries. However, the industry-level export sophistication is positively correlated with the presence of OECD-owned firms and the share of processing exports of foreign-invested firms but is negatively associated with the share of processing exports of domestic Chinese firms.

3. The Impacts of China’s Trade

The previous section presented some features of China’s trade and provided some explanations. It is perhaps more important to learn about the impacts of China’s trade. In this section, we divide the research into two parts, one about the contributions of trade to economic growth, and one about the other impacts.

3.1. Contributions to Economic Growth

A very important question is ‘How much does trade contribute to growth in China?’ Such an issue has been extensively and intensively analyzed in the growth accounting literature in which the contribution of trade is studied along with other factors such as labor and capital. However, there exist many studies that focus purely on the impacts of trade.

Lin and Li (2003) point out that earlier studies, merely employing a direct approach to estimate the contribution of China’s international trade to its economic growth, may arrive at downward-biased conclusions since they ignore the indirect effect, that is, China’s
exports growth may stimulate domestic consumption, imports, investment and government expenditure. To correct this, this paper combines linear equations of national identity, imports, consumption and investment. Based on data of 1979–2000, it finds a higher contribution of exports to economic growth, in comparison with prior studies using a traditional approach. On average, a 10% increase in China’s exports will bring about 1% increase in GDP.

Different from the above paper, Shen and Wu (2003) use input-output tables to measure the contribution of Chinese exports to GDP and GDP growth over 1997–2001. They claim this will give a more precise measure than other methods. Results based on the I/O tables show that China’s exports account for over 14% of its GDP over this period. The contribution of exports to GDP growth rate fluctuates a lot, ranging from 0.24% in 1998 to 2.56% in 2000. On average, the contribution of exports to GDP growth rate is around 1%. In addition, this paper finds that exports of textiles, apparel, electronic and machinery equipments contribute the most to GDP and GDP growth among 26 Chinese industries.

Yao and Wei (2008) examine the growth effect of China’s exports, together with the exchange rate and FDI, using the Dynamic Panel Data (DPD) estimation methodology. Potential endogeneity of explanatory variables, like FDI and exports and capital stock, are solved by using instrumental variables (IVs). They use provincial level data from 1978 to 2000. They find that exports and FDI tend to positively affect the economic growth of China, controlling for exchange rates and factor endowments. But the positive effects of exports and real exchange rates are found to be much stronger than that of FDI. On the other hand, economic growth significantly promotes exports and largely determines China’s FDI inflow. GDP, exports and FDI are all positively affected by real exchange rate of China.

Some researchers examine the growth effects of different types of trade on China. Yan et al. (2009) conduct careful econometric analysis to examine the long-run cointegration relationship between China’s processing trade and macro-level variables using time-series data from 1995–2007. They find that both ordinary trade and processing trade significantly promote China’s economic growth, but the contribution of ordinary trade is much more than that of processing trade. Moreover, their analysis shows that processing trade significantly stimulates employment.

1 Specific Aspects of Trade and Economic Growth

The research discussed above is about the effects on economic growth by trade aggregation. Many researchers also look at what specific aspects of trade contribute to the growth. Shen and Li (2003) explore the mechanisms through which China’s foreign trade contributes to the economic growth. They focus on output per capita, rather than total GDP. They revise the methodology introduced by Frankel and Romer (1999) to decompose output per capita into three components: capital/output ratio, human capital and technology. They find that over the period from 1978–1999, the proportion of international trade in GDP had a positive effect on output per capita, but the domestic trade share tends to negatively affect output per capita. They find that the international trade share is positively and significantly associated with the capital/labor ratio and institutional reform. Xiong, Wei, and Yang (2012) also analyze provincial level trade and growth data and reach the conclusion that trade openness exhibits positive and significant effect on regional economic growth, and the increase in trade openness leads to faster economic growth in low-income regions.
Jarreau and Poncet (2012) study the impact of export sophistication level of Chinese provinces on their per capita GDP growth from 1997 to 2009. Controlling for regional income level, export sophistication is found varying substantially across Chinese provinces. Regression results from both cross-section and panel fixed effects models show that the export sophistication of Chinese provinces significantly stimulates the GDP per capita growth rate, controlling for initial income level and all possible determinants of economic growth. China’s economic gains are mainly driven by improved technology embedded in ordinary exports of domestic firms. In contrast, processing trade and exports of foreign-owned firms seem to make no contribution.

Wang (2006) uses Chinese data from 1980–2002 in a VAR model to estimate the role of trade structure in promoting economic growth for China. The paper first defines trade structure as the relative quantity of capital goods to consumption goods in exports over their relative quantity in imports. Similarly, technology intensity is expressed as the relative quantity of high-technology goods to middle-to-low-tech goods in exports over their relative quantity in imports. Cointegration tests show that both trade structure and technology intensity are cointegrated with real GDP growth rate. However, it finds that only one-way causality exists. China’s economic growth is found to significantly affect trade structure and technology intensity. Specifically, economic growth promotes the exports of capital goods and high-technology goods. However, trade structure and technology intensity seem to have no significant impact on economic growth, contrary to the results found in existing studies. Thus, the author concludes that it is trade volume expansion, rather than trade structure upgrading, that mainly contributes to economic growth.

He and Sun (2012) also examine the effect of trade on GDP growth in China. Based on an extended technology diffusion model of Acemeglu (2009), this paper predicts that if foreign technologies spill over to China via international trade, financial deregulation should complement international trade in stimulating economic growth. The authors gather financial reform information from the publications of the Chinese Academy of Social Sciences, which record all reform polices of China from 1978 to 1998. Their empirical analysis reveals that both trade to GDP ratio and financial reform significantly promote provincial output per capita growth between 1978 and 2004, but coefficient estimates of interaction term of trade and financial reform are not significant, indicating no complementarity between trade and financial deregulation. Since complementarities between FDI and financial reform have been found by other studies, the authors claim that foreign technologies may transfer to China via FDI rather than international trade.

Welfare is closely related to GDP. Chen and Ma (2012) examine the welfare impact of increasing import varieties in China. They find that welfare gain due to new imported varieties from 1997 to 2008 amounts to 6.2% of GDP. It is equivalent to 0.53% of GDP in each year.

**Summary and Additional Comments.**

The impact of trade on economic growth is perhaps the most important issue. This is about the gains from trade. However, the quantitative evaluation generally finds the contributions of trade to GDP growth to be small, at least smaller than normally expected. Most of the research focuses on the effects of various aspects of trade on economic growth, and some pay attention to the mechanisms through which trade affects growth. This is an important direction. We hope to see more research on this topic.
3.2. Other Impacts

■ Trade and Productivity Progress

Many researchers are also interested in the technology effects of trade. Li, Lu, and Zhu (2008) explore the effect of trade on the productivity growth of Chinese manufacturing industries. Distinct from other studies, this paper decomposes the total factor productivity growth of 32 Chinese industries into technology efficiency growth and technology progress growth. They find that Chinese industrial TFP growth from 1998–2003 is mainly explained by technology progress growth rather than technology efficiency growth. Imports greatly boost TFP growth and technology progress for Chinese industries, but exports seem to have no significant effect on productivity growth. Berdell and Dong (2011) explore the effect of imported intermediate goods on the productivity growth of the Chinese manufacturing sector from 2005–2006. They find that both the change in imported to domestic intermediate inputs ratio and gross output growth rate have positive and significant effect on TFP growth rate. Chen (2011) uses provincial level data to show that an increase in export product varieties results in significant increase in productivity. His regression estimates show that a 10% increase in export varieties leads to a 1.4% productivity growth in China.

Yao (2011) investigates the possible linkage between China’s international trade and technology progress using Chinese time-series data between 1983–2007. The author points out that the conflicting results in the literature may be due to an endogeneity problem and non-stationarity of data. This paper tries to address this issue by adopting a bounds tests approach (Pesaran, Shin, and Smith 2001) to evaluate the cointegration relationship between trade and technology progress. Technology progress is defined as the change of TFP. Results of bounds testing show that no cointegration relationship exists among TFP, share of total trade in GDP (or share of export in GDP) and FDI. However, TFP, import share and FDI are cointegrated at 5% significance level. Furthermore, it finds a two-way causal relationship between changes of imports and changes of TFP in the long run, but not in the short run.

Xue and Zhao (2009) examine the spillover effect of trade on domestic innovation. They build a theoretical model and predict that for exporters of an innovation laggard country, like China, exports will induce them to reduce product innovation and focus on process innovation when there are limited resources for innovation. Using panel data of 37 Chinese manufacturing industries from 2001 to 2003 and the 2002 I/O table, they find that horizontal spillovers of exports have no significant effect on of the productivity of domestic firms, but backward linkage spillovers of both domestic firms and joint-venture firms are found to be positive and significant. In particular, backward spillovers of exports to process innovation of domestic firms are positive, but backward spillovers to product innovation are negative, lending support to their prediction.

■ Others

The impact of trade on income inequality is an old topic. While the conclusion from trade theory is clear, the empirical findings are mixed. For example, Heckscher-Ohlin model predicts that trade liberalization of a labor-abundant country, like China, will increase the relative returns to its unskilled labor. Han, Liu, and Zhang (2012) reexamine this issue using Chinese data. The usual difficulty with such empirical investigations is to
isolate the effect of trade liberalization from others such as technology progress. The authors contribute to the literature by examining how the two crucial trade liberalization shocks of China, namely Deng Xiaoping’s Southern Tour in 1992 and China’s accession to the WTO in 2001, impact wage inequality in urban China. They divide China into high-exposure and low-exposure regions. Empirical results show that both the South Tour and WTO accession are associated with widened between-region wage inequality, contrary to the theory. And China’s accession to WTO significantly raises within-region wage inequality in exposed regions through generating more rapid real wage growth in the upper half of wage distribution. They further find that higher within-region inequality can be explained by rising returns to education in exposed regions.

Different from the above paper, Lu and Cai (2011) examine the influence of effective factor endowments and trade openness on the income distribution of 24 Chinese provinces from 1997 to 2005. The Gini coefficient is used to measure income inequality. Effective factor endowment of a region is constructed as the relative factor endowment of this region to the total factor endowment of the country. The regression results reveal that regional trade openness, human capital and labor tend to significantly widen the income gap across Chinese provinces. In contrast, endowments of land and capital significantly relieve income inequality. They also find that the coefficient of interaction term between trade openness and labor is positive and significant, meaning that trade openness will result in larger income gap for labor-abundant regions.

Chen et al. (2012) estimate the employment contribution of Chinese exports. They find that for every USD 1000 dollars of Chinese exports in 2002 (2007), the total employment is 0.242 (0.096). From 2002 to 2007, employment dramatically declines. Non-processing exports lead to higher employment in all sectors compared to processing exports. Specifically, labor-intensive manufacturing exports, like textiles and garment products, are found to generate higher employment than high-tech exports such as electric and machinery equipment.

Liang and Shi (2004) reexamine the correlation between trade and FDI using Chinese data from 1980 to 2001. They first find the cointegration between FDI and export (import). They then find the complementarity between total export (import) and FDI, which is supported by the finding on the existence of two-way causality. Using lagged FDI data, they also find that FDI exhibits a trade-facilitating effect in the second and third years of the inflows. Qiu, Tang, and Sun (2007) take the same approach to analyze the correlation between FDI and trade in China from 1983–2004. They reach similar conclusions.

Summary and Additional Comments.

The effect of trade on productivity attracts a lot of research attention. However, the findings are mixed. This is perhaps the conclusion from aggregate trade. We will review the results based on firm level data later in this paper.

The effect of trade on income inequality from China is different from the prediction of Stolper-Samuelson Theory based on the Heckscher-Ohlin Model. We do not get sufficient explanations for this result. More research along this line is necessary as income distribution is such a crucial issue in China.

4. Chinese Firms in International Trade

The new-new trade literature focuses on the roles of heterogeneous firms in international trade and the micro level of a country’s trade characteristics. The bulk of the recent
literature on China’s foreign trade also follows this trend. Most of researchers treat econometrics in their studies seriously. For example, many papers address the self-selection of export decisions by employing a propensity score matching approach and use a difference-in-difference method. Some use instrumental variables to tackle the endogeneity problem.

- **Features of China’s Trade Obtained from Firm-Level Data**

Manova and Zhang (2012) present six stylized facts about the export prices and imported input prices of Chinese trading firms in 2005, and highlight the importance of product quality in understanding firm heterogeneity. First, across firms selling a given product, the firm’s export revenue has a positive correlation with export price. Second, firms that export more, that have more export destinations, and that charge higher export prices, use more expensive imported inputs. The next four stylized facts are about quality differentiation across destinations. Third, firms charge higher f.o.b. export prices for larger, richer, more distant and less remote markets. Fourth, firms earn larger revenues from a given product to destinations where they set higher f.o.b. prices. Fifth, across firms within a product, a firm’s number of export destinations for a given product is found to be positively correlated with its standard deviation of export price, which indicates that firms with more export destinations offer a wider range of export prices. Finally, firms that export more, that enter more destinations, and that charge a broader range of export prices, pay a wider range of imported input prices and import inputs from more source countries.

In conclusion, the authors suggest that international trade models should incorporate product quality differentiation both across firms and across destinations within firms to provide explanations for these newly explored trade patterns.

Lee, Park, and Wang (2013) present some stylized facts about Chinese imports, based on firm-level trade data at HS 8-digit product category in 2000 and 2008 from Chinese Customs. It empirically estimates the extensive margin (number of products) and intensive margin (the amount imported per product) of Chinese imports by employing both static gravity equations and a dynamic partial-adjustment model. On average, China imports more from larger and less distant countries. And free trade agreement significantly promotes China’s total imports from partner countries. Similarly, both China’s total number of imported goods (extensive margin) and average value of imported products (intensive margin) are positively correlated with the GDP of trade partners, and negatively correlated with distance. These findings hold for imports of both final goods and intermediate inputs, and for all three types of importing firms—private firms, foreign firms and state-owned firms. In sum, the intensive margin of imports is similar among all three types of firms in China. But foreign firms show higher extensive margin for both final goods and intermediate inputs than other firms and thus dominate China’s imports.

Chen, Chen, and Zhou (2012) examine the impact of trade costs on intensive margin (average exports of firms) and extensive margin (number of exporters). They document the export dynamics and dual margin structure of Chinese enterprises from 2000–2005. Their empirical results reveal that the economic size of destinations has significant positive effect on total export, intensive margin and extensive margin. And bilateral distance significantly reduces both margins. They conclude that China’s export growth resulting from reduced trade costs comes in large measure through extensive margin.

Firms may face financial constraints, which may affect a firm’s performance and export decisions. This is the issue analyzed by many researchers for other countries and some for China. Feenstra, Li, and Yu (Forthcoming) look at the issue differently. They
show that in fact exporters may face more financial or credit constraint than non-exporters due to the higher risk and uncertainty associated with exporting. They use a model with asymmetric information between the banks and producers to explain this. They also use Chinese data to confirm their prediction. That is, Chinese exporters face more severe credit constraints than pure domestic firms.

This literature, especially the two papers by Manova and Zhang (2012) and Lee, Park, and Wang (2013), has provided us a comprehensive description of the micro features of the imports of Chinese firms as well as exports. For this reason, future research efforts are expected to focus on other issues.

- Determinants of Export Decision Making: Productivity and Other Variables

How are exporters different from non-exporters? Many researchers have analyzed this question extensively, both theoretically and empirically, using the experiences of many countries. It is generally found that firms with higher productivity will export. Exporting firms also have other areas of good performance. This has been largely confirmed by Chinese data (e.g., Dai and Yu 2012 and Jin, Liu, and Yu 2012, to be discussed later). However, there are some special features of the Chinese economy and trade that have led researchers to explore them.

Ahn, Khandelwal, and Wei (2011) show that intermediary firms play a crucial role in international trade. In China, intermediaries accounted for 22% of China’s aggregate exports in 2005. The paper introduces an intermediary sector into a standard open-economy firm heterogeneity model and show that the share of exports through intermediaries in a country increases with fixed and variable costs of exporting but decreases with market size. Firms with high productivity can overcome smaller profits from directly exporting while firms with an intermediate level of productivity could only rely on intermediaries to access foreign markets. And the price of indirect exports is predicted to be higher than that of direct exports since intermediaries have to pay an additional marginal cost to sell these products abroad. They carry out empirical tests on their theoretical predictions, employing World Bank Enterprise Survey Data that covers Chinese firms in 2002 and 2003. A firm’s productivity is found to be positively correlated with direct export share, meaning that highly productive firms are more likely to export directly. And indirect export share appears to be significantly positively associated with productivity but negatively associated with productivity squared, indicating an inverted U-shape relationship. Therefore, firms with an intermediate level of productivity are more likely to export via intermediaries, supporting the predictions of their model.

Sun and Li (2011) investigate how financial constraints influence a firm’s entry into the export market using Chinese firm-level data obtained from the World Bank’s investment climate survey of Chinese enterprises (2003). The firm’s cash flow serves as a proxy for internal financial constraint. The firm’s interest payments over fixed assets serves as a proxy for external financial constraint. The cross-section data sample in 2002 covers 1,444 Chinese firms from 15 provinces. Probit regression shows that external financial constraints have a significant effect on the possibility of a firm’s participation in exporting, controlling for productivity, factor intensity, firm scale, foreign capital share and processing trade. The lower the external financial constraints, the higher the possibility of firms entering into export markets. However, a firm’s internal financial constraints exert no significant effect. Moreover, the effect of external financial constraints varies across the ownership structure. Specifically, external financial constraint only matter for domestic private firms.
Most of the literature examines a firm’s entry into the export market by productivity. Shi (2013) follows Hallak and Sivadasan (2013) to examine firm selection to export by quality: firms with high product quality tend to gain more profits and are more likely to enter into export markets. This is confirmed by Chinese data from 2000–2006. He also finds some other aspects of product quality of Chinese firms. China’s overall export quality has been increasing. The quality improvement is largely driven by the quality upgrading of foreign firms. In contrast, domestic Chinese enterprises exhibit overall export quality deterioration. Quality improvement comes from extensive margin that is more than offsetting the quality decrease due to intensive margin, resulting in overall quality increase of Chinese exports.

In contrast to many other studies that focus on the export behavior of Chinese firms, Lu, Lu, and Tao (2010) study the export behavior of foreign affiliates in China. Based on the period 1998–2005, for foreign affiliates in China, exporters tend to have lower TFP than non-exporters. The main explanation is that more productive foreign affiliates choose to pay the fixed costs of entering the Chinese market and sell their output in that market, while the exporters face lower fixed cost in the foreign market. Thus, the productivity of exporters is significantly lower than that of non-exporters among foreign affiliates.

- Impacts of Export and Import

Park et al. (2010) try to isolate the causal effect of exporting on firm productivity. To this end, the paper adopts a randomized experiment—Chinese exporting during the Asian financial crisis—that randomly assigns export demand shocks across firms to access the impact of exporting on firm performance. They construct firm-level exchange rate shock as the weighted average real currency depreciation of firm’s foreign trade partners between 1995 and 1998. They find that export growth leads to increases in firm productivity and other firm performance measures. The productivity impact of export growth is greater when firms export to more developed countries, supporting the ‘learning by exporting’ argument.

Du et al. (2012) ask whether domestic firms and foreign affiliates in China experience different effects of exporting on firm productivity. Specifically, they estimate the impacts of export entry (or exit) on firm TFP for both domestic firms and foreign firms in China. Their results confirm the existence of a ‘learning by exporting’ effect exclusively for domestic firms. The ‘learning by exporting’ effect is not significant for foreign affiliates.

Dai and Yu (2012) hypothesize that a firm’s R&D in pre-export periods will increase their capability to absorb knowledge and thus enhance productivity gains after starting to export. For all firms, TFP of exporters on average is 2% higher than that of their matched counterparts in the initial year of exporting. But in the subsequent three years, exporter productivity is not significantly higher than their counterparts. Furthermore, the authors decompose exporters into two groups, one with pre-entry R&D (at least one year) and the other without previous R&D. For firms with pre-entry R&D, the productivity effect of exporting is 16% in the first year and turns out to be 20% three years after exporting. But for firms without pre-entry R&D, the effects are negative and insignificant.

Jin, Liu, and Yu (2012) empirically investigate two exporting effects: self-selection into exporting, and learning by exporting, using Chinese manufacturing enterprises data from 2001–2007. They regress firms’ export status on firm characteristics in previous years using the system GMM estimation approach. Results show that firms with larger scale, higher TFP and previous year exporting experience are more likely to export, supporting the ‘self-selection’ hypothesis. In both short run and long run, exporters
experience higher growth in gross output and firm scale than non-exporters. The industrial value added per capita growth and capital per capita growth of enterprises are significantly lower than non-exporters. Only short-run (one-year) productivity effect of exporting is confirmed by their results. Exporting significantly boosts scale expansion of firms but generates limited efficiency improvement for exporters.

Ma, Tang and Zhang (Forthcoming) explore the effect of exporting on firm’s factor intensity and thus productivity. Using Chinese manufacturing enterprises panel data from 1998 to 2007, they find that Chinese firms become more productive but less capital-intensive after exporting than non-exporters. These results are observed for both domestic and foreign firms, for both processing and non-processing firms, within firms and within sectors, and before and after China’s WTO accession. These findings are contrary to earlier studies in which exporters are found to be more capital-intensive. However, they are in line with comparative advantages.

Summary and Additional Comments

Studies based on Chinese firm-level data have already provided a very comprehensive picture on the imports and exports of China. Some unique features have been observed using Chinese data such as the role of intermediaries in helping imports and exports, and the performance differential of local firms and foreign multinationals in China.

Many studies identify the productivity-enhancing effect of export by Chinese firms.

Given the availability of micro-level data on Chinese trade, many researchers are working on various issues related to Chinese trade. However, it is still too early to get conclusive results as much of that research is work in progress. In the next few years, we expect to have a much clearer and more complete picture of the engagement of Chinese firms in international trade.

5. Concluding Remarks

What can we conclude from recent research on China’s foreign trade? Research attention has shifted away from the comparative advantage approach to specific aspects of trade. China’s export products do not have high technology content, and the value added to the domestic economy is not very high. New factors conducive to trade growth have been identified such as China’s vertical integration with the global supply chain. At the aggregate level, the contribution of trade to economic growth and technology progress is found be to small, but it is significant at the firm level. While most of the firm-level analyses using Chinese data merely follow models conducted based on data from other countries, some new findings are obtained due to the special features of China’s foreign trade, such as the prevalence of processing trade, foreign firms, and intermediary firms.

We are far from getting a complete and detailed picture of China’s foreign trade. This is one shortcoming which makes it difficult for us to consider the task of reforming China’s foreign trade regime. Existing studies do not pay sufficient attention to the problems of China’s trade structure. Without identifying the problems of the present, it is hard to know what and how we should reform. Some papers do point out some problems. For example, Shi (2011) points out that quantity-driven export growth may pose a great threat to the environment and do harm to sustainable economic growth. Accordingly, the author suggests that China should shift from quantity-dominated exports to extensive- and quality-driven exports. Zhu and Yang (2009) also point out that the trade development patterns of the Yangtze River Delta and the Pearl River Delta may not be sustainable in the long run. They argue that
processing industries in Pearl River Delta are more likely to be constrained by limited cheap resources. For the Yangtze River Delta, continued trade growth probably will not be witnessed without preferential government policies.

Reforms are more about policy changes. Unfortunately, due to the space limitation, we are not able to survey articles related to China’s trade policies and the impacts of those policies on Chinese exporters and importers. This is left for the next survey.

Acknowledgment
We thank Hong Ma and other participants in the workshop on ‘China’s Foreign Trade in the Global Economy’ organized by Peking University (Beijing, 2014) for their helpful comments.

Notes
1. The book by Feenstra and Wei (2010) has collected a set of important research papers covering various topics on China’s foreign trade. To avoid repetition, we will not discuss them in this survey but recommend them to readers as a supplement to this survey.
2. Examples include Bao and Qiu (2010) on the effects of China’s technical barriers to trade and Bao and Qiu (2011) on China’s antidumping policies.
3. One example is Li, Qiu, and Sun (2003).
4. Yu (2011) provides a picture of the productivity and profits of Chinese firms. Processing firms have lower TFP than non-processing firms among FIEs and on average the TFP of FIEs is higher than that of non-FIEs. Moreover, the productivity of state-owned enterprises is lower than that of private firms.

References


