Essays on Trade Integration, China and Other Developing Economies

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Abstract

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In my thesis, I seek to answer the question, how did China's entry to the WTO affect the export performance and therefore the real income of other developing economies?As a part of this research I complete an extensive literature review on China's impact on the economy and real income of the rest of the world. However, the focus of the research and debate on China's impact on the rest of the world has been mostly about the rich developed countries, I focus my research on the top six Asian textile exporters that are also developing economies. To address endogeneity concerns, I use the removal of product-specific quotas following China's WTO accession as an instrumental variable. Surprisingly, I find that more Chinese competition does not have a negative impact on these countries' competitive positions or market shares of their exports to Europe. I therefore investigate the mechanisms through which exporters might be able to shield themselves against Chinese competition. I find three dimensions, along which empirical results are consistent with existing theory in international economics: Developing countries lose market share to China in more homogenous products, in more capital-intensive products, and in categories with higher relative prices compared to other exporting countries. However, my analysis also suggests that it is important to consider product market segmentation to understand how some countries stay unaffected by China. Notably, although the market share of these exporters is unaffected, I show that new product creation is significantly hampered, highlighting extensive margin effects.

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GLOSSARY

ATC: The Agreement on Trade and Clothing ATC (1994) ended the MFA and gradually removed the quotas in 4 phases.

CES: Constant Elasticity of Substitution.

HS: Harmonized System.

HECKSCHER-OHLIN MODEL: A general equilibrium mathematical model of international trade.

IV: Instrumental Variable.

MFA: Multi Fiber Arrangement (1974-1994) was a trade agreement intended to save the apparel and textile industries of the developed world by imposing quotas on the amount of textiles and garments that the developing countries can export to the developed world.

SIC: Standard Industrial Classification is a standard four digit way of arranging industries which was introduced in USA in 1934.

TSSC: Textile Specific Safeguard Clause.

UN: United Nations.

UNIT VALUE: Total Value/Quantity (Price).

WTO: World Trade Organization.

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DEDICATION

To My Dear Husband, Naheem

Chapter 1

TRADE INTEGRATION OF CHINA AND ITS IMPACT ON OTHER COUNTRIES: A LITERATURE REVIEW

1.1 Introduction

Since China's entry to the World Trade Organization in 2001, its impact on rest of the world has been a very popular topic of discussion in research, news and policy platforms. There have been predictions before 2001 about how countries sharing export with China will be impacted negatively in terms of real income and market share. However, the research after 2001 has found results different than the predictions. Not all export competing countries were impacted negatively by China's trade integration. In the first chapter of my thesis, I analyze an extensive group of literature on this area. The literatures consulted in this chapter talk about the direct impact of China on its exporting partners market share and prices as well as its indirect impact on the other economic variables of this country, like labor force, technology, economic structure and more. Some of the literature also distinguish

between the industries more impacted by Chinese competition. In this literature review, I categorize the relevant research works in different sections to explain China's impact on the real income and other variables of the competing countries.

The rest of this chapter is as follows. The second section gives a theoretical background on how China's entry is supposed to impact the other countries. The third section talks about the predictions vs reality of China's WTO entry in 2001 on the export performance of other countries with a focus on its developing trade partners. The fourth section illustrates how Chinese entry impacted the real income, price, market share and unemployment of rest of the world. The fifth section highlights how product segmentation can help countries in sustaining Chinese competition. The last section concludes the paper.

1.2 Theoretical Background

China's trade integration and it's impact world-wide can be related to a classic question at the core of international economics. Trade integration and how the entry and growth of a highly productive country impacts its trading partners has been a subject of discussion since John Hick's "An Inaugural Lecture" in 1953[Hicks, 1953]. In this paper, he explained the phenomenon using an example of two countries, country A and country B. When the productivity in country A increases rapidly relative to its income and country B's productivity, the price of A's product decreases, there is an increase in export from A to B. Even though the import competing industries in B would suffer, the consumers in B would benefit. Overall, if this improvement in productivity is only in the export industries for A, most of the benefit goes to the foreign (Country B) consumers.

However, more generally even if the improvement in productivity is only in the export biased industries at the beginning, with time it starts improving the productivity of all industries including export based and import competing industries. In that case, the consumers of country B might be benefited but the producers of country B lose market share in both their own market and in country A's market. Moreover, if country B competes with country A in the export market of other countries, it will lose market share and income in the third countries as well. Therefore, a rapid increase in the productivity of a giant nation will possibly have adverse impact on the real income of its trading partners.

Hicks examples of country A and country B are the US and the UK because at around

1950s, after world war II, the UK started falling behind in improvement of productivity compared to the US. And Hicks predicts that the UK will end up losing market share both in their own markets, in North America and also in third countries to the US. The same analysis can be used at present time, as a highly productive giant country, China emerges in the world trade. With its expansive production, competitive prices and continuous rapid growth in productivity China's integration in the world trade system has been expected to have adverse impact on the competitive positions and real incomes of its export competing trading partners.

1.3 Prediction and Reality of The Export Performance of Developing Countries

Since China entered WTO in 2001, it became eligible to have all quota restriction removed from its export industries specially in textile and apparel industries under the phase out of Multi Fibre Arrangement (MFA) by 2005. It became a worthwhile and necessary research and policy question of how China's trade integration will impact the rest of the world after the quota elimination. The Trade, Development Research Group of the World Bank took the initiative to produce multiple research to understand and predict the implications of trade reforms on the rest of the world and specially the developing trading partners of China[**?**].

Ianchovichina and Martin (2001)[**?**] give an initial estimation of the impact of China's WTO integration on China and its trading partners using a GTAP model. They estimate that China's share in the world trade would go up by double in between 1995 and 2005. The most dramatic increase in import would be in the apparel and textile sector under the influence of both reduced cost and abolition of export quotas. Even though the big industrial nation might lose market share in China's export categories, their welfare gain will be substantial from the low price products. China's major trading partners will also gain from low price Chinese export and increase in Chinese import demand. However most developing countries specially in South Asia and South East Asia competing with China in third markets will end up losing in welfare as they are expected to lose substantial market shares to China which would outweigh the gains.

Ianchovichina and Martin (2004)[Ianchovichina and Martin, 2004] extend their 2001 re-

search by using a more extensive dataset, including better estimates of agriculture and service protection, using the liberazitation measure from the final, multilateral arrangement and also incorporating the labor market reforms in China. Their findings are similar to their earlier work. Specifically, they estimated that North America and Western Europe will gain most in absolute term in welfare because of quota free access of Chinese products. Taiwan and Japan will also gain because of their trade links with China including their export to China. However, they maintained that the developing countries specially, Indonesia, Vietnam, India and other South-East Asian and Asian countries will lose a great amount of market share in third countries to China which will cause them loss in welfare.

Bhattasali and Kawai (2001)[**?**] predicted similar results from their analysis where the developing nations from South-East Asia and South Asia would experience decrease in net income especially because of their loss in apparel and textile sector after the quota restrictions on China are removed.

In a very comprehensive paper by Montfort Mlachila and Yongzheng Yang (2007) named "The End of Textiles Quotas: A Case Study of the Impact on Bangladesh?" [Mlachila and Yang, 2004] , the writers predicted that the potential loss of Bangladesh from the elimination of all quotas in 2005 could be around 25% of the RMG export value. They examined a number of scenarios, based on different assumptions on elasticity's of substitution and factor markets using the GTAP global general equilibrium model. It was confirmed from the simulation results that the phase out of the textile and clothing quota is likely to affect Bangladesh adversely. In their first scenario, they use standard GTAP elasticities and they assume fixed

nominal wages. In this scenario they found that not only textile, apparel and over all export but also the GDP and employment rate of Bangladesh experiences a large slump. The other two scenarios assume real wage as fixed and some continued restrictions on China even after 2005 in the Europe and the US. The decrease in GDP, employment rate and export is less than the first scenario. However, it is still substantial. Even with some continued restriction on China's export they still estimated Bangladesh's total export to go down by 10%, GDP and Employment rate to go down by 1.7 and 3.2% respectively.

Majority of the research completed before 2005 to predict the outcome of China's integration in the world trade system estimated that most of the developing countries that compete with China specially in the textile and apparel industries will experience large declines in market share in EU and USA and ultimately declines in their real income. However, the studies that followed the quota phase-out and were undertaken after 2005 based on real world data, gave a surprisingly different result. Even though most of the research on the performance of the developing countries in the textile and apparel sector after the quota phase out are based of descriptive statistics, they give an overall picture of the export and income performance of these countries. Adhikari and Weeratunge (2006) [**?**] have mentioned the success of the South Asian developing countries in the post MFA era as a surprising story. According to them, all the South Asian developing nations with big textile and apparel industries which were predicted to lose out in the quota-free era, not only maintained their past gains, but also improved their performance in the 18-month period after the quota phase-out. India, Bangladesh, Sri Lanka and Pakistan all of them saw an increase in market

share in the textile and apparel industry both in the EU and the US.

Adhikari and Yamamoto (2008)[**?**] generate a similar analysis but on 12 developing nations of Asia, who are also big exporters of textile and apparel. The 12 countries are Bangladesh, Cambodia, China, India, Indonesia, Sri Lanka, the Lao PDR, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand and Vietnam. They found that the EU imports from these Asian-12 countries grew by 19.6%, in between 2004 and 2005. However, the gain was not evenly distributed. China was the biggest winner. But even India, Bangladesh, Sri Lanka and Vietnam saw an increase in market share during the time. The growth rate in USA's textile and clothing import from the Asian 12 went up by 28.6 % in between 2004 and 2005. Like the EU China is the biggest contributor of the growth in the US as well, where it accounts for 50 % of the growth. However, other than Thailand and Nepal all other countries experienced a steady increase in their export.

When it comes to estimating the impact of China's trade integration on rest of the world, the predictions about the big industrialized nations losing in market share but gaining in overall welfare through consumer benefit stays true. However, the predictions about smaller developing countries are different than the actual results after the quota phase out, where many of them stay competitive to China in the third country markets.

1.4 China's Impact on the Real Income, Unemployment, Price, Market share and Other Economics Variables of Rest of the World

Hsieh and Ossa (2016)[Hsieh and Ossa, 2016] measures the global spillover effects of China's productivity growth by using a data sample of 14 largest countries and the world from year 1995 to 2007. Their analysis is based on a general equilibrium model of international trade with multiple countries and industries. It follows the theoretical literature with traditional terms of trade effect and new-home market trade effects. It also includes an industry level gravity structure to match the world wide industry level trade. Their analysis of 14 largest countries and rest of the world does limit their study to the developed and industrialized countries. They find the spillover effect on these countries causes the real income to rise on average by only 0.1 percent. Only 1.5 % of China's world-wide gain from productivity growth is spilled over to other countries. They find two reasons why this spillover effect is so small. First, because Chinese import still constitutes a very small part of the total expenditure of these countries and the world. Second, they find the terms of trade effect and the home market effects works in off-setting way when it comes to welfare of these countries.

Autor, Dorn and Hanson (2013)[Autor et al., 2013] provide an analysis on the labor market impact of China's trade integration in the import competing industries of the US. Increase in import has a direct link with decrease in employment and lower wages in import competing industries. Autor, Dorn and Hanson (2013) relate changes in labor-market variables in local labor markets of the US to their exposure to imports from China. For the time period 1990-2007 of this paper the import from lower income economy was largely driven

by China. They use a standard model of trade to derive the product demand shocks to US labor markets created by increase in Chinese imports. Their analysis complements previous research on wages by adding impacts on other variables in the local-labor market. Their results show that when the exposure of the local markets to Chinese import increases, it creates higher unemployment, lower labor force participation, lower wages and an increase in transfer benefits. As they compare two different community zones or two different labor markets at different levels of exposure to Chinese import growth (One at 25th percentile and the other at 75th percentile), they find that the more exposed labor market experiences a 4.5 % larger drop in employed workers, a 0.8% larger fall in labor-force participation rate, a 0.8% larger decline in average log weekly wage and a larger increase in transfer benefits. They conclude that even though overall terms of trade effect benefit US from trades with China, the distribution of these gain is not uniform. Coupled with the medium run efficiency losses caused by the adjustment to trade shocks, the common people might not be able to comprehend the welfare gains completely in the short run.

Bloom, Draca and Van Reenen [Bloom et al., 2016] focus on the 12 of the largest economies in Europe and analyze the impact of China's trade integration on technological changes in these European economies through patents, innovation and IT. Particularly, they establish a direct relationship between increase in innovations in firms and higher negative impact from Chinese imports. To address endogeneity concerns, they utilize the product-specific quota removals following China's WTO accession as an instrumental variable. According to the first stage results of the IV regression, abolition of quotas has a significant effect on China's

export market gains in the EU. The products or industries in which China had the highest amount of restriction before its accession to WTO, are the industries where it has gained the largest market shares. Their empirical model analyze the impact of Chinese competition on the within firms intensive margin of technological innovation and also the impact on innovation by redistributing economic activities between firms. They provide two core results. First they find that Chinese competition encourages innovation in the surviving firms. After China's integration into the world trade system firms from these 12 large countries of Europe face higher competition. They response to this competition by increasing R&D, management quality, skill levels, improving their IT sector, creating more patents, raising their productivity and by decreasing prices and profitability. Secondly, they find that firms with lower level of technology, patents or TFP have a harder time facing Chinese competition and have a higher probability of exiting the market and lowering their employment. After collaborating both the results they find that overall, there is an upgrade in technology in the industries that are affected most by Chinese import. According to their results, China could be responsible for about 14% of the overall improvement technology in Europe. Overall, their paper has important findings for European trade policies where they show that lowering trade barriers to low wage countries like China can have added welfare gain by improving the technology of the import competition firms through innovation and diffusion.

Brambilla, Khandelwal and Schott (2010) [Brambilla et al., 2010] use a new data set to look at China's performance in the textile and clothing sectors in the US market under the Agreement on Trade and Clothing (ATC) after the imports quotas were abolished. It also

looks at how different geographical regions reacted to China's performance in terms of price and market share. Following the phase out of the Multi Fibre Arrangement the import quotas on developing countries were abolished in four phases (1995,1998,2002,2005). For China the first and second stages came into effect after it entered the World Trade Organization in 2001. This paper measure the export growth after the quota phase out in two margins. First, along the intensive margin or growth in the continued products of the countries studied and second, along the extensive margin or growth in new products. For China, majority of the growth in export products came through the intensive margin. The overall increase in export for China from phase I to phase IV were 42, 32, 306 and 271 percent respectively. The reaction to China's increase in export by other trading partners of USA are found to be varied in this paper. The other trading partners or the rest of the world is divided in different regions such as, the Caribbean, Central America, East Asia, the EU, Former Soviet Union, Middle East, North Africa, North America, Oceania, Other Europe,South America, South Asia, South East Asia and Sub Saharan Africa. From the results, it is evident that China has experienced a bigger raise in export growth in the products bound by quotas vs the products which were not bound by quotas. South Asia and East Asia have seen an increase in export quantity in the first three phases in the products where China had non-binding quotas. In the phase IV results China had a dramatic increase in export quantities in the binding products vs non-binding products. Nine out of the fourteen regions experiences a negative and significant change in the bound products for China. Overall of the 143 countries in the sample the average export fell for 102 countries out of which for 54 countries it was

statistically significant. They also looked at the price or unit value impact of the quota phase out. They find that China's prices dropped over the years when it was gradually integrated. They also found that the change in prices were negative and significant for also South Asia, South East Asia and East Asia and the drop in prices are bigger in bound products compared to unbound products. They explained that the price decrease may also happen because of quality downgrading, as exporters normally try to export only high-quality and high-margin products when they have a quantity restriction. They find small, relative declines in the quality of China's bound products after phase III and IV.

Coleman (2007) [Coleman, 2007], includes a mix of countries in different stages of development to show how the reaction to China's emergence in their prices and structural changes vary based on their level of development. He develops a general equilibrium model to show how an emerging giant can impact real income, growth and structural transformation between manufacturing and service sector of other countries. Overall the model explains that with the emergence of a giant nation with capacity to produce certain goods in unlimited quantities will affect the relative export prices of certain goods. Which will lead to changes in industry structures in other countries and that will impact the allocation of resources in different manufacturing and service sectors and the aggregate growth of these countries. The model is consistent with Coleman's empirical findings. After China's entry in the world trade scenario, prices fell in categories where China's market share increased the most. He looks at a set of 11 countries from different levels of development but with close proximity to China to analyze China's impact on their economy. He finds that the impact on their aggre-

gate growth because of the decrease in world prices in categories where they compete with China are different based on their wage share in the "China High-Growth Export Goods". However, he does find that all together these 11 countries (Japan, Hong-Kong, Singapore, South Korea, Philippines, Malaysia, Thailand, Indonesia, Australia, India and Taiwan) have re-allocated their labor force away from the manufacturing industries where China has seen the highest growth in terms of export quantity and also overall from manufacturing to service sectors. Lastly, his findings suggest that Japan's growth slow down after China's integration to the world trade system has in fact happened due to increased Chinese competition.

1.5 Product segmentation and Chinese Competition

Holmes and Stevens (2014)[Holmes and Stevens, 2014] develops a theory where in an industry there are large plants that produce standard goods and small plants that produce customized, special goods. They use their theoretical model to explore how size distributions of plants and geographic distributions of plants are connected. And also, how the impacts of a trade shock in the form of a surge in imports will vary based on geographic concentration and plant size. Using the model they find several empirical results. They found that in most industries majority of the plants were specialty segment plants. They also find that industries that were hit worst by the surge in imports from China, saw a bigger decline in leading locations with larger plants compared to the rest of the domestic industry. They find that in the industries that were hit worst by Chinese imports, the share of the primary segment with large plants and standard goods declined significantly. Their results are consistent with the hypothesis that the imported goods from China are closer substitutes to the standard products produced by larger plants than the niche, special products produced by smaller plants. Therefore, they conclude that the industries most likely to be heavily affected by China are the ones with products that are close substitutes for Chinese products. Their paper uses horizontal product segmentation to explain how certain plants with customized, special products can withstand Chinese competition by producing different products than China.

According to Khandelwal (2010)[Khandelwal, 2010],, one way in which unit values might

matter, is that countries with higher unit values, might produce higher quality goods and therefore shield them selves from competition through vertical product differentiation or by producing different quality products. This paper relaxes the assumption that price equals to quality which has been used by most of the work in estimating quality before. It derives the quality measures using a nested logit demand function where the variable quality captures the mean valuation of an imported product by the consumers. In this model, conditional on price, products with higher market shares are assigned higher quality. Using a simple model, he explains how the impact of import surge from low-wage developing nations on the US industries will vary based on the quality ladder. Developed countries can insulate themselves from price-competitive products of developing countries like China by producing higher quality and more capital intensive products when there is a long quality ladder. However, when the quality ladder is short, it is not feasible for developed countries to upgrade the product quality by much and therefore, faces more competition from the developing countries. By matching US industry and import data to the estimated quality ladders, he finds empirical support for his conjecture. Overall he finds that a developed country like USA can insulate themselves in certain categories from China or other low wage developing country's products by producing superior quality products which will have demand even with a higher price. However, this can only work in categories where there are opportunities for substantial quality up gradation by the developed country.

1.6 Conclusion

As is evident from this literature review, there has been a number of papers from before and after China was fully incorporated in the world trade system that are asking the question, "How the trade integration of China impacts other countries?" However, in today's world with ever changing policies and scenarios this topic remains very fascinating with still so many diverse areas needing more research.

Even though China's export impact on other countries remain a popular topic, the focus of majority of these papers has been on the developed countries, especially the US and Europe. But it is also important to see how the developing countries face the competition from China and what effects it has on their income and other economic variables. The estimations of how other countries will perform facing Chinese competition in the research prior to China's integration often failed to correctly predict the results for the developing world specially the South Asian and South East Asian countries. It is important to particularly look at these countries to analyze what helped them stay competitive against China. Along with the other factors that contributed to their success, product differentiation, how producing products different than China can also help them insulate from Chinese competition. All together, there are still a lot of unanswered research questions related to China's accession to the WTO that should be considered, especially on China's impact on its export-competing developing trading partners.

Chapter 2

DAVID AND GOLIATH: HOW CHINESE COMPETITION IMPACTS OTHER EXPORT-COMPETING DEVELOPING COUNTRIES

2.1 Introduction

How does China's integration into the world economy affect the export performances and the incomes of other developing economies? This question has been a popular topic of discussion following China's entry to the World Trade Organization (WTO) in 2001. According to the Economist (July 28th, 2005), "China has become the global power that is increasingly taking the decisions that impact workers, financial markets and economies everywhere." China's trade integration and its impact worldwide can in fact be related to a classic question at the core of international economics: What are the real-income effects of the entry of a large economy on its trading partners through terms-of-trade effects?[Hicks, 1953] [Hsieh and Ossa, 2016] [Coleman, 2007]. With its cheap labor and substantial production

capacity, China has been expected to have an adverse impact on the competitive positions of its trading partners, both in developing countries export markets as well as their home markets.

In this paper, I consider a sample of six developing countries from Asia, which are among the biggest textile exporters to Europe to analyze China's impact on their competitive positions in their export markets in Europe. I focus on export performance as it has been one of the strongest driving forces of growth in the developing countries in the last few decades and they have been strongly encouraged to promote exports. In my sample of developing countries, labor dependent textile and manufacturing are one of their biggest export industries, accounting for 10% to 95% of total exports.[1].The export of apparel and textile is substantial for these countries in their overall export performance and it plays an important role in their growth and development. Specifically I analyze China's impact on the market shares of its developing trading partners in the apparel and textile industries in Europe. Using data on relative prices, capital intensity and product segmentation, I explore why this impact is different for different products produced by different countries.

One of the challenges in measuring the impact of change in China's market share on other countries' market share is the issue of endogeneity. It is expected that China's market share gains should have a negative effect on the market share of other export-oriented countries. However, both of these variables are highly correlated and the same unobserved shocks can affect them both. For example, if Europe subsidizes its own producers, it will have a negative

[1]Source: World Trade Organization(2017)

effect both on China and any other developing country's market shares. There will be a positive correlation between the market share of China and the other developing countries studied. On the other hand, under the Generalized Scheme of Preferences (GSP), many lower-income developing countries such as, Bangladesh and Pakistan still receive tariff free or low tariff access to the EU [Özden and Reinhardt, 2005] [Brenton, 2003], while China pays a higher tariff than these developing nations. Also, the use of the Textile Specific Safeguard Clause (TSSC) in China's WTO Accession Protocol allows the European countries to take temporary import policy measures to protect their producers in the event of an abrupt rise in Chinese imports.[Hayashi, 2007][2]. Overall, such import policies applied by the EU has a negative impact on China's market share and a positive impact on the low-income developing countries' market shares, therefore creating a negative correlation between the two variables. So, it is possible to have unobservable differential trade policies imposed on China compared to other Asian exporters, which can impact the variables in the opposite directions. Therefore, exogenous variation is needed in this case to to calculate the causal impact of Chinese competition. Before its entry to the WTO, China had one of the most restricted quotas in this sector under the Multi-Fiber Arrangement (MFA (1974-2004)) and was expected to gain a considerable market share after the quotas were eliminated. I use the abolition of quotas in the apparel and textile industries, under the Agreement on Textile and Clothing (replacing the Multi-Fiber Arrangement) following China's entry in WTO in 2001,

[2]In the post-MFA period, they added extra measures against China and had a new bilateral agreement because of a surge in Chinese import. At the same time, under Generalized Scheme of Preferences (GSP) they are still providing tariff free or low tariff access to many lower-income developing countries

as an instrument for the variable, change in Chinese market share (building on the work of Bloom, Draca and Van Reenen, (2016))[Bloom et al., 2016].

My paper highlights several aspects of changes in Chinese market share and its impact on the market shares of other countries. First, consistent with Bloom, Draca and Van-Reenen(2016)[Bloom et al., 2016], I find that abolition of quotas has a significant effect on China's market gain in the apparel and textile sector. The products or industries in which China had the highest amount of restriction during the era of the Multi-Fiber Arrangement are the industries where it has gained the largest market shares.

My initial sample consists of 15 big exporters[3] of textile and apparel to Europe other than China, only six (Hong Kong, South Korea, USA, Mexico, Morocco and Indonesia) lose market share to China. The other eight countries (Bangladesh, Vietnam, India, Pakistan, Sri Lanka, Thailand, Tunisia, EU and Turkey) have not seen a decline in market share during the time of China's integration into the world trade system. In fact, on average the market share in each category went up by .3% for these nine countries.It was expected and predicted before the MFA phase out that all these countries would end up losing market shares to China because of its cheap labor and capacity to produce at a considerable scale[Mlachila and Yang, 2004] [Ianchovichina and Martin, 2004]. So the absence of a strong negative impact on some of them and in fact a positive gain for some is a puzzle. My aim is to investigate and explain this puzzle in this paper.

Out of the 15 countries, I take a subsample of six Asian developing countries (Bangladesh,

[3]Source:Eurostat. The 15 countries are EU, India, Bangladesh, Pakistan, Sri Lanka, Vietnam, Indonesia, Mexico, Turkey, Thailand, Tunisia, Morocco, South Korea, Hong Kong and USA

Vietnam, Indonesia, India, Sri Lanka and Pakistan). They are the only lower-middle income developing countries in the sample of 15 countries. As they are located close to each other geographically, their transportation cost to Europe are comparable. They have the lowest per capita GDPs in the sample in the year 2005. They also have lower or similar capital-labor ratios compared to China[4]. They are more labor-intensive compared to the other exporters in the sample and therefore have comparative advantage in the labor dependent industries.

As reported by the baseline regression results, out of these six lower-middle income developing countries Indonesia is the only country to suffer a considerable loss of market share to China. The other countries do not experience a statistically or economically significant drop in market share. In fact these five countries together have seen an average market share gain of .1% in each product category. Therefore, I explore the mechanisms through which these countries have preserved their competitive positions. In my first set of results, the group of countries are found to lose market share to China in categories with higher elasticities of demand or less differentiated products. This conforms to the theory and expectation that China gains larger market share through competitive pricing, in more substitutable product markets where price is more important to the consumers. Overall, countries seem to be more insulated from Chinese competition in differentiated product markets.

Second, as predicted by classical Heckscher-Ohlin theorem, when China becomes more capital intensive than other developing countries, its comparative advantage in capital-intensive products increases and therefore, it gains more market share in those categories.

[4]Table 13 in Appendix shows the rank of these 15 countries based on GDP/Capita and Capital/Labor ratio along with their respective GDP/Capita and Capital/Labor data

On the other hand, the other developing economies manage to have a comparative advantage in more labor intensive textile products and stay competitive in these categories. Out of the six developing countries in my sample, Bangladesh, India, Pakistan and Vietnam have lower capital-labor ratios than China. Using the data sample of the six countries, I find that as the capital-labor ratio based on both country and industry becomes larger, the developing countries give up more market share to China. It can be concluded that in the developing world, less capital intensive countries successfully face the competition from China in the more labor-intensive apparel and textile industries after the MFA quota phase out. This confirms the theory that more labor intensive developing countries maintains their market shares in more labor intensive product categories where they have a comparative advantage.

I also find that exporters' market shares remained stable in product markets in which these exporters have the lower initial prices, relative to other countries. I rank all 16 big exporters of apparel and textile in each category based on their prices. The result indicates that the developing countries studied do not suffer loss of market share in products where they have lower ranking (lower price compared to other exporters). Therefore, one of the explanations why these countries do not lose market share for some products is the simple fact that they are able to offer lower or more competitive prices than other countries for those products.

However, I find that even though China does not have much effect on the developing countries' market shares, it disrupts their growth in new product categories. The results indicate that the entry to new HS sub-categories by the developing countries is negatively

impacted by China's overall market gain in the SIC product categories.

My paper contributes to the literature on trade integration in several ways. The focus of the research and debate on China's impact on the rest of the world has been mostly about the rich developed countries, especially the US and Europe. But it is also important to see how the developing countries face the competition from China and what effects it has on their income. Hsieh and Ossa [Hsieh and Ossa, 2016] discuss the spillover effect of China's growth on the real income of 14 of the world's largest economies, almost all of which are developed countries. Autor, Dorn and Hanson [Autor et al., 2013] provide an analysis on the labor market impact of the import competing industries in the US. Bloom, Draca and Van Reenen [Bloom et al., 2016] write about the impact of China's trade integration on technological changes in 12 of the largest European economies through patents, innovation and IT. Brambilla, Khandelwal and Schott [Brambilla et al., 2010] focus mostly on China and also on how distinct geographical regions reacted differently in terms of price and market share. Coleman[Coleman, 2007], however, includes a mix of countries in different stages of development to show how the reaction to prices and structural changes vary based on their level of development. This paper focuses only on the developing countries. There has been a debate about the idea that rich countries can escape some of competition from China by focusing on technological innovation. Poorer developing nations have fewer resources for that purpose, but I nevertheless find that they were able to shield themselves by using strategies different from R&D based innovation.

The remainder of this chapter is as follows. Section 2 talks about the empirical method-

ology used for the baseline regression of this study. It also provides a background on the Multi-Fiber Arrangement (MFA) and why quotas abolished under the MFA phase-out is a good instrument for change in China's market share. Section 3 contains a dicsussion about the data sources and provides and overview of the data. Section 4 shows the main results on how China's market share gain affected the market shares of other countries. Section 5 investigates the impact of China on a sub-sample of six developing countries and the possible causes behind why some of them have lost market share and some have not. I use the hypothesis of price competition, the hypothesis of elasticity of import demand, the hypothesis based on capital-labor ratio and the hypothesis of relative price (rank based on price) to investigate the reasons. Section 7 discusses how Chinese competition hinders the developing countries' growth in new product entry despite of not affecting their market shares. Section 9 concludes the paper with possible extensions and other experiments that can also help in understanding the puzzle of how certain developing countries managed to handle the competition from China.

2.2 Empirical Methodology

The empirical model analyzes the effect of change in China's market share after the MFA phase out on the change in market share of other main exporters of textile and apparel to Europe.

2.2.1 Baseline Regression

I consider a basic equation of market share of country i , in product j, of the market of importing country k at time t ,

$$\Delta MarketShare^{i}_{jkt} = \alpha \Delta MarketShare^{CN}_{jkt} + \Delta f_{kt} + \varepsilon_{jkt}$$

Here, Δ denotes a long difference (five years) operator which erases the product fixed effect. Based on research prediction before the MFA phase out, the coefficient of the change in market share of China α should be negative. Δf_{kt} is a full set of country dummies interacted with time dummies to absorb macroeconomic shocks at country and time level[7]. And

$$MarketShare^{i}_{jkt} = \frac{TradeValue^{i}_{jkt}}{TradeValue^{World}_{jkt}}$$

$$MarketShare^{CN}_{jkt} = \frac{TradeValue^{CN}_{jkt}}{TradeValue^{World}_{jkt}}$$

[7]As I am using long difference, I did not include a product fixed effect

$MarketShare^{i}_{jkt}$ is the total value of the imported goods from country i to country k, in industry j at time period t divided by the total value of imported goods from the whole world to country k, in industry j at time period t. We cluster at the industry/product category level.

2.2.2 Use of Instrumental Variable

The change in Chinese market share and the change in other countries' market share are very highly-correlated. They both can be affected by same unobserved shocks in $\Delta\varepsilon_{jkt}$. To account for the potential endogeneity biases, I consider an instrumental variable which is an exogenous shock to China's market share but not to the other countries'. I use the removal of Muti-Fiber Arrangement (MFA) quotas after China joined the WTO as the instrument.

The Multi-Fiber Arrangement (1974-2004) was a trade agreement introduced to save the apparel and textile industries of the developed world by imposing quotas on the amount of textiles and garments that the developing countries can export to the developed world. However some developing countries such as Bangladesh, Vietnam and Sri Lanka actually were benefited from this arrangement. The MFA supported the growth in the clothing industry in several low-income countries (LIC) as established clothing exporting countries reached their quota limits and started using triangular manufacturing networks in LICs to use their unfulfilled quota. All these small countries took the opportunity and started to play an important role in the textile and apparel market. The growth of textile and apparel manufacturing industries in these countries during the period of the MFA has been

phenomenal[Joarder et al., 2010]. China had one of the most restricted quotas compared to these smaller developing nations[Diao and Somwaru, 2001].

The Agreement on Trade and Clothing ATC (1994) ended the MFA and gradually removed the quotas in 4 phases: Phase I came into effect on January, 1995; Phase II on January 1, 1998; Phase III on January 1, 2002 and Phase IV on January 1, 2005. China joined WTO in December 2001. Phase I and II came into effect for China after its integration into the WTO. Then the rest of the quotas were removed in Phase III and Phase IV[Diao and Somwaru, 2001] [Round, 1995]. Policymakers and researchers anticipated an increase in China's exports and market shares both in the EU and the US after each phase. It was also expected that not only the developed world but also the low income developing countries that have been enjoying their access to these markets without a complete Chinese presence would lose market share to China[Sattar, 2005] [Mlachila and Yang, 2004].

The first stage equation with quotas as the instrument can be written as,

$$\Delta MarketShare_{jkt}^{CN} = -\beta \Delta Quota_{jkt} + \Delta f_{kt}^{Q} + \varepsilon_{jkt}^{Q}$$

$Quota_{jkt}$ is measured by the value-weighted proportion of the products in an industry that are covered by quotas at period t for China. I expect β ¿ 0, the larger the increase in quotas during the time period, the smaller the increase in Chinese market share becomes. As the

quotas were completely gone by 2005, for the 2005-2000 time period,

$$\Delta MarketShare_{jkt}^{CN} = \beta Quota_{jk,t-5} + \Delta f_{kt}^{Q} + \varepsilon_{jkt}^{Q}$$

As the quotas in 2005 equal 0, I expect that the higher the quotas in 2000, will result in bigger gains in market share for China. The reduced form for the baseline regression becomes,

$$\Delta MarketShare_{jkt}^{BD} = \gamma Quota_{jk,t-5} + \Delta \varphi_{kt} + e_{jkt}$$

2.3 Data

My dataset consists of the export data of 16 major exporters of textile and apparel to Europe. China, EU, India, Bangladesh, Vietnam, Turkey, Indonesia, Sri Lanka, Pakistan, Mexico, Thailand, Tunisia, Morocco, Hong Kong, South Korea and USA.

2.3.1 UN Comtrade Data

UN Comtrade is an international database of six-digit product level information on bilateral import and export between any pair of countries. I take 13 large economies of Europe to determine the market share and unit value and price data of the 16 exporting countries on 87 SIC product categories. I aggregate the six-digit Harmonized System to the four digit US SIC industry level using the work of Pierce and Schott (2010) [Pierce and Schott, 2012].

2.3.2 The Quota Data

I use the quota data from the dataset made available by Bloom, Draca and Van Reenen [Bloom et al., 2016] in their paper "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity". For each four-digit SIC industry they calculate the proportion of six-digit product categories (HS6) that were covered by quotas, while weighting each product by its share of import value.

2.3.3 Elasticity of Demand and Capital-Labor Ratio Data

The trade elasticity data used come from the work of Broda, Greenfield Weinstein(2006)[Broda et al., 2006]. I use the HS-3 import demand elasticities for the importing European countries and convert them to SIC categories using the work of Pierce and Schott (2010). The industry capital-labor ratio is calculated using the National Bureaue of Economic Research Manufacturing Productivity Database[Bartlesman and Gray, 1996] and the country capital-ratio data is calculated using the Penn World table.

2.4 Results

2.4.1 Summary Statistics

The data set consists of 16 exporting countries, with 13 large European countries as importers, during two time periods and 87 product categories. Table B.1 shows the average change in market share for all 16 exporting countries and the average quota for China under the MFA. Indonesia, the EU, Sri Lanka, Hong Kong, Korea, Thailand, Morocco, Mexico and the US have on average of negative change in market share (without taking into account of the fixed effects or clustering). All other countries have positive change in market share on average. China has the biggest gain in market share on average of 5% using the basic summary statistics. The average quota on Chinese products under the MFA was .2842 or 28.42%.

2.4.2 Baseline Regression

Table B.2, B.3, and B.4 are the first stage and second stage results of the baseline regression. Column 1 in Table B.2 shows the first stage regression result using the quotas in 1999-2000 as the instrument for change in market share of China. The first stage coefficient is positive and significant for all the cases. The removal of quotas has a positive and large (.134) effect on the change in market share. Therefore, the industries and products in which China had the highest amount of quotas are the ones in which it has realized the largest gain after the removal of quotas.

Rest of the columns in these three tables represent the second stage regression results of the change in the market share of the 15 exporters in the EU for change in market share of China. The coefficient of change in market share of Hong Kong, Korea, Morocco, the US, Mexico and Indonesia are negative and significant as expected. However, the rest of the countries do not match with this expectation. The coefficients of Sri Lanka, Pakistan and Vietnam are negative but not significant. The coefficients of Bangladesh, EU, Turkey, Tunisia, Thailand, and India are in fact positive (though none but Turkey is significant). It was predicted and expected that almost all of these countries from both the developed and developing world will end up losing extensively to China[Mlachila and Yang, 2004][Joarder et al., 2010]. The absence of a strong negative impact on Sri Lanka, Pakistan and Vietnam, as well as the positive coefficients of Bangladesh, EU, Turkey, Tunisia, Thailand and India are all unexpected and remain a puzzle.

2.5 Investigating China's Impact on the Developing Countries

To investigate the puzzle of why certain developing countries are affected by China and some are not, I take the sub-sample of six lower-middle income Asian developing economies (Bangladesh, India, Sri Lanka, Pakistan ,Vietnam and Indonesia). They have the lowest per capita GDPs in the sample in year 2005. They also have lower/similar capital/labor ratios or are more labor intensive compared to China.[8] In this sample only Indonesia loses market share to China. I use different hypotheses to explain what might have been the differences in these countries reacting differently to Chinese competition.

2.5.1 Hypothesis: Price Competition

Empirical papers have found that Chinese prices have dropped after the quota abolition[Brambilla et al., 201 [Harrigan and Barrows, 2009]. It is possible that the countries that do not lose market share are the ones that are able to lower their price accordingly and can still sustain the price competition.The regression equation to prove this hypothesis [9],

$$\Delta UnitValue^{i}_{jkt} = \beta_1 \Delta UnitValue^{CN}_{jkt} + \Delta m_{kt} + \Delta n_{jkt}$$

I calculate unit value by dividing total trade value for each country, each category and each time period by the respective total weight. The change in unit value of country i (Δ is the

[8]Table 17 in the Appendix shows the rank of these 15 countries based on GDP per Capita and Capital-Labor ratio along with their respective GDP per Capita and Capital-Labor data

[9]A similar approach in[Özden and Sharma, 2006] illustrates the price effect of regional trade integration

five years long difference) in each product category j, in each importing country k and at time period t is the dependent variable. The change in unit value of China for the same category, importing country and time period is the independent variable. Similar to the baseline regression of change in market share, $\Delta UnitValue_{jkt}^{CN}$ is instrumented using quotas.

$$\Delta UnitValue_{jkt}^{CN} = \beta_2 Quota_{jk,t-5} + \Delta m_{kt}^{Q} + \Delta n_{jkt}^{Q}$$

However the results indicate that none of the first stage coefficients are significant[10]. It is not really surprising. Even though empirical studies have concluded that Chinese prices dropped after the MFA phase out [Brambilla et al., 2010] [Harrigan and Barrows, 2009], it has not been established that it was directly related to quotas. It can not be said that the categories where China had the highest quotas are the ones where Chinese prices dropped the most. Therefore, it is not possible to prove the argument that the countries did not lose market share as they bit China on a price war in their export products.

[10]Table B.5 and B.6 in the Appendix show the first and second stage results for price competition hypothesis for all six countries

2.5.2 Hypothesis: Elasticity of Import-Demand

Elasticity of import demand measures the substitutability of the products imported to the consumers. If the consumers are not willing to substitute them for other products even when the price increases, the products consist of mostly inelastic or differentiated goods. I use the data set for all six developing countries to check if elasticity of demand of the product categories that the developing countries are exporting, can shed light on the investigation of why these countries are not impacted as expected by China. I use the import-demand elasticities of product categories of each of the importing countries of the EU in my data sample. The regression equation using the combined data set for all six countries for this purpose is ,

$$\Delta MarketShare^{i}_{jkt} = \phi_1 \Delta MarketShare^{CN}_{jkt} + \phi_2 Elasticity_{jk}$$

$$+\phi_3 Elasticity_{jk}.\Delta MarketShare^{CN}_{jkt} + \Delta f_{kt} + \varepsilon_{jkt}$$

$Quota_{jk,t-5}$ and $Elasticity_{jk}.Quota_{jk,t-5}$ are used as instruments for the first stage. Table B.7 shows the result. Sigma stands for import-demand elasticity. For this set of developing countries, as the import-demand elasticity of products increases, they lose more market share. The categories where they maintain their market shares are the ones with lower elasticity of demand or more heterogenous goods. The countries survive better in product categories which are more unique or which do not have close substitutes.

2.5.3 Hypothesis: Capital-Labor Ratio

In my sample of six developing countries, I find that five of them are less capital intensive than China[11]. Indonesia is the only country here that is more capital intensive than China. To check if being less capital intensive and more labor abundant has helped these countries in facing the competition from China, I run the following regression using the dataset for all six developing countries.

$$\Delta MarketShare^{x}_{j,k,t} = \chi_1 \Delta MarketShare^{CN}_{j,k,t} + \chi_2 CapitalLabor^{x}_{j,k,t-5} + \chi_3 SICCapitalLabor^{x}_{j,k,t-5}$$

$$+ \chi_4 CountryCapitalLabor^{x}_{j,k,t-5} + \chi_5 CapitalLabor^{x}_{j,k,t-5}.\Delta MarketShare^{CN}_{j,k,t} + \Delta f_{k,t} + e_{j,k,t}$$

where, $CapitalLabor^{x}_{j,k,t-5}$ is the capital-labor ratio of each country multiplied by the capital-labor ratio of each SIC industry for the years 1999-2000. $SICCapitalLabor^{x}_{j,k,t-5}$ is the capital-labor ratio in each SIC industry and $CountryCapitalLabor^{x}_{j,k,t-5}$ is the capital-labor ratio for each of these six countries in year 1999-2000. $\Delta MarketShare^{CN}_{j,k,t}$ is instrumented using $Quota_{jk,t-5}$ and $CapitalLabor^{D}_{j,k,t-5}.\Delta MarketShare^{CN}_{j,k,t}$ is instrumented using $CapitalLabor^{D}_{j,k,t-5}.Quota_{jk,t-5}$.

Table B.8 shows the result for this regression. The coefficient of $\Delta MarketShare^{CN}_{j,k,t}$ is significant and positive. My point of interest is the coefficient of $CapitalLabor^{D}_{j,k,t-5}.\Delta MarketShare^{CN}_{j,k,t}$ which is negative and significant. This tells us that as the combined capital-labor ratio (both product level and country level) becomes larger, the developing countries start losing market

[11] Appendix: Figure A.1

share. The countries in this sample that do not lose market share are less capital intensive and they produce more labor intensive products. As predicted by the Heckchser-Ohlin theorem, more labor intensive developing countries maintains their market shares in more labor intensive product categories where they have a comparative advantage. [**?**]

2.5.4 Hypothesis: Relative Price (Based on rank)

According to this hypothesis, the countries that do not lose market share to China have lower relative price compared to the other exporters. To prove this hypothesis, I use rank as the variable that represents their relative price compared to the other big exporters of textile and apparel to the Europe. I rank these six countries amongst the 16 largest apparel exporters to Europe using unit value for each product category, each time period and each importing country. The lower the price of an exporter is for a category, the smaller its rank is. I use the following regression equation to analyze if relative price provides an explanation for the puzzle,

$$\Delta MarketShare^{i}_{jkt} = \alpha_1 \Delta MarketShare^{CN}_{jkt} + \alpha_2 Rank^{i}_{jkt} + \alpha_3 Rank^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt} + \Delta f_{kt} + e_{jkt}$$

Here, $Rank^{i}_{jkt}$ is the rank of country i in product j at time period t in the market of country k. I regress the changes in market share of a country i, on the rank, the change in market share of China and the interaction term between rank and $\Delta MarketShare^{CN}_{jkt}$. I use the quotas as an instrument for $\Delta MarketShare^{CN}_{jkt}$ and $Rank^{i}_{jkt}.Quotas$ as an instrument for $Rank^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt}$. Therefore, the first stage regressions are,

$$\Delta MarketShare^{CN}_{jkt} = \alpha_4 Quota_{jk,t-5} + \Delta f^{Q}_{kt} + \varepsilon^{Q}_{jkt}$$

$$Rank^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt} = \alpha_5 Rank^{i}_{jkt}.Quota_{jk,t-5} + \Delta f^{RQ}_{kt} + \varepsilon^{RQ}_{jkt}$$

Table B.9 shows both the first and second stage results for the data set including the six developing countries. All the results for the first stage are significant.For second stage the interaction term $Rank^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt}$ is negative and significant. This means that, for all these five countries together, as their rank based on unit value becomes higher the change in China's market share has a more negative impact on them. For example, if the average rank of all the products of this sample set of countries go up by seven amongst the group of 16 exporters, the impact of China's market share gains on them will become negative. It can be inferred from this result that the developing countries that do not lose market share to China offer much lower prices compared to the other exporters in their export categories.

2.6 Regression Results for Growth in New Products

Even though Chinese trade integration does not appear to have much of an impact in the developing countries' market shares, it is possible that it has stopped them from venturing into new product categories. To check if that is the situation here, I use the following regression equation:

$$Entry^{i}_{j,k,t} = \phi \Delta MarketShare^{CN}_{j,k,t} + \Delta f_{k,t} + e_{j,k,t}$$

where $Entry^{i}_{j,k,t}$ = (No of HS products in each SIC category j at importing country k at time t-No of HS products in each SIC category j at importing country k at time t-5)/no of total products by country i at SIC category j in importing country k at time t

As before I use $Quota_{jk,t-5}$ as the instrument for $\Delta MarketShare^{CN}_{j,k,t}$. According to my findings in table B.10, the coefficient of the variable $\Delta MarketShare^{CN}_{j,k,t}$ is negative and significant. Even though the market share of the developing countries studied for this paper are not affected by China, it has stopped them from expanding into new product categories.The categories where China gains more market share are also the categories where the developing countries have less growth in new product categories.

I get similar results (Table B.12) for when,

$Entry^{i}_{j,k,t}$= (No of HS products in each SIC category j at importing country k at time t-No of HS products in each SIC category j at importing country k at time t-5)/no of total products by country i at SIC category j in importing country k at time t-5

Which represents growth in new products in the SIC categories where they have been producing since 1999, but does not take into account the SIC categories where they might have started producing in these 5 years.

2.7 Robustness Check

An important consideration while investigating the impact of changes in China's market share on other countries' market shares is the fact that the data or the number are expressed in percentages using decimals (in between 0 and 1). In order to take into account this particular feature of the dependent and independent variable, I run an ivtobit regression model for the baseline regressions. I find that the results are almost the same as the original baseline regressions. Table B.13, B.14 and B.15 in the Appendix shows the baseline results for the 15 countries using an ivtobit model. The results are very similar to the original one.

2.8 Conclusion

This paper examines the impact of China's trade integration on the market shares of its export competitors from the developing world. I use an instrumental variable regression analysis to explain why the impact is different for different developing nations. I use several hypotheses to find out why certain countries lose their market shares to China and why certain countries do not.

Using a sample of 15 big exporters of apparel and textile to Europe, I find that only the US, Mexico, Hong Kong, Korea, Morocco and Indonesia have lost market shares to China. In my subsample of six developing lower-middle-income countries, only Indonesia has lost market share to China. A combined dataset for all six countries indicates that, as the elasticity of import demand of the products exported by these developing countries increases or products become less differentiated, the countries suffer losses in terms of market shares.My findings also illustrate that, they lose market shares to China as the capital-labor ratio becomes higher based on country capital intensity and product category capital intensity. After investigating the relative prices and ranks based on the unit values of all 16 countries, I also conclude that, as the rank increases for a country of this sub-sample, it loses more market share to China. These countries have been able to survive at the face of competition from China because of their ability to charge lower prices compared to all main exporters.

It is also interesting to find that China's competitiveness has actually reduced the growth

rate in terms of the number of products instead of actual market share. Though the developing countries have kept growing their market shares for most of its products, China's entry actually discouraged them from producing in more categories.

Chapter 3

INVESTIGATION OF CHINA'S IMPACT ON THE DEVELOPING COUNTRIES BASED ON PRODUCT SEGMENTATION

3.1 Introduction

I continue my investigation of how Chinese competition impacts its export competing developing countries. In this chapter I specifically look at how product segmentation can help many of these developing countries to shield themselves from Chinese competition.

There are two kinds of product differentiation which can help in explaining the baseline results. Vertical product differentiation and horizontal product differentiation. Vertical product differentiation happens when products can be ranked objectively from highest to lowest or better to worse quality. Horizontal product differentiation occurs when products can not be differentiated based on their objective quality. In this case, the products simply belong to different categories and can not be ranked as better or worse than one another[Piana, 2003].

I use a simple model of distance in product space to explain this hypothesis of product segmentation.

According to vertical product differentiation, one way in which unit values might matter, is that countries with higher unit values, might produce higher quality goods and therefore shield them selves through quality from competition [Khandelwal, 2010]. But surprisingly in my sample of developing countries, I find that, products with very low unit value have been shielded form Chinese competition. Out of the 15 big exporters of apparel and textile to the EU, Bangladesh and Pakistan have the lowest average unit values amongst all exporting countries to Europe.[5] Only these two countries have a lower average unit value than China. Using a smaller sub-sample of only these two countries, I find that they face less competition from China in the very low unit value product categories. As the price of product categories increases to a certain point, they start losing market share to China. It can be infered that Bangladesh and Pakistan in particular have not experienced a drop in market share as they manufacture very low-priced and low quality product categories that China does not offer anymore.

Next, I consider the possibility of horizontal product differentiation: Countries that produce goods that differ from those manufactured China are better insulated from being adversely affected by China's market gains. To measure horizontal product segmentation, I inspect if they are producing in different sub-categories (HS categories) in each SIC category compared to China. I construct a variable overlap which measures the specialization by

[5]The variable unit value to represent price can be established by dividing the total trade value in each category by the total weight.

summing the trade value of the overlapping HS categories in each SIC category. I confirm that this specialization pattern is not correlated with the capital-labor ratio, so it can not be explained by capital intensity[6]. I find that they maintain or gain market shares in the SIC categories, where they produce more different HS categories than China . The market share declines in the categories where they have more common or overlapped sub-categories with China. Therefore, the countries are better protected by specializing in different categories than China does and by producing fewer products that overlap with Chinese ones, which results in less competition from China. Hypothesis: Distance in product space can help countries face competition from another country [Holmes and Stevens, 2014]. I investigate if these countries produce different products than China and if they sustain their market shares by product segmentation.

My paper relates to the main finding of horizontal product differentiation in the work of Holmes and Stevens [Holmes and Stevens, 2014]. They conclude that the industries most likely to be heavily affected by China are the ones with products that are close substitutes for Chinese products. I find that the developing countries face less competition from China in the product categories with less overlapping sub-categories. Therefore, these countries are protected from China because they specialize in different categories than China does.

The literature on product segmentation ([Khandelwal, 2010], [Schott, 2003]) also indicates that very high end products and luxury goods are insulated from price competition from developing countries. Interestingly my paper demonstrates, that even producers of very

[6]The correlation coefficient between the variable capital-labor ratio based on country and product and the variable overlap is only .093.

low priced homogenous goods such as Bangladesh and Pakistan are insulated from China's market gain following vertical product differentiation.

The rest of the chapter is as follows, in section two I develop a simple model of distance in product space to provide a theoretical explanation of how product segmentation helps countries from competition. Section three talks about vertical product segmentation and how it helped Bangladesh and Pakistan to shield themselves against China. Section four talks about horizontal product segmentation and how all of the developing countries from my set could have survived against Chinese competition. Section five concludes the chapter and the thesis.

3.2 A Simple Model of Distance in Product Space and Competitiveness

I develop a simple model of distance in product space which delivers two important results. One, the products which are most differentiated from Chinese products have the least probability of competing with China. Therefore, countries that produce more different categories compared to China, they will face less competition from China in those categories. As demonstrated by the second result, countries that produce more than one products, lose less market share to China in categories that are more different compared to Chinese products.

Let's assume that the price of a good k produced in location l^1,

$$p_{l^1} = \frac{w_{l^1}}{A_{l^1}}$$

where, w_{l^1} is the wage in location l^1 and A_{l^1} is the unit labor productivity in location l^1. So I assume, that the market for each country or good is perfectly competitive. The price is just the marginal cost of the product and labor is the only input. $\tau_{l^1,l^0} > 1$ is the iceberg cost of trading the product from location l^1 to location l^0. In order for one unit of a good to reach and to be consumed in location l^0, τ_{l^1,l^0} units of good needs to shipped from and produced in location l^1. Using [Armington, 1969], the price of a good k in location l^0 that was produced in location l^1,

$$p_{l^1 l^0} = \tau_{l^1,l^0} \frac{w_{l^1}}{A_{l^1}}$$

Let $d(l^1, l^0)$ be the distance between location l^1 and l^0. Iceberg trade of cost $\tau(d) \geq 1$ and is

weakly increasing in d. Following [Holmes and Stevens, 2014] for a good k, the probability that a good of location l^0 competes with the good in location l^1 is,

$$\phi_{l^1,l^0} = \frac{a_{l^1,l^0}\gamma_{l^1}}{\sum_{l=0}^{L} a_{l^1,l^i}\gamma_{l^i}} \text{.....(1)}$$

where $\gamma_{l^i} = \frac{A_{l^i}}{w_{l^i}}$ is the cost efficiency index for location l^i and $a_{l^1,l^i} = \frac{1}{\tau(d(l^1,l^i))}$ is the distance adjustment between l^1 and l^i and (i=0,1,2,...,L).

Let $d_1 = d(l^1, l^0)$ and $d_2 = d(l^2, l^0)$ and $d_1 < d_2$. Then the distance between l^1 and l^0 is smaller than the distance between l^2 and l^0. Therefore, the iceberg trade cost is higher for d_2 than d_1.

$\tau(d_1) < \tau(d_2)$ which implies, $a_{l^1,l^0} > a_{l^2,l^0}$

Using equation (1)

$$\phi_{l^1,l^0} > \phi_{l^2,l^0}$$

I assume d_1 and d_2 as distance in product space instead of geographical distance. Thus, the product that is situated furthest from l^0 has the least probability that the product at l^0 is competing with it. Following this result, products that are situated furthest from China's products in the product space (in this case the lower priced products from Bangladesh and Pakistan) should have less of an impact from Chinese products.

Assuming CES demand preference for the consumers of the importing location, I find that spending on product produced at l^1 at location l^0 is as follows,

$$x_{l^1 l^0} = (\frac{p_{l^1 l^0}}{P_{l^0}})^{1-\theta} x_{l^0}$$

Here x_{l^1,l^0} is the spending on product produced at l^1 at location l^0 . x_{l^0} is the total spending on all products at location l^0. $p_{l^0 l^1}$ is the price of the product produced at l^1 at location l^0, P_{l^0} is the total price index at location l^0 for all products from all locations $l^i where i = (0, 1, 2, ...L)$

Market share of product of l^1 at location l^0,

$$MarketShare_{l^1,l^0} = \frac{x_{l^1,l^0}}{x_{l^0}} = \frac{x_{l^1,l^0}}{\sum_{n=0}^{L} x_{l^n,l^0}} = \frac{x_{l^1,l^0}}{x_{l^0,l^0} + x_{l^1,l^0} + x_{l^2,l^0} + ... + x_{l^L,l^0}}$$

$$= \frac{x_{l^1,l^0}}{\frac{x_{l^0,l^0}.x_{l^0}}{x_{l^0}} + x_{l^1,l^0} + x_{l^2,l^0} + ... + x_{l^L,l^0}}$$

Differentiating with respect to change in market share of product produced in location l^0 I find,

$$\frac{\partial y}{\partial x} = \frac{\partial MarketShare_{l^1,l^0}}{\partial MarketShare_{l^0,l^0}} = -\frac{x_{l^1,l^0}}{{x_{l^0}}^2} x_{l^0} = -\frac{x_{l^1,l^0}}{x_{l^0}}$$

$$= -\left(\frac{p_{l^1,l^0}}{P_{l^0}}\right)^{1-\theta} \frac{x_{l^0}}{x_{l^0}} = -\left(\frac{p_{l^1,l^0}}{P_{l^0}}\right)^{1-\theta}$$

$$= -\left(\tau_{l^1,l^0}.\frac{w_{l^1}}{A_{l^1}}\right)^{1-\theta}.{P_{l^0}}^{\theta-1} = -(\phi_{l^1,l^0})^{\theta-1}.{P_{l^0}}^{\theta-1}{B_{l^0}}^{\theta-1}$$

where, $B_{l^0} = \sum_{n=0}^{L} a_{l^n,l^0}\gamma_{l^n}$

For $\theta > 1$ (products not complements, more substitutable), if $d_1 < d_2$.

$$\Rightarrow \tau(d_1) < \tau(d_2)$$

$$\Rightarrow a_{l^1,l^0} > a_{l^2,l^0}$$

$$\Rightarrow \phi_{l^1,l^0} > \phi_{l^2,l^0}$$

$$\left|\frac{\partial MarketShare_{l^1,l^0}}{\partial MarketShare_{l^0,l^0}}\right| > \left|\frac{\partial MarketShare_{l^2,l^0}}{\partial MarketShare_{l^0,l^0}}\right|$$

The smaller the distance between product from $l^n and l^0$ the more negative impact on the $MarketShare_{l^1,l^0}$ because of an increase in market share of product from l^0 .

Therefore, countries can shield themselves from China by producing products that are more differentiated than Chinese products. They can specialize by producing in different HS categories than China in each SIC category. They can also specialize by producing different SIC categories than China.

3.3 Vertical Product Differentiation by Producing Different SIC Categories Based on Unit Value

After arranging all 11 countries according to their average unit value (Table B.16), I take a sub-sample of two countries (Bangladesh and Pakistan) from the six developing countries based on the fact that they have the lowest average unit value. The variable unit value to represent price can be established by dividing the total trade value in each category by the total weight. Thus, they mostly produce lower ended products from the price point of view and China mostly manufactures mid-range products. This phenomenon can be explained using vertical product differentiation. Developing countries produce very low price and probably lower quality products that China does not produce anymore[12].The distance in product categories help them avoid facing too much competition from China.

I run the following regression equation to see if product segmentation based on unit value can have an impact on the effect of change in Chinese market share on other countries' market shares.

$$\Delta MarketShare^{i}_{jkt} = \gamma_1 \Delta MarketShare^{CN}_{jkt} + \gamma_2 UnitValue^{i}_{jkt}$$

$$+\gamma_3 UnitValue^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt} + \Delta f_{kt} + \varepsilon_{jkt}$$

$\Delta MarketShare^{CN}_{jkt}, UnitValue^{i}_{jkt} and UnitValue^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt}$ are instrumented with $Quota_{jk,t-5}, UnitValue^{i}_{jkt-5} and UnitValue^{i}_{jkt-5}.Quota_{jk,t-5}$. I use unit value or prices

[12]In the literature on vertical product differentiation price is used as an indicator of quality. Higher price means higher quality

from 1999 to 2000 as an instrument for unit value/prices for 2004-2005 to avoid division bias. As before, quota is the instrument for change in market share of China. For the interaction term between the unit value 2004-2005 and the changes in the market share of China the instrument becomes the unit value 1999-2000 interacted with quotas. Therefore, the first stage regressions are as follows,

$$\Delta MarketShare^{CN}_{jkt} = \gamma_4 Quota_{jk,t-5} + \Delta f^{Q}_{kt} + \Delta \varepsilon^{Q}_{jkt}$$

$$UnitValue^{i}_{jkt} = \gamma_5 UnitValue^{i}_{jkt-5} + \Delta f^{U}_{kt} + \Delta \varepsilon^{U}_{jkt}$$

$$UnitValue^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt} = \gamma_6 UnitValue^{i}_{jkt-5}.Quota_{jk,t-5} + \Delta f^{UQ}_{kt} + \varepsilon^{UQ}_{jkt}$$

Table B.17 and B.18 show the results for this regression for Bangladesh and Pakistan. The first stage results for the respective instruments are significant for both countries. In the second stage regression results, both the countries have positive and statistically significant coefficients for $\Delta MarketShare^{CN}_{jkt}$ and negative and statistically significant coefficients for ΔMKTShareCN. As prices go up there is a negative impact on the effect of China's market share gain on both Bangladesh and Pakistan. In the case of Bangladesh, as the unit value increases by one unit, the positive effect from China's market gains decreases by .0161. For a unit value of higher than 11.5528 USD/kg the impact of China's market share gain in

Bangladesh's market share actually becomes negative. In the case of Pakistan the impact of China's market gain in Pakistan's market share is negative for unit values higher than 14.2832 USD/kg. They also offer lower relative price in this categories compared to China.[13] Using these results it can be argued that Bangladesh and Pakistan have survived the competition from China due to very low price and possibly lower quality but more affordable products that they can offer that China does not produce anymore. It is interesting to see that the countries/producers can survive from China's competition by producing low priced products that are not close substitutes for Chinese goods. Vertical product segmentation can insulate countries from China not only in the higher priced categories but also in the very low priced categories.

[13]Table B.19 and B.20 in the Appendix represents the results for how relative price compared to China affects China's impact on these two countries' market shares

3.4 Vertical Product Differentiation Based on Unit Value: Further Explanation

Figure A.4 and A.5 show the unit values(USD/kg) of the top 10 product categories with the largest market shares in Europe for Bangladesh and Pakistan using 2005 data[14]. For both of these countries, as market share goes up, the average unit value gradually declines. Bangladesh enjoys the highest market share in the category SIC 2311 with a unit value of less than 10 USD/kg. The top three categories for Pakistan by market share have unit values less than 5 USD/kg.

I highlight the unit value/vertical differentiation hypothesis further using a unit value distribution for the different countries in my sample. Figure A.8 and A.9 depict the unit value distributions of Bangladesh, China, India, the US and Mexico in 1999 and 2005. Out of these countries Bangladesh and India are the two developing countries that have not lost market share to China. In contrast the US and Mexico have lost significant market share to China. As seen in the figures, both the US and Mexico have a wider distribution compared to Bangladesh and India and they are more on the right compared to these two countries and also compared to China both in 1999 and 2005. However compared to 1999 China's unit value distribution has moved slightly to the left in 2005 as Chinese prices dropped after the MFA phase out[Brambilla et al., 2010].

Figure A.10 and A.11 shows the unit value distribution of Bangladesh, China, Indonesia and Pakistan. Other than China all three countries are part of my sub-sample of developing

[14]Figure A.6 and A.7 in the Appendix shows their relative prices for these same categories

countries in Asia. It is obvious from the figures that both Bangladesh and Pakistan have very narrow distribution with a lower mean compared to China. Indonesia is the only country in this sub-sample that has lost market share to China significantly and it's distribution is wider compared to the other two, and it has a higher mean than China. In this example having a smaller mean and a narrower distribution results in less of a negative impact from China. Producing very inexpensive product categories with lower quality, which are not close substitutes to Chinese goods can protect countries from the negative effect of China's market gains.

3.5 Horizontal Product Segmentation by Producing Different Product Categories in Each SIC Category

Each SIC category comprises of a number of HS categories. While analyzing the results for the hypothesis of product segmentation, the question arises as to whether or not the developing countries specialize in different HS categories than China in these SIC categories. To check if they produce in different HS categories in the SIC categories where they are not losing market share I introduce the following variable.

$Overlap^{i}_{jkt}$=TradeValue of Overlapped HS Categories in Each SIC for Country i in time period t/Total TradeValue of All categories in Each SIC for Country i in time period t

Overlapped categories are the HS categories that country i produces in each SIC category j that overlap with China. I divide the trade value of overlapped HS categories by the total trade value of all HS products that country i produces in SIC category j. The regression equation for this purpose is as follows,

$$\Delta MarketShare^{i}_{jkt} = \rho_1 \Delta MarketShare^{CN}_{jkt} + \rho_2 Overlap^{i}_{jkt} + \rho_3 Overlap^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt} + \Delta f_{kt} + \varepsilon_{jkt}$$

As in the previous regressions $Quota_{jk,t-5}$ and $Overlap^{i}_{jkt}.Quota_{jk,t-5}$ are used as instruments for $\Delta MarketShare^{CN}_{jkt}$ and $Overlap^{i}_{jkt}.\Delta MarketShare^{CN}_{jkt}$. Table 11 displays the results. The coefficient of the interaction term is negative and significant.

A lower value of overlap means that the developing countries are producing in more HS categories that differ from those that China operates in. As the overlap term becomes larger

for SIC categories, it means that these developing countries are producing in none of same HS categories as China. The highest value of the overlap term is 1, in which case all the HS categories that the country is producing in a SIC category are same as China. China can of course produce in more HS categories other than the overlapped categories, which does not impact the value of the overlap variable. According to my findings in table B.12, the interaction coefficient is negative and significant .This means that, as developing countries produce more HS categories that overlap with China, they lose more market share following the theory of horizontal product segmentation.

3.6 Conclusion

Out of the sub-sample of six developing countries, Bangladesh and Pakistan are the ones with the lowest average unit values and. For these two countries, as unit values become higher, the positive relationship between China's market share and their market share becomes smaller and even negative. This is, in fact, one of the most interesting findings of this paper. The opinion regarding vertical product segmentation and how it can help very high-ended and higher-priced categories to survive competition from the mass production and price-competition of big developing countries such as China can also be used for very low-priced product categories. It can be said that Bangladesh and Pakistan have not been affected by China because they mostly produce very cheap, lower-quality products that China does not offer anymore.

Horizontal product differentiation also explains the developing countries' performances while facing Chinese competition. The findings of this study highlight the fact that, the countries are producing in different HS categories compared to China in the SIC categories where they maintain their market shares. It can be concluded that one of the reasons why they have not been affected by China's market gains is the fact that most of their products are different than China's products. I use a regression of trade value of overlapped sub-categories interacted with changes in Chinese market share to prove this hypothesis. As they mostly produce products that do not overlap with the products China produces in each SIC category, they remain insulated from China by the logic of product segmentation. I

use a simple model of distance in product space as a theoretical basis to describe how these two kinds of product differentiation can explain the performance of the developing countries studied.

My thesis provides important insights into China's impact on it's developing export competitors and what helps them stay competitive with China. The focus of my paper has been on the lower-middle-income Asian developing economies who are also among the biggest exporters of textile and apparel to the EU. However, not all developing countries from the rest of the world were able to perform as well as their Asian counter parts. Future analysis on the countries from different regions of the world as well as at different stages of development can lead to more interesting findings. Even for the same countries, further interesting analysis can be carried on in this subject in future. For example, researchers could look into the role of Foreign Direct Investment (FDA) from developed nations into the developing countries, infrastructure, trade finance and so forth as well as how how they can help them in their competitiveness in the export market.

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Appendix A

FIGURES

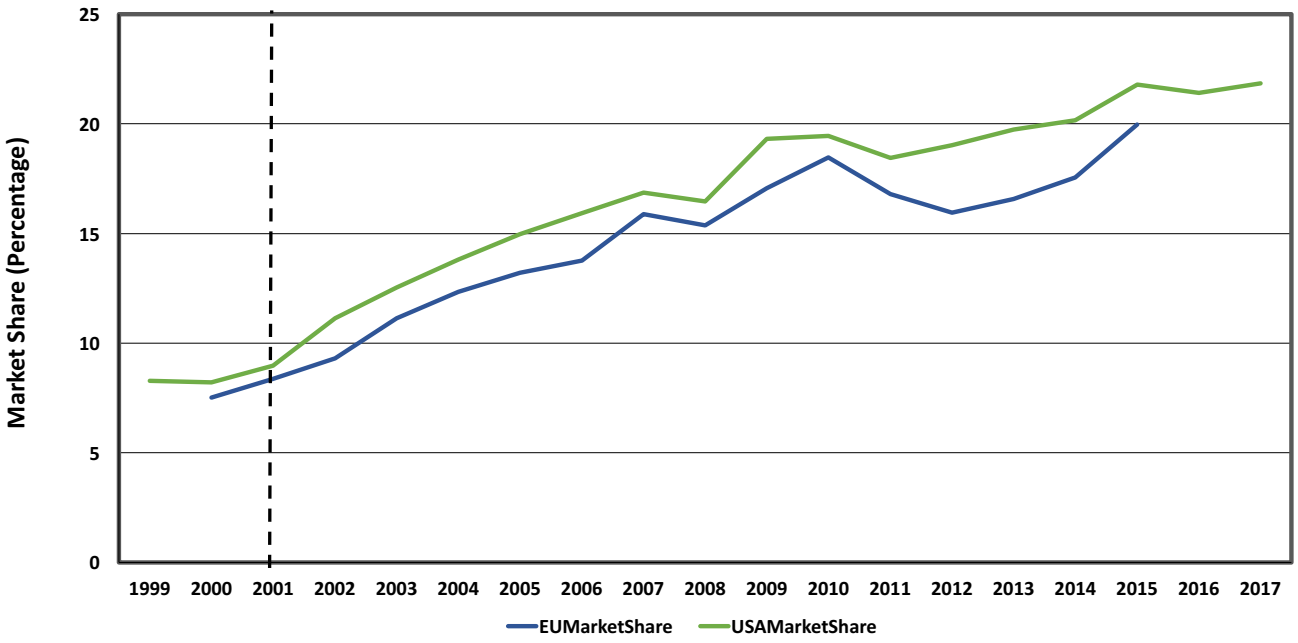
Figure A.1: Rank Based on GDP per Capita and Capital/Labor Ratio (Lower to Higher)

Country	GDP/Capita (USD/Person)	Rank 2005
Bangladesh	484	1
Vietnam	683	2
India	707	3
Pakistan	711	4
Sri Lanka	1250	5
Indonesia	1342	6
China	1753	7
Morocco	2013	8
Thailand	2893	9
Tunisia	3194	10
Turkey	7384	12
Mexico	7986	12
South Korea	18639	13
Hong Kong	26649	14
EU	29108	15
USA	44237	16

Country	Capital/Labor (USD/Person)	Rank 2005
Bangladesh	11361.32389	1
Pakistan	14625.25815	2
India	16179.47084	3
Vietnam	17012.72273	4
China	27802.96242	5
Indonesia	30500.60651	6
Sri Lanka	38451.94082	7
Morocco	44027.10483	8
Thailand	53703.68839	9
Tunisia	74412.45861	10
Turkey	77668.11625	11
Mexico	85006.56935	12
South Korea	213527.3662	13
Hong Kong	307943.7337	14
USA	312877.2533	15

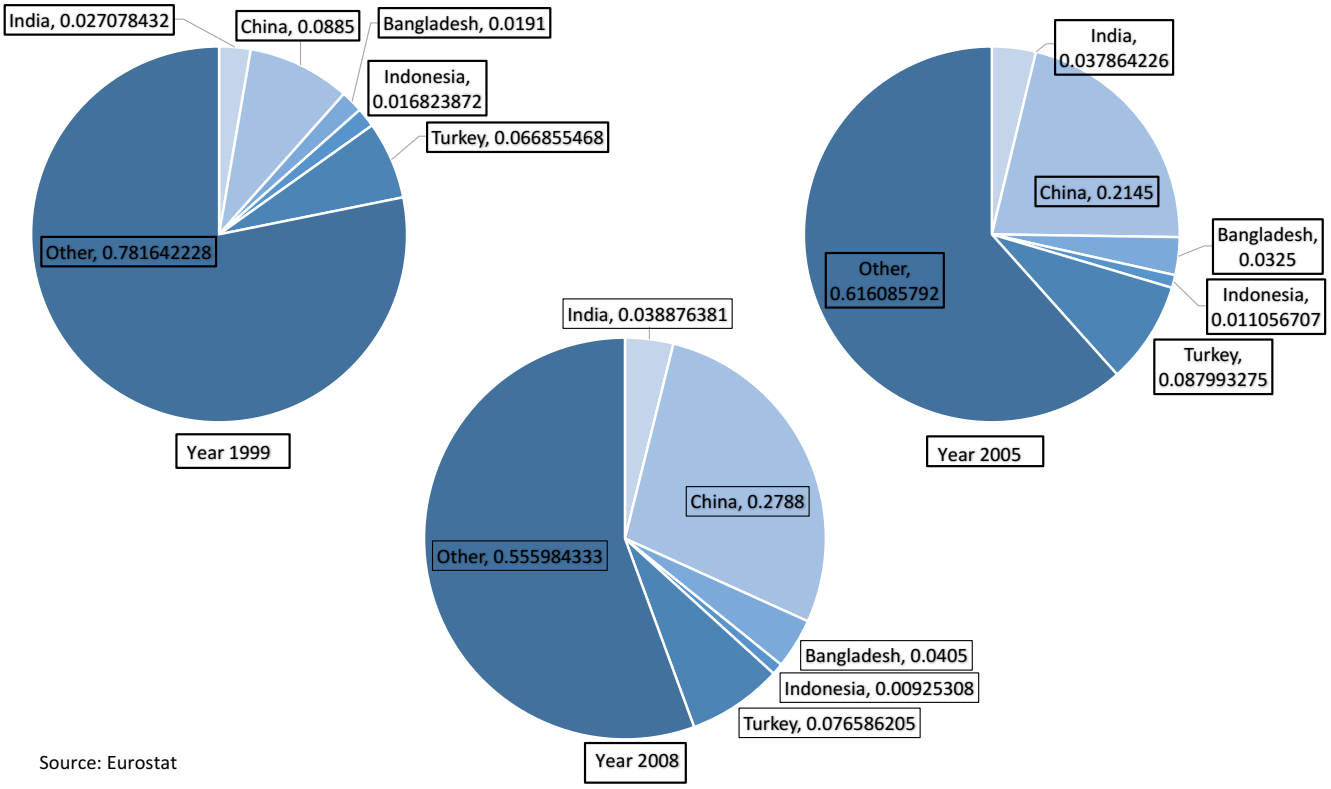
Source: World Bank, Penn World Table 9.0

Figure A.2: China's Market Share in Import by Europe and USA



Source: UN Comtrade & Euro Stat Database

Figure A.3: Market Share of the Top 5 Exporters of Textile and Apparel to Europe



Source: Eurostat

Figure A.4: Unit Value(USD/kg) of Bangladeshi Products for the top 10 Categories with Largest Market Share

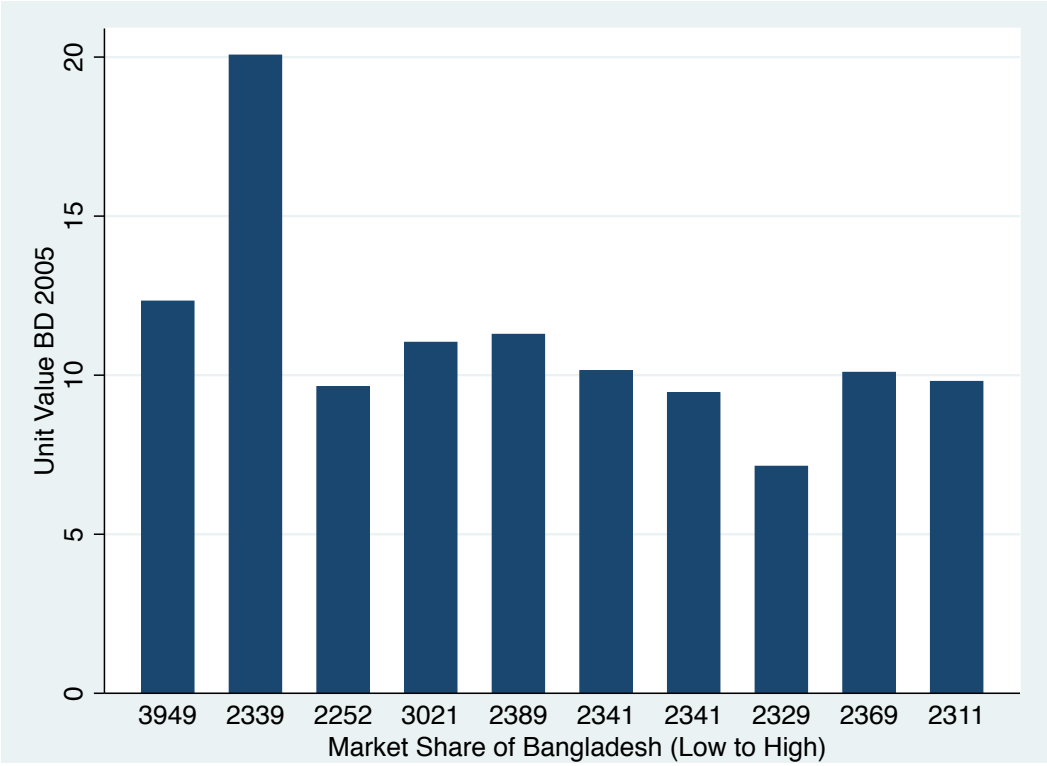


Figure A.5: Unit Value(USD/kg) of Pakistani Products for the top 10 Categories with Largest Market Share

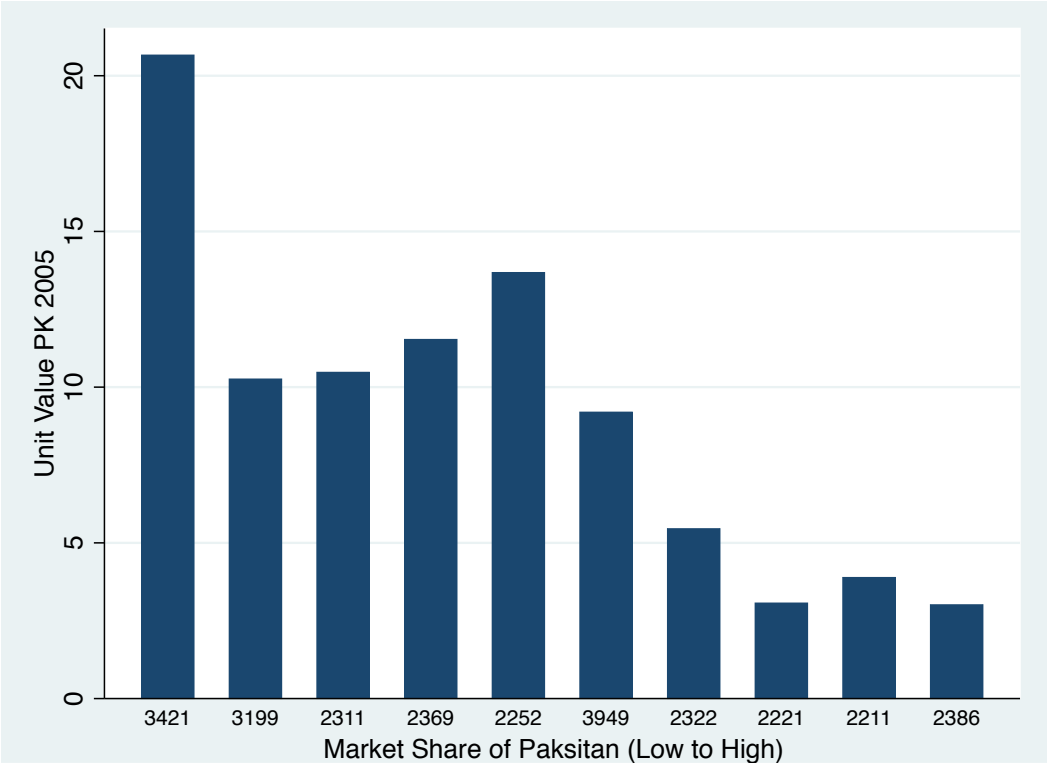


Figure A.6: Relative Price of Bangladeshi Products for the top 10 Categories with Largest Market Share

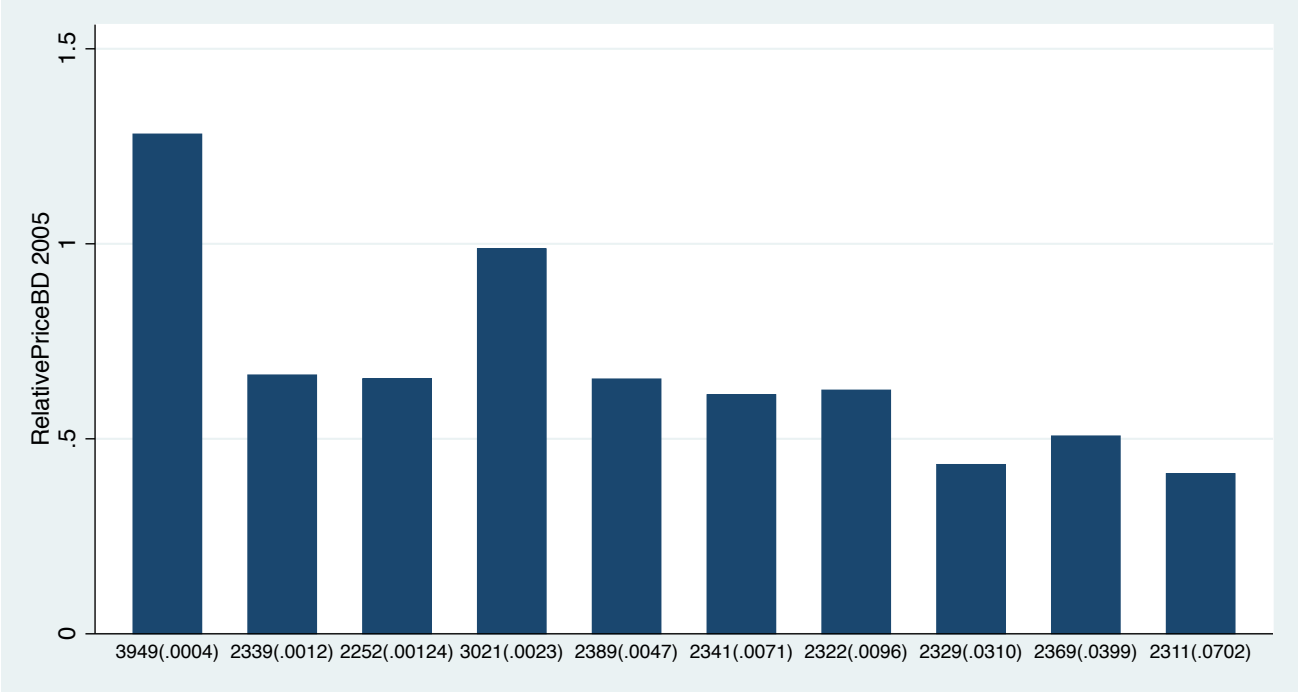


Figure A.7: Relative Price of Pakistani Products for the top 10 Categories with Largest Market Share

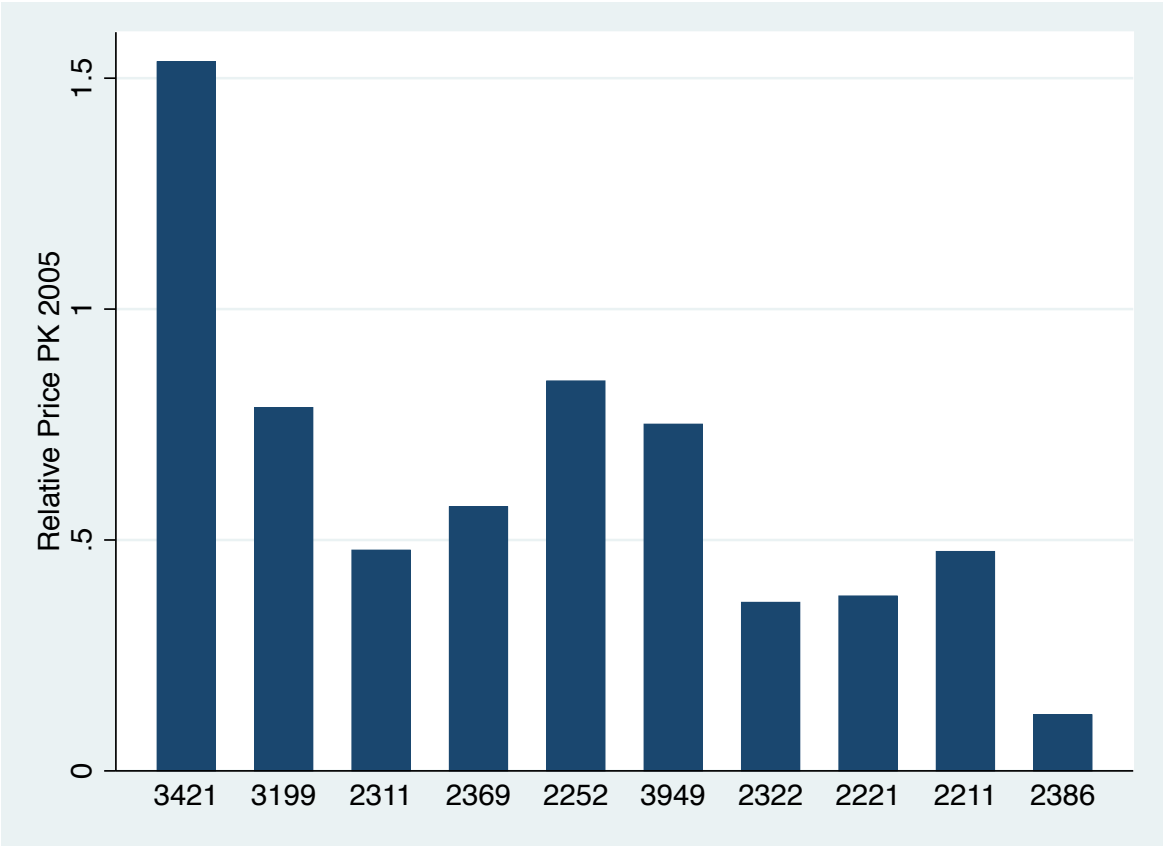


Figure A.8: Unit Value Distribution of Bangladesh, China, India, USA and Mexico 1999

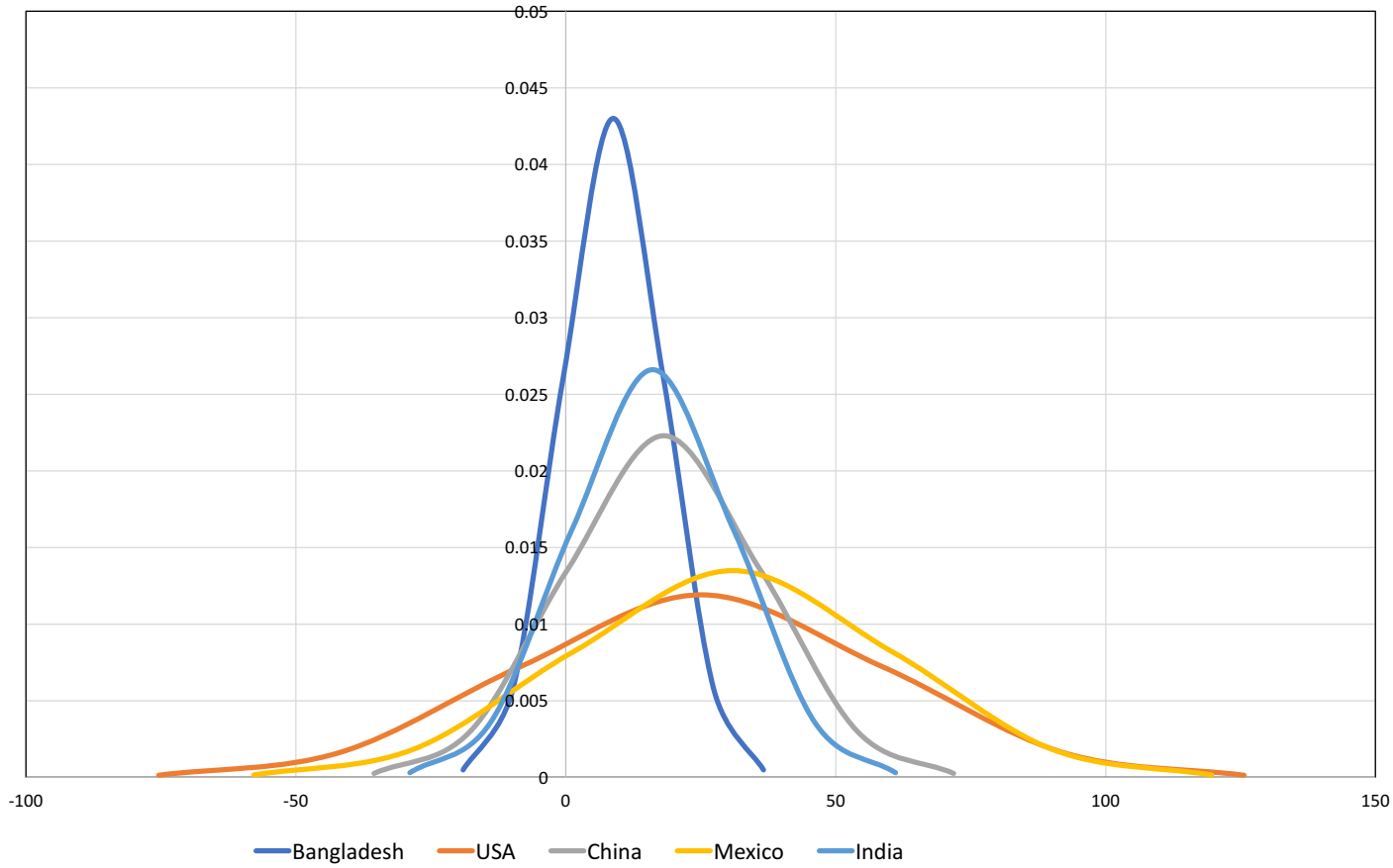


Figure A.9: Unit Value Distribution of Bangladesh, China, India, USA and Mexico 2005

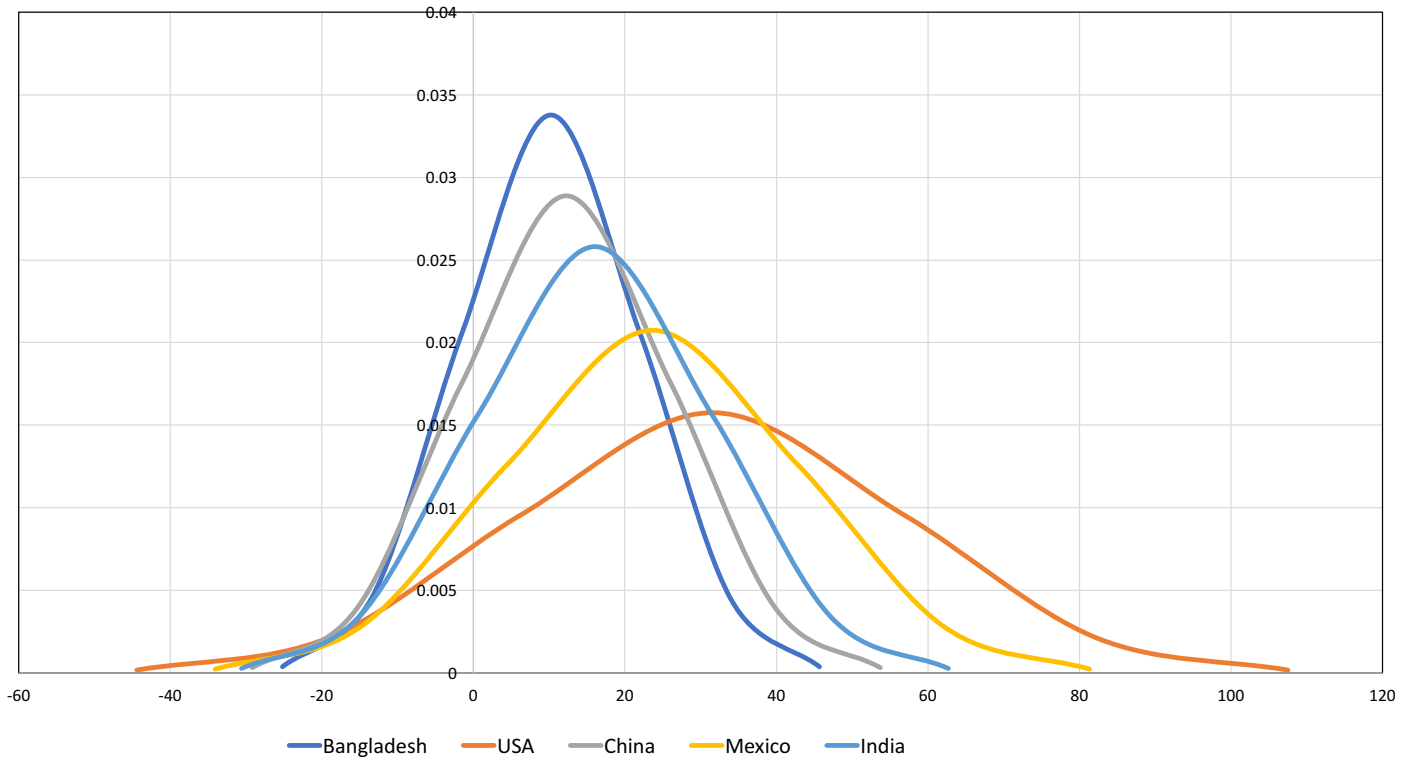


Figure A.10: Unit Value Distribution of Bangladesh, Indonesia, China and Pakistan 1999

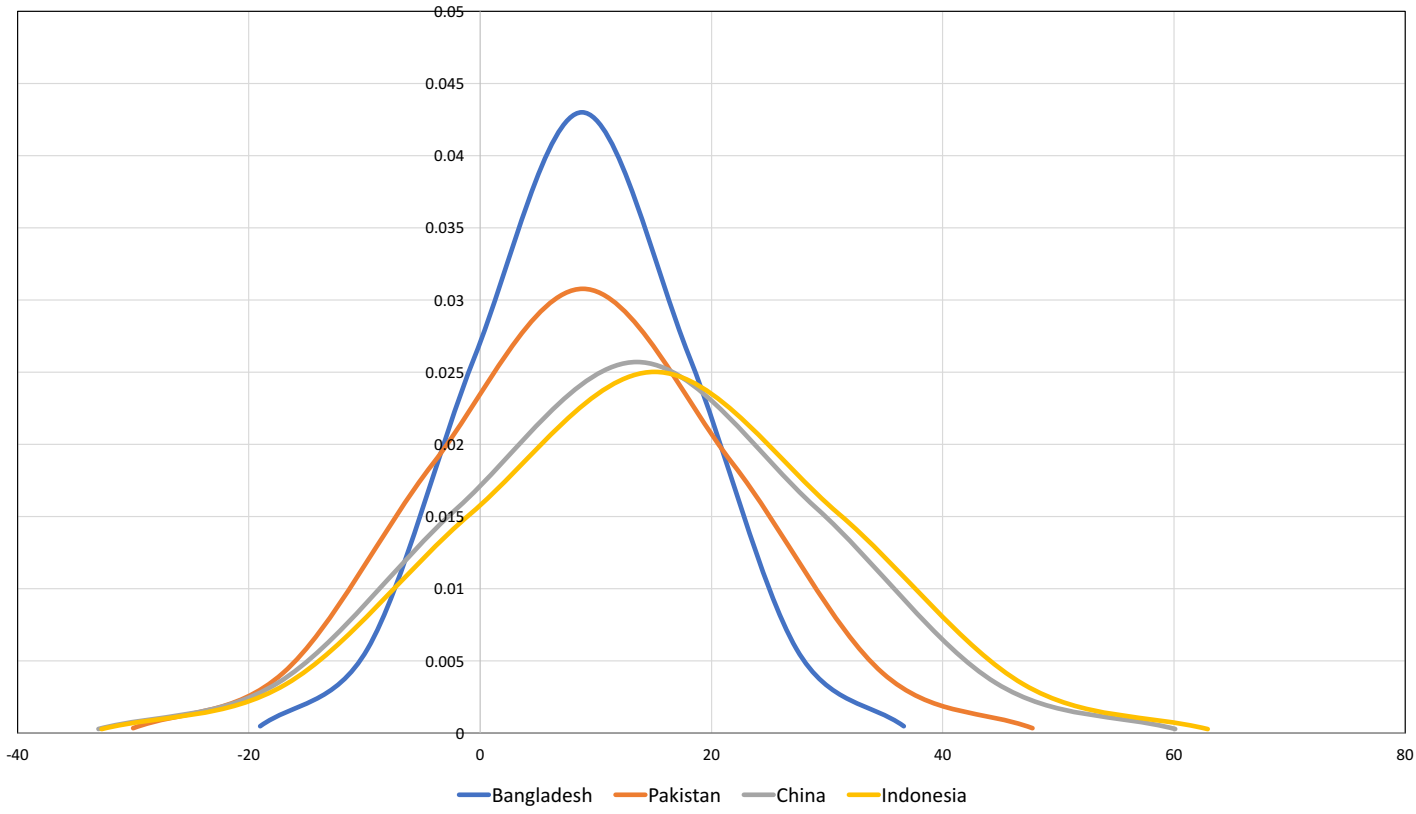
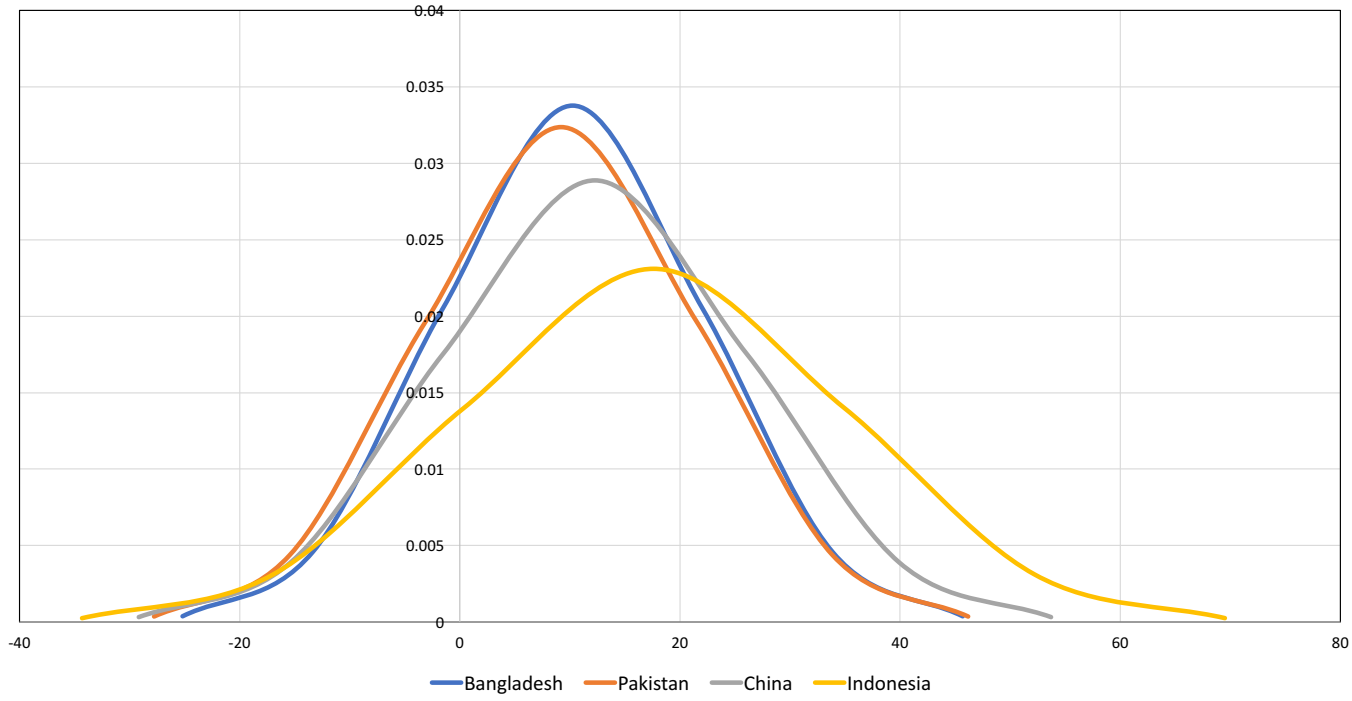


Figure A.11: Unit Value Distribution of Bangladesh, Indonsia, China and Pakistan 2005



Appendix B

TABLES

Table B.1: Summary Statistics for Change in Market Share of Exporters of Apparel and Textile in EU

Variable	Obs	Mean
ΔMKTShareCN	715	.0579029
ΔMKTShareID	685	-.0049077
ΔMKTShareVN	642	.0001518
ΔMKTSharePK	717	.0015137
ΔMKTShareEU	691	-.0101507
ΔMKTShareBD	702	.003376
ΔMKTShareTN	535	.000502
ΔMKTShareHK	676	-.05543
ΔMKTShareKR	714	-.07102
ΔMKTShareMX	630	-.0002665
ΔMKTShareLK	552	-.0010407
ΔMKTShareUS	703	-.0013201
ΔMKTShareIN	682	.002087
ΔMKTShareTR	687	.0095971
ΔMKTShareTH	711	-.0014899
ΔMKTShareMA	709	-.0719522
Quotas	715	.2842336

Table B.2: Baseline Regression

	(1) ΔMKTShareCN	(2) ΔMKTShareBD	(3) ΔMKTShareID	(4) ΔMKTShareHK	(5) ΔMKTShareKR
Quotas	0.139***				
	(7.57)				
ΔMKTShareCN		0.0118	-0.0648*	-0.127**	-0.0827**
		(0.50)	(-1.68)	(-2.26)	(-2.29)
Cons	0.0236	0.00796	0.00391	0.00825	0.0224***
	(1.26)	(0.92)	(1.38)	(1.50)	(3.69)
N	715	698	681	676	714

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.3: Baseline Regression

	(1) ΔMKTShareTH	(2) ΔMKTSharePK	(3) ΔMKTShareMX	(4) ΔMKTShareEU	(5) ΔMKTShareVN
ΔMKTShareCN	0.0352	-0.0439	-0.00777*	0.240	-0.0315
	(1.23)	(-0.99)	(-1.74)	(-4.34)	(-0.97)
Cons	-0.00243	0.00995	0.000273	0.00145	0.00171
	(-0.99)	(1.22)	(0.51)	(0.18)	(0.81)
N	678	711	624	683	639

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.4: Baseline Regression

	(1) ΔMKTShareUS	(2) ΔMKTShareTR	(3) ΔMKTShareTN	(4) ΔMKTShareMA	(5) ΔMKTShareIN	(6) ΔMKTShareLK
ΔMKTShareCN	-0.245*	0.195**	0.0332	-0.0698*	0.137	-0.00205
	(-1.82)	(2.37)	(0.58)	(-1.87)	(0.87)	(-0.12)
Cons	0.00902	-0.0148	-0.00332	0.00766	-0.0119	0.000224
	(0.95)	(-1.88)	(-0.66)	(1.13)	(-1.13)	(0.14)
N	697	682	533	709	677	550

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.5: Price Competition: Bangladesh, Indonesia and India

	(1) ΔPriceCN	(2) ΔPriceBD	(3) ΔPriceCN	(4) ΔPriceID	(5) ΔPriceCN	(6) ΔPriceIN
Quotas	0.688		3.268		3.347	
	(0.14)		(0.42)		(0.42)	
ΔPriceCN		-1.212		51.43		-802.7
		(-0.14)		(0.79)		(-0.00)
Cons	2.874	3.198	2.240	-201.7	2.221	3363.0
	(0.53)	(0.12)	(0.38)	(-0.47)	(0.38)	(0.00)
N	713	713	715	623	715	659

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.6: Price Competition: Sri Lanka, Pakistan and Vietnam

	(1) ΔPriceCN	(2) ΔPriceLK	(3) ΔPriceCN	(4) ΔPricePK	(5) ΔPriceCN	(6) ΔPriceVN
Quotas	3.360		3.267		3.268	
	(0.43)		(0.42)		(0.42)	
ΔPriceCN		3.158		0.760		11.61
		(0.49)		(0.40)		(0.56)
Cons	2.217	7.218	2.240	-3.055	2.240	-51.24
	(0.38)	(0.24)	(0.38)	(-0.40)	(0.38)	(-0.42)
N	715	550	715	715	715	538

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.7: Regression Results for Elasticity of Import Demand for All Six Developing Countries

	(1) ΔMKTShareCN	(2) SigmaΔMKTShareCN	(3) ΔMKTShareX
Sigma	-0.0001278	-.0152	-.00001
	(-0.96)	(-1.60)	(-0.03)
Quotas	0.1367***	-.1227	
	(8.10)	(-0.50)	
SigmaQuotas	-0.0011522	0.06486**	
	(-1.48)	(2.30)	
ΔMKTShareCN			0.0661**
			(2.13)
SigmaΔMKTShareCN			-0.02135***
			(-2.91)
Cons	0.03506	0.23673	0.0006652
	(1.35)	(2.13)	(0.15)
N	3954	3954	3954

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.8: Capital-Labor Ratio Hypothesis

	(1) ΔMKTShareCN	(2) CapitalLaborMKTShare	(3) ΔMKTShareX
SICCapitalLabor	-0.00295**	-.00697	0.00028
	(-2.53)	(-0.39)	(0.45)
CountryCapitallabor	0.0015***	0.0744**	0.000671
	(3.13)	(2.19)	(0.81)
CapitalLabor	-0.000066	-0.0043	-0.0000264
	(-1.53)	(-1.03)	(-0.21)
Quotas	0.139***	-.0381	
	(7.25)	(-0.10)	
CapitalLaborQuotas	-0.00231***	0.09286*	
	(-3.27)	(1.76)	
ΔMKTShareCN			0.0709*
			(1.81)
CapitalLaborMKTShare			-0.0140**
			(-2.46)
Cons	0.0442	0.0499	-0.00376
	(1.50)	(0.18)	(-0.59)
N	3954	3954	3954

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.9: Rank Regression Results

	(1) ΔMKTShareCN	(2) RankMKT	(3) ΔMKTShareX
Rank	0.00077*	0.03094***	-0.0008414*
	(1.65)	(4.39)	(-1.74)
Quotas	0.1102***	-.155*	
	(5.58)	(-1.98)	
RankQuotas	0.0031	0.16007***	
	(1.50)	(5.37)	
ΔMKTShareCN			0.1437**
			(2.39)
RankΔMKTShareCN			-0.02636***
			(-3.54)
Cons	0.0367	0.2097	0.00509
	(1.28)	(0.69)	(1.52)
N	3593	3593	3593

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B.10: Regression Results for New Product Entry for All Six Developing Countries of Asia

	(1) ΔMktshareCN	(2) Entry
Quotas	0.1320108***	
	(7.16)	
ΔMktshareCN		-0.286*
		(-1.71)
Cons	0.0337	0.580***
	(1.30)	(13.81)
N	3954	3954

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.11: Regression Results for New Product Entry(No Exit) for All Six Developing Countries of Asia

	(1) ΔMKTShareCN	(2) EntryOnly2004
Quotas	0.132***	
	(7.16)	
ΔMKTShareCN		-0.250
		(-1.58)
Cons	0.0337	0.577***
	(1.30)	(13.83)
N	3954	3954

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.12: Regression Results for New Product Entry/Total 1999 Product Number for All Six Developing Countries of Asia

	(1) ΔMKTShareCN	(2) E2004/1999
Quotas	0.129***	
	(7.00)	
ΔMKTShareCN		-0.240*
		(-1.68)
Cons	0.040	0.539***
	(1.35)	(12.82)
N	3594	3594

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.13: Robustness Check: Baseline Regression

	(1) ΔMKTShareBD	(2) ΔMKTShareID	(3) ΔMKTShareHK	(4) ΔMKTShareKR	(5) ΔMKTShareTH
main					
ΔMKTShareCN	0.0118	-0.0648*	-0.127**	-0.0827**	0.0352
	(0.50)	(-1.67)	(-2.26)	(-2.30)	(1.23)
Cons	0.00796	0.00391	0.00825	0.0224***	-0.00243
	(0.92)	(1.38)	(1.50)	(3.69)	(-.99)
N	698	681	676	714	678

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.14: Robustness Check: Baseline Regression

	(1) ΔMKTSharePK	(2) ΔMKTShareMX	(3) ΔMKTShareEU	(4) ΔMKTShareVN	(5) ΔMKTShareUS
main					
ΔMKTShareCN	-0.0439	-0.00777*	0.240	-0.0315	-0.245*
	(-0.99)	(-1.73)	(-4.34)	(-0.98)	(-1.82)
Cons	0.00995	0.000273	0.00145	0.00171	0.00902
	(1.22)	(0.51)	(0.18)	(0.81)	(0.95)
N	711	624	683	639	697

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.15: Robustness Check: Baseline Regression

	(1) ΔMKTShareTR	(2) ΔMKTShareTN	(3) ΔMKTShareMA	(4) ΔMKTShareIN	(5) ΔMKTShareLK
main					
ΔMKTShareCN	0.195**	0.0332	-0.0698*	0.137	-0.00205
	(2.37)	(0.58)	(-1.87)	(0.86)	(-0.12)
Cons	-0.0148	-0.00332	0.00766	-0.0119	0.000224
	(-1.88)	(-0.66)	(1.15)	(-1.13)	(0.15)
N	682	533	709	677	550

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.16: Rank Based on Unit Value

Country	Rank 1999	Average Unit Value(USD/kg)
Pakistan	1	8.43
Bangladesh	2	8.52
India	3	15.47
China	4	16.29
Turkey	5	18.73
Sri Lanka	6	18.91
Viet Nam	7	19.16
Indonesia	8	19.24
Thailand	9	20.36
Tunisia	10	22.42
USA	11	27.80
EU	12	31.55
Mexico	13	32.50

Country	Rank 2005	Average Unit Value(USD/kg)
Pakistan	1	9.12
Bangladesh	2	10.29
China	3	14.58
Viet Nam	4	16.73
Indonesia	5	18.61
India	6	20.51
Sri Lanka	7	21.39
Thailand	8	21.68
Turkey	9	24.21
EU	10	25.11
Mexico	11	27.23
Tunisia	12	31.78
USA	13	36.70

Table B.17: Regression Results for Unit Value of Bangladesh

	(1) UnitValueBD2005	(2) ΔMKTShareCN	(3) UnitValueΔMKT	(4) ΔMKTShareBD
UnitValueBD1999	0.620***	0.0000569	0.0152	
	(7.38)	(0.30)	(1.45)	
Quotas	2.352	0.0889***	0.432	
	(1.03)	(3.68)	(1.32)	
UnitValueQuotas	-0.269	0.00400***	0.104***	
	(-1.32)	(3.05)	(3.36)	
UnitValueBD2005				-0.000497
				(-1.08)
ΔMKTShareCN				0.186**
				(2.06)
UnitValueΔMKT				-0.0161**
				(-2.18)
Cons	4.410**	0.0305	0.281	0.0109
	(3.07)	(1.31)	(0.72)	(1.68)
N	640	640	640	640

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.18: Regression Results for Unit Value of Pakistan

	(1) UnitValuePK2005	(2) ΔMKTShareCN	(3) UnitValueΔMKT	(4) ΔMKTSharePK
UnitValuePK1999	0.528***	-0.0000235	-0.0104	
	(4.31)	(-0.36)	(-1.02)	
Quotas	-5.313	0.121***	-0.0705	
	(-0.79)	(6.28)	(-0.11)	
UnitValueQuotas	0.233	0.000614**	0.143**	
	(0.39)	(2.11)	(2.10)	
UnitValuePK2005				0.000000675
				(0.01)
ΔMKTShareCN				0.0817***
				(5.07)
UnitValueΔMKT				-0.00572***
				(-11.60)
_cons	5.686*	0.0396	0.210	-0.0107
	(2.24)	(1.24)	(1.02)	(-1.44)
N	536	536	536	536

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.19: Relative Price Compared To China for Bangladesh

	(1) RelPrice2005	(2) ΔMKTShareCN	(3) RelPriceMKT	(4) ΔMKTShareBD
RelPrice1999	0.457**	0.000385	0.0171	
	(2.98)	(0.54)	(1.60)	
Quotas	-2.839*	0.115***	-0.0387	
	(-2.59)	(6.87)	(-1.46)	
RelPriceQuotas	0.342	0.0207	0.127***	
	(1.01)	(1.99)	(3.65)	
RelPrice2005				-0.000621
				(-0.29)
ΔMKTShareCN				0.0211
				(0.32)
RelPriceMKT				-0.0501*
				(-1.69)
_cons	2.023***	0.0290	-0.00277	0.00504
	(3.56)	(1.25)	(-0.10)	(0.62)
N	706	708	706	687

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.20: Relative Price Compared To China for Pakistan

	(1) RelPrice2005	(2) ΔMKTShareCN	(3) RelPrice2005	(4) ΔMKTSharePK
RelPrice1999	0.0664*	-0.000766*	0.0664	
	(0.86)	(-2.60)	(0.86)	
Quotas	-3.041***	0.121***	-3.041***	
	(-3.93)	(7.61)	(-3.93)	
RelPriceQuotas	1.214*	0.0100	1.214*	
	(2.27)	(1.66)	(2.27)	
RelPrice2005				-0.00247*
				(-1.78)
ΔMKTShareCN				-0.0400
				(-0.86)
RelPriceMKT				-0.0221**
				(-2.37)
Cons	1.710**	0.0301	1.710**	0.0141
	(2.95)	(1.29)	(2.95)	(1.74)
N	706	708	706	702

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.21: Regression Results for Share of Trade Value in Overlapped HS Categories in Each SIC Category with China for All Six Developing Countries

	(1) ΔMKTShareCN	(2) OverlapΔMKTShareCN	(3) ΔMKTShareX
OverLap	-0.00147	0.0215***	-0.006*
	(-0.75)	(5.04)	(-1.74)
Quotas	0.122***	-0.00038	
	(6.25)	(-.21)	
OverlapQuotas	0.0199*	0.0183***	
	(1.86)	(8.23)	
ΔMKTShareCN			0.0374
			(0.69)
OverlapΔMKTShareCN			-0.1255**
			(-2.02)
Cons	0.0342	0.01651	0.00449
	(1.34)	(0.69)	(1.30)
N	3954	3954	3954

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.22: Relative Price Compared to Average World price Regression Results

	(1) ΔMKTShareCN	(2) Relativeprice2005	(3) RelativePriceMKT	(4) ΔMKTShareX
Quotas	0.111***	-0.3003**	0.0574***	
	(7.68)	(-2.16)	(9.20)	
RelativePrice1999	-0.0023	0.162***	0.0035**	
	(-1.04)	(3.73)	(1.99)	
RelativePriceQuotas	0.0237*	-0.0885	0.01496*	
	(2.45)	(-1.13)	(1.87)	
[1em] ΔMKTShareCN				0.109
				(0.08)
Relativeprice2005				0.00714
				(0.09)
RelativePriceMKT				-0.216
				(-0.09)
Cons	0.0416	0.688***	0.00840	-0.0106
	(1.40)	(6.55)	(1.11)	(-0.11)
N	3594	3594	3594	3594

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.23: Unit Value Regression Results for All Six Countries Together

	(1) ΔMKTShareCN	(2) UnitValue2005	(3) UnitValueMKT	(4) ΔMKTShareX
Quotas	0.123***	15.75***	1.553***	
	(6.50)	(6.20)	(3.81)	
UnitValue1999	0.0000152	0.827***	0.0114**	
	(0.46)	(9.32)	(2.26)	
UnitValueQuotas	0.000278	-0.741***	0.0384***	
	(1.56)	(-4.92)	(2.97)	
[1em] ΔMKTShareCN				0.00778
				(0.23)
UnitValue2005				-0.0000369
				(-0.81)
UnitValueMKT				-0.001828
				(-1.10)
Cons	0.0402	2.924	0.4579	-0.001314
	(1.34)	(1.31)	(1.47)	(-0.24)
N	3594	3594	3594	3594

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$