

David and Goliath: How Chinese Competition Impacts Other Export-Competing Developing Countries

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Abstract

How China's integration into the world economy affects the real incomes of other countries through international trade has been widely regarded as a key economic question at least since its entry to the World Trade Organization in 2001. In this paper, I use a sample of six developing economies from Asia to see how China's market share gain since 2001 affects the market share of the smaller developing countries in one of their biggest export industries, apparel and textile. I use the removal of product-specific quotas following China's integration as an instrumental variable to correct for endogeneity. Surprisingly, I find that more Chinese competition does not have a negative impact on these countries' competitive positions and market shares in their exports to Europe. I explore the mechanisms through which developing countries could shield themselves against Chinese Competition. I find that these developing countries lose market share to China in more capital-intensive categories and in categories with higher relative prices compared to other exporting countries. I also explore how product segmentation based on unit value and import-demand elasticity can explain how certain developing countries have stayed unaffected by China by producing products which are different from China's most competitive product categories.

Keywords: International Trade, Trade Integration, Product Differentiation

JEL Classification: F11, F12, F13, F15

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1 Introduction

How China's integration into the world economy affects the economic positions and incomes of other countries through the channel of international trade has been a popular topic of discussion following its entry to the World Trade Organization (WTO) in 2001. Quoting 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 be referred to a classic question at the core of international economics. The entry of a large economy can have real-income effects on its trading partners through terms-of-trade effects[Hicks, 1953]. 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 in their own and export markets. In this paper, I consider a sample of six developing countries from Asia. I use an instrumental variable regression analysis to analyze China's impact on the market shares of its developing trading partners in Europe. Using the arguments of relative price, capital intensity and product segmentation I explore why this impact is different for different product categories produced by different countries.

The focus of the research and debate on China's impact on the rest of the world has been mostly the rich developed countries. But it is also important to see how the developing countries face the competition from China and what effects it has on their income. Export performance 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 pursue export-promotion. In my sample of developing countries, labor dependent textile and manufacturing has been one of their biggest export industries, accounting for 10% to 95% of total exports.¹The export of apparel and textile is substantial for these countries in their overall export performance and it plays an important role on their growth and development. Before its entry to the WTO,

¹Source: World Trade Organization(2017)

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. The apparel and textile sector therefore gives a great opportunity to analyze how the shared export industries of the developing trading partners of China are impacted by China's large gain in unrestricted markets after the quota phase out.

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 market share gain of China should have a negative effect on the market share of other export sharing countries. However, both of these variables are highly-correlated and they both can be affected by the same unobserved shocks. For example, if Europe subsidizes its own producers, that will have a negative effect on both Bangladesh and China's market shares. On the other hand, the import tariff policy used by the European countries still has a negative impact on China's market gain and a positive impact on the low-income developing nations². Therefore an exogenous instrument is needed in this case to correctly calculate the impact of Chinese market share change on the other countries' market shares. I use the abolition of quotas in apparel and textile industries, under Agreement on Textile and Clothing (replacing the Multi-Fiber Arrangement) following China's entry in WTO in 2001, as an instrument for the variable change in Chinese market share (building on the work of Bloom, Draca and Van-Reenen(2015))[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 of all, same as [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 Multi-Fiber Arrangement are the industries where it has gained

²Post-MFA period, they added extra tariffs on China and are still providing tariff free access to many lower-income developing countries

the largest market shares.

I also find in my sample of 12 big exporters³ of textile and apparel to Europe other than China, only four (EU, USA, Mexico and Indonesia) lose market share to China. The other eight amongst the group (Bangladesh, Vietnam, India, Pakistan, Sri Lanka, Thailand, Tunisia and Turkey) have either gained market share during the time of China's integration into the world trade system or their losses are not statistically significant. 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 12 countries on which my baseline regression of the impact of China's market share gain is based, I take a subsample of six Asian countries (Bangladesh, Vietnam, Indonesia, India, Sri Lanka and Pakistan). They are the only lower-middle income developing countries in the sample of 12 countries. As they are geographically located close to each other, their transportation cost to Europe are comparable. They have the lowest per capita GDPs in the sample in year 2005. They also have lower/similar capital/labor ratios or are less capital intensive compared to China⁴ and therefore have comparative advantage in the labor dependent industries.

According to my baseline regression result, only Indonesia out of these six lower-middle income developing countries experiences a considerable loss of market share to China. Rest of them do not see a loss in market share which is statistically significant. I then explore

³Source:Eurostat. The 12 countries are EU, India, Bangladesh, Pakistan, Sri Lanka, Vietnam, Indonesia, Mexico, Turkey, Thailand, Tunisia and USA

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

the mechanisms through which these countries could preserve their market shares. I find that they lose market share to China in categories where their prices/unit value is higher compared to other exporting countries. They gain market share in categories with lower prices compared to other exporters. The countries which have comparative advantage/lower price in the labor dependent apparel and textile industry end up not losing or even gaining market shares in the face of competition from China. Bangladesh, Vietnam, India, Sri Lanka and Pakistan have lower capital-labor ratios than China for the year 2005 and do not lose market share. Indonesia is the other country in this subsample which has a higher capital-labor ratio than China and it loses a significant market share in apparel and textile exports to China. For the data sample of these six countries, I find that as the capital-labor ratio based on both countries and industries gets larger, the developing countries lose more market share to China. So I find that in the developing world, the countries which are less capital intensive could successfully face the competition from China in the more labor dependent apparel and textile industries after the MFA quota phase out.

Using a smaller sub-sample of two countries, Bangladesh and Pakistan, I find that countries that produce goods which are further away from China are better insulated from being adversely affected by China's market gain. I use a simple model of distance in product space to explain the hypothesis of product segmentation. Bangladesh and Pakistan have the lowest average unit values amongst all exporting countries to Europe. I find that they faced 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. I also find that they maintained their market shares by producing in less demand elastic goods or necessary goods instead of luxury items. The argument of product segmentation based on both unit value and elasticity of demand can be used as an explanation in the case of Bangladesh and Pakistan for not losing market share to China.

Another interesting experiment in understanding Bangladesh and Pakistan's spe-

cialization in different product categories than China is to examine if they are producing in different sub-categories (HS categories) in each SIC category compared to China. I find that they produce in more HS categories which are different than China in the SIC categories where they are maintaining or gaining market shares. As they produce more common categories with China, they lose more market share. The result confirms that in these less elastic and lower unit value categories where Bangladesh and Pakistan do not lose market shares, they are producing in more different categories than China.

My paper contributes to the literature on trade integration in several ways. As mentioned before there has been a lot of research on China's impact on the rest of the world in the last two decades. However, the biggest focus in the literature has been on the developed world and specifically USA and Europe. Hsieh and Ossa [Hsieh and Ossa, 2016] talk about 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] focus on the labor market impact on the import competing industries in USA. Bloom, Draca and Van Reenen's [Bloom et al., 2016] paper is about the impact of China's trade integration on technological changes in 12 of the largest European economies through patent, innovation and IT. Brambilla, Khandelwal and Schott [Brambilla et al., 2010] focus mostly on China and also on how different geographical regions reacted differently price and market share wise. Coleman [Coleman et al., 2007], however, has a mix of countries in different stages of development to show how the reaction to prices and structural changes were different based on their level of development. This paper focuses only on the developing countries. There has been a debate that rich countries can escape some of China's competition by focusing on technological innovation. Poorer developing nations have less resources for that purpose. I found that poorer developing countries were able to shield themselves against Chinese competition as well.

My paper explores why these developing countries in the same income bracket (lower-

middle income) or at similar stages of development reacted differently to China's market gain. I find that the developing countries were better at shielding themselves from Chinese competition in less capital intensive economies together with less capital intensive categories.

My paper also relates to the main finding 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 to Chinese products. I find that Bangladesh and Pakistan faced less competition from China as the product categories where they are producing are very less elastic necessity goods and have very low unit values.

Literature on product segmentation ([Khandelwal, 2010], [Schott, 2003]) also finds that very high end products and luxury goods are insulated from price competition from developing countries. It is interesting to find in my paper, that even very low priced necessity goods producers like Bangladesh and Pakistan are insulated from China's market gain following product segmentation.

The remainder of this paper is as follows. Section 2 talks about the empirical methodology used for the baseline regression of this study. It also provides a background on Multi-Fiber Arrangement (MFA) and why quotas abolished under MFA phase-out is a good instrument for change in market share of China. Section 3 talks about the data sources and gives a background on 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 6 developing countries and what might be the causes behind why some of them lost market share and some did not. I used the hypothesis of relative price (rank based on price) and the hypothesis of price competition to investigate the reasons. Section 7 talks about another sub-sample of the developing countries (Bangladesh and Pakistan) and how product segmentation has possibly helped them in the face of Chinese competition. It discusses product segmentation based on both unit value and import-demand elasticity. It

also discusses if these two countries are staying competitive not only by specializing in certain SIC product categories but also by producing in different HS categories than China in these SIC categories. Section 8 concludes the paper with possible extensions and other experiments that can possibly help in understanding the puzzle of why certain developing countries lost market share to China and others did not.

2 Empirical Methodology

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

2.1 Baseline Regression

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

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

Here, Δ denotes long difference (5 years) operator which erases the product fixed effect. The change in market share hypothesis based on research prediction is that $\alpha < 0$. Δf_{kt} is a full set of country dummies interacted with time dummies to absorb macroeconomic shocks at country and time level⁵. And

$$MarketShare_{jkt}^i = \frac{TradeValue_{jkt}^i}{TradeValue_{jkt}^{World}}$$

$$MarketShare_{jkt}^{CN} = \frac{TradeValue_{jkt}^{CN}}{TradeValue_{jkt}^{World}}$$

⁵As I am using long difference, I did not include product fixed effect

$MarketShare_{jkt}^i$ 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 Use of Instrumental variable

The change in Chinese market share and the change in other country Market share are very highly-correlated and they both can be affected by same unobserved shocks in $\Delta\varepsilon_{jkt}$. I need an instrumental variable which is an exogenous shock to China's market share but not to the other countries. I use the removal of Multi-Fiber Arrangement (MFA) quotas after china joined WTO as the instrument to take care of the possible endogeneity biases.

Multi-Fiber Arrangement (1974-2004) was a trade agreement trying 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 like Bangladesh, Vietnam, Srilanka actually were benefited from this arrangement. 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[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 removed the quotas in 4 phases: Phase I was in January, 1995; Phase II in January 1, 1998; Phase III in January 1, 2002 and Phase IV in January 1, 2005. China joined WTO in December 2001. Phase I and II came into effect for China after its integration into WTO. Then

the rest of the quotas were removed in Phase III and Phase IV[Diao and Somwaru, 2001] [Round, 1995]. It was expected that China's exports and market shares both in EU and USA would increase after each phase. It was also expected that not only the developed world but also the low income developing countries which have been enjoying their access to these markets without a complete presence of China will lose market share to China[Sattar, 2005] [Mlachila and Yang, 2004]. The first stage equation can be written as,

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

$Quota_{jkt}$ 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 $\beta > 0$, the bigger the increase in quotas during the time period, the lesser the increase in Chinese market share. As the quotas were completely gone by 2005, for the 2005-2000 time period, for the time periods we are considering,

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

So as the quotas in 2005 are 0, I expect that the higher the quotas were in 2000, the bigger will be the gain in market share for China. The reduced form for the baseline regression becomes,

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

3 Data

My dataset consists of export data of 13 big exporters of textile and apparel to Europe. China, EU, India, Bangladesh, Vietnam, Turkey, Indonesia, Sri Lanka, Pakistan, Mexico, Thailand, Tunisia and USA.

3.1 UN Comtrade Data

UN Comtrade is an international database of 6 digit product level information on bilateral import and export between any pair of countries. I take 13 large economies of Europe to get the market share and unit value/price data of the 13 exporting countries on 87 SIC product categories. I aggregate six-digit Harmonized System to four digit US SIC industry level using Pierce and Schott (2010) [Pierce and Schott, 2012].

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 calculated the proportion of six-digit product categories (HS6) that were covered by quotas, while weighting each product by its share of import value.

3.3 Elasticity of Demand and Capital-Labor Ratio Data

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

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

Variable	Obs	Mean	Variable	Obs	Mean
Δ MKTShareCN	715	.0579029	Δ MKTShareMX	630	.0002665
Δ MKTShareID	685	-.0049077	Δ MKTShareLK	552	-.0010407
Δ MKTShareVN	642	.0001518	Δ MKTShareUS	703	-.0013201
Δ MKTSharePK	717	.0015137	Δ MKTShareIN	682	.002087
Δ MKTShareEU	691	-.0101507	Δ MKTShareTR	687	.0095971
Δ MKTShareBD	702	.003376	Δ MKTShareTH	711	-.0014899
Δ MKTShareTN	535	.000502	Quotas	715	.2842336

4 Results

4.1 Summary Statistics

The data set consists of 13 exporting countries, 13 large European countries as importers, with two time period and 87 product categories. Table 1 shows the average change in market share for all 13 exporting countries and average quota on China under MFA. Indonesia, EU, Srilanka and USA 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 MFA was .2842 or 28.42%.

4.2 Baseline Regression

Table 2,3,4 and 5 are the first stage and second stage of the baseline regression. Column 1, 3 and 5 in each table represent the first stage regression results 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. So the industries/products in which China had the highest amount of quotas are the ones in which it saw the largest gain after the removal of quotas.

Columns 2, 4, and 6 in each table shows the second stage regression results of the change in the market share of the 12 exporters in EU for change in market share of China. The coefficient of change in market share of USA, Mexico and Indonesia are negative and significant as expected. However, the rest of the countries do not match with this expectation. the coefficients of India, Pakistan, Thailand, and Vietnam are negative but not significant. The coefficients of Bangladesh, Turkey, Tunisia and Sri Lanka 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 significantly to China[Mlachila and Yang, 2004][Joarder et al., 2010]. The absence of a strong negative impact on India, Pakistan, Thailand and Vietnam and the positive coefficients of Bangladesh, Turkey, Tunisia and Srilanka are all unexpected and is a puzzle.

Table 2: Baseline Regression

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ MKTShareCN	Δ MKTShareBD	Δ MKTShareCN	Δ MKTShareID	Δ MKTShareCN	Δ MKTshareEU
Quotas	0.134*** (7.28)		0.134*** (7.54)		0.134*** (7.48)	
[1em] Δ MKTShareCN		0.0118 (0.50)		-0.0648* (-1.68)		0.0542 (0.48)
Cons	0.0296 (1.29)	0.00181 (0.51)	0.0295 (1.32)	0.00391 (1.38)	0.0296 (1.32)	-0.00317 (-0.45)
<i>N</i>	717	698	715	681	715	699

t statistics in parentheses

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

Table 3: Baseline Regression

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ MKTShareCN	Δ MKTSharePK	Δ MKTShareCN	Δ MKTShareIN	Δ MKTShareCN	Δ MKTShareUS
Quotas	0.134*** (7.36)		0.134*** (7.30)		0.134*** (7.30)	
Δ MKTShareCN		-0.0439 (-0.99)		0.137 (0.87)		-0.245* (-1.82)
Cons	0.0295 (1.28)	0.00995 (1.22)	0.0296 (1.29)	-0.0119 (-1.13)	0.0296 (1.29)	0.00902 (0.95)
<i>N</i>	715	711	715	677	715	697

t statistics in parentheses

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

Table 4: Baseline Regression

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareVN}$	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareLK}$	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareTR}$
Quotas	0.134*** (7.36)		0.134*** (7.30)		0.134*** (7.30)	
$\Delta\text{MKTShareCN}$		-0.0315 (-0.97)		-0.00205 (-0.12)		0.191** (2.38)
Cons	0.0295 (1.28)	0.00171 (0.81)	0.0296 (1.29)	0.000224 (0.14)	0.0296 (1.29)	-0.0145 (-1.88)
N	715	639	715	550	715	682

t statistics in parentheses

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

Table 5: Baseline Regression

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareTN}$	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareTH}$	$\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareMX}$
Quotas	0.134*** (7.30)		0.134*** (7.30)		0.134*** (7.36)	
[1em] $\Delta\text{MKTShareCN}$		0.0320 (0.60)		0.00991 (0.39)		-0.00777* (-1.74)
Cons	0.0296 (1.29)	-0.00321 (-0.68)	0.0296 (1.29)	-0.000847 (-0.40)	0.0295 (1.28)	0.000273 (0.51)
N	715	533	715	678	715	624

t statistics in parentheses

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

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.⁶ In this sample only Indonesia loses market share to China. I use the hypothesis of relative price and to explain what might have been the differences in these countries.

5.1 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. Indonesia in this case does not have a comparative advantage or lower price than China. To prove this hypothesis, I rank these six countries amongst the 13 biggest 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 the rank is. The regression equation,

$$\Delta MarketShare_{jkt}^i = \alpha_1 \Delta MarketShare_{jkt}^{CN} + \alpha_2 Rank_{jkt}^i + \alpha_3 Rank_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN} + \Delta f_{kt} + \Delta e_{jkt}$$

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

⁶Table 17 in appendix shows the rank of these 13 countries based on GDP/Capita and Capital/Labor ratio along with their respective GDP/Capita and Capital/Labor data

$$\Delta MarketShare_{jkt}^{CN} = \alpha_4 Quota_{jk,t-5} + \Delta f_{kt}^Q + \Delta \varepsilon_{jkt}^Q$$

$$Rank_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN} = \alpha_5 Rank_{jkt}^i \cdot Quota_{jk,t-5} + \Delta f_{kt}^{RQ} + \Delta \varepsilon_{jkt}^{RQ}$$

Table 6 shows the first stage results and Table 7 shows the second stage results. All the results for the first stage are significant. For second stage the interaction term $Rank_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN}$ is negative and significant for all countries except Srilanka. This means for all these five countries as their rank based on unit value gets higher the change in China's market share has more negative impact on them. For example, according to this result if the rank of Bangladesh for all products goes up by 2 amongst the group of exporters, the impact of China's market share gain on Bangladesh will become negative.

Table 6: First Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Δ MKTCN	RankMKTBD	Δ MKTCN	RankMKTID	Δ MKTCN	RankMKTIN	Δ MKTCN	RankMKTLK	Δ MKTCN	RankMKTPK	Δ MKTCN	RankMKTVN
Rank	0.000863 (1.09)	0.0266*** (4.85)	0.000102 (0.08)	0.0271* (2.11)	0.00158 (1.23)	0.0294*** (4.41)	0.000749 (0.64)	0.0328** (2.86)	-0.00258* (-2.42)	0.00932 (0.92)	0.000214 (0.17)	0.0271*** (3.59)
Quotas	0.153*** (4.72)	0.138 (1.33)	0.118*** (4.18)	-0.0952 (-0.48)	0.145*** (4.16)	-0.0317 (-0.55)	0.111** (2.95)	0.0343 (0.18)	0.0776** (3.43)	-0.335* (-1.78)	0.129*** (5.46)	0.105 (1.12)
RankQuotas	-0.00386 (-0.82)	0.0922** (2.68)	0.00179 (0.45)	0.145*** (3.51)	-0.00232 (-0.53)	0.135*** (6.11)	-0.000143 (-0.04)	0.109** (3.40)	0.0111** (2.19)	0.237*** (4.03)	0.0000180 (0.01)	0.109*** (4.45)
[lem] _ cons	0.0196 (0.96)	-0.0574 (-1.12)	0.0388 (1.28)	0.0721 (0.46)	0.0243 (0.92)	0.0862 (0.45)	0.0605 (1.53)	0.245 (0.90)	0.0535 (1.57)	-0.0295 (-0.27)	0.0473 (1.22)	0.207 (0.62)
<i>N</i>	645	645	641	641	664	664	523	523	562	562	574	574

t statistics in parentheses

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

Table 7: Second Stage

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ MKTShareBD	Δ MKTShareID	Δ MKTShareIN	Δ MKTShareLK	Δ MKTSharePK	Δ MKTShareVN
Δ MKTShareCN	0.0201 (0.71)	0.0917** (1.99)	0.507*** (3.30)	-0.00252 (-0.07)	0.101*** (2.84)	0.0840 (1.56)
RankMKT	-0.0108* (-1.88)	-0.0224* (-1.87)	-0.0639*** (-3.73)	-0.000460 (-0.14)	-0.0239**** (-3.40)	-0.0165* (-1.68)
Rank	-0.00106*** (-3.09)	-0.000302 (-0.46)	-0.00360** (-2.29)	-0.000287 (-0.97)	0.000251 (0.39)	-0.000624 (-1.39)
Cons	0.0135 (1.52)	0.00399 (1.53)	0.00594 (0.56)	0.00243 (0.80)	-0.0117* (-2.48)	0.00598 (1.71)
<i>N</i>	641	640	648	482	562	574

t statistics in parentheses

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

5.2 Hypothesis: Price Competition

It has been found that Chinese prices dropped after the quota abolition [Brambilla et al., 2010] [Harrigan and Barrows, 2009]. It is possible that the countries that did not lose market share are the ones who were able to lower their price accordingly and sustained the price competition. The regression equation to prove this hypothesis ⁷,

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

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 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 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 with Quotas as the instrument.

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

However the results state that none of the first stage coefficients are significant⁸. It is not really surprising. Even though empirical studies 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.

⁷A similar approach in [Özden and Sharma, 2006] to see price effect of regional trade integration

⁸Table 11 and 12 in appendix shows the first and second stage results for price competition hypothesis for all six countries

5.3 Hypothesis: Capital-Labor Ratio

In my sample of six developing countries, I find that 5 of them are less capital intensive than China⁸. Indonesia is the only country here which is more capital intensive than China. To check if being less capital intensive and labor abundant has helped these countries in facing the competition from China, I run the following regression using the combined data set for all six countries.

$$\begin{aligned} \Delta MarketShare_{j,k,t}^x = & \chi_1 \Delta MarketShare_{j,k,t}^{CN} + \chi_2 CapitalLabor_{j,k,t-5}^x + \chi_3 SICCapitalLabor_{j,k,t-5}^x \\ & + \chi_4 CountryCapitalLabor_{j,k,t-5}^x + \chi_5 CapitalLabor_{j,k,t-5}^x \cdot \Delta MarketShare_{j,k,t}^{CN} + \Delta f_{k,t} + \Delta e_{j,k,t} \end{aligned}$$

Where, $CapitalLabor_{j,k,t-5}^x$ is the capital-labor ratio of each country multiplied by the capital-labor ratio of each SIC industry for the years 1999-2000. $SICCapitalLabor_{j,k,t-5}^x$ is the capital-labor ratio in each SIC industry and $CountryCapitalLabor_{j,k,t-5}^x$ is the capital-labor ratio for each of these six countries in year 1999-2000. $\Delta MarketShare_{j,k,t}^{CN}$ is instrumented using $Quota_{jk,t-5}$ and $CapitalLabor_{j,k,t-5}^D \cdot \Delta MarketShare_{j,k,t}^{CN}$ is instrumented using $CapitalLabor_{j,k,t-5}^D \cdot Quota_{jk,t-5}$.

Table 8 shows the result for this regression. The coefficient of $\Delta MarketShare_{j,k,t}^{CN}$ is significant and positive. My point of interest is the coefficient of $CapitalLabor_{j,k,t-5}^D \cdot \Delta MarketShare_{j,k,t}^{CN}$ which is negative and significant. This tells us that as the combined capital-labor ratio (both product level and country level) gets bigger, the developing countries start losing market share. The countries in this sample that do not lose market share are less capital intensive and they produce more of the less capital intensive products.

⁸Appendix: Figure 7

Table 8: Capital-Labor Ratio Hypothesis

	(1)	(2)	(3)
	$\Delta\text{MKTShareCN}$	$\text{CapitalLaborMKTShare}$	$\Delta\text{MKTShareX}$
SICCapitalLabor	-0.00322** (-3.12)	0.00755 (0.52)	0.000280 (0.45)
CountryCapitallabor	0.00128** (3.32)	0.0893** (2.92)	0.000671 (0.81)
CapitalLabor	-0.0000378 (-0.44)	-0.00731* (-2.08)	-0.0000264 (-0.21)
Quotas	0.141*** (7.51)	0.145 (0.42)	
CapitalLaborQuotas	-0.00236*** (-4.32)	0.0702* (1.46)	
$\Delta\text{MKTShareCN}$			0.0709* (1.81)
$\text{CapitalLaborMKTShare}$			-0.0140** (-2.46)
Cons	0.0427 (1.69)	-0.0570 (-0.23)	-0.00376 (-0.59)
N	4289	4289	3953

t statistics in parentheses

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

Table 9: Rank Based on Unit value

Country	Rank 1999	Average Unit Value(USD/kg)	Country	Rank 2005	Average Unit Value(USD/kg)
Pakistan	1	8.43	Pakistan	1	9.12
Bangladesh	2	8.52	Bangladesh	2	10.29
India	3	15.47	China	3	14.58
China	4	16.29	Viet Nam	4	16.73
Turkey	5	18.73	Indonesia	5	18.61
Sri Lanka	6	18.91	India	6	20.51
Viet Nam	7	19.16	Sri Lanka	7	21.39
Indonesia	8	19.24	Thailand	8	21.68
Thailand	9	20.36	Turkey	9	24.21
Tunisia	10	22.42	EU	10	25.11
USA	11	27.80	Mexico	11	27.23
EU	12	31.55	Tunisia	12	31.78
Mexico	13	32.50	USA	13	36.70

6 Further Investigation of China's Impact on the Developing Countries Based on Product Segmentation

Hypothesis: Distance in product space can help countries face competition from another country [Holmes and Stevens, 2014]. I arranged all 11 countries according to their average unit value. 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. So they produce mostly in the lower ended products from the price point of view and China produces mostly in the middle ranged products. The distance in product categories helped them not to face too much competition from China.

6.1 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 situated furthest from Chinese products or are most different than Chinese products have the least probability of competing with China. So when a country produces more different categories compared to China, they will face less competition from China in those categories. Which gives the second result, if a country is producing two different products, it will lose less market share to China in the category which is more different compared to Chinese products.

Let's assume, 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/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 1 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,

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

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 $(i=0,1,2,\dots,L)$.

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

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

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. So 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 which 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 ,

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

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 $i = (0, 1, 2, \dots, L)$

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

$$\begin{aligned} \text{MarketShare}_{l^1, l^0} &= \frac{x_{l^1, l^0}}{x_{l^0}} = \frac{x_{l^1, l^0}}{\sum_{n=0}^L x_{l^n, l^0}} = \frac{x_{l^1, l^0}}{x_{l^0, l^0} + x_{l^1, l^0} + x_{l^2, l^0} + \dots + x_{l^L, l^0}} \\ &= \frac{x_{l^1, l^0}}{\frac{x_{l^0, l^0} \cdot x_{l^0}}{x_{l^0}} + x_{l^1, l^0} + x_{l^2, l^0} + \dots + x_{l^L, l^0}} \end{aligned}$$

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

$$\begin{aligned}\frac{\delta y}{\delta x} &= \frac{\delta MarketShare_{l^1, l^0}}{\delta MarketShare_{l^0, l^0}} = -\frac{x_{l^1, l^0}}{x_{l^0}^2} x_{l^0} = -\frac{x_{l^1, l^0}}{x_{l^0}} \\ &= -\left(\frac{p_{l^1, l^0}}{P_{l^0}}\right)^{1-\theta} \frac{x_{l^0}}{x_{l^0}} = -\left(\frac{p_{l^1, l^0}}{P_{l^0}}\right)^{1-\theta} \\ &= -\left(\tau_{l^1, l^0} \cdot \frac{w_{l^1}}{A_{l^1}}\right)^{1-\theta} \cdot P_{l^0}^{\theta-1} = -(\phi_{l^1, l^0})^{\theta-1} \cdot P_{l^0}^{\theta-1}\end{aligned}$$

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

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

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

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

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

The lesser 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 .

So countries can shield themselves from China by producing products that are more different than Chinese products. It can be different on the basis on unit value (very high or very low unit value categories) or based on elasticity of substitution (less elastic vs more elastic). They can also specialize by not only producing in different SIC categories than China, but also by specializing in different HS categories than China in each SIC category.

6.2 Regression and Results of Product Segmentation Based on Unit Value

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 country market

shares.

$$\begin{aligned} \Delta MarketShare_{jkt}^i &= \gamma_1 \Delta MarketShare_{jkt}^{CN} + \gamma_2 UnitValue_{jkt}^i \\ &+ \gamma_3 UnitValue_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN} + \Delta f_{kt} + \Delta \varepsilon_{jkt} \end{aligned}$$

$\Delta MarketShare_{jkt}^{CN}$, $UnitValue_{jkt}^i$ and $UnitValue_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN}$ are instrumented with $Quota_{jk,t-5}$, $UnitValue_{jkt-5}^i$ and $UnitValue_{jkt-5}^i \cdot Quota_{jk,t-5}$. I use unit value /prices from 1999-2000 as an instrument for unit value/prices for 2004-2005 to avoid division bias. Quota is the instrument for change in market share of China as before. For the interaction term between unit value 2004-2005 and change in market share of China the instrument becomes unit value 1999-2000 interacted with quotas. So the first stage regression are,

$$\Delta MarketShare_{jkt}^{CN} = \gamma_4 Quota_{jk,t-5} + \Delta f_{kt}^Q + \Delta \varepsilon_{jkt}^Q$$

$$UnitValue_{jkt}^i = \gamma_5 UnitValue_{jkt-5}^i + \Delta f_{kt}^U + \Delta \varepsilon_{jkt}^U$$

$$UnitValue_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN} = \gamma_6 UnitValue_{jkt-5}^i \cdot Quota_{jk,t-5} + \Delta f_{kt}^{UQ} + \Delta \varepsilon_{jkt}^{UQ}$$

Table 10 and 11 shows 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 $\Delta MarketShare_{jkt}^{CN}$ and negative and statistically significant coefficients for $\Delta MKTShareCN$. 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 gain decreases by .0161. For a unit value of higher than 11.5528 USD/kg the impact of China's market share gain on change of Bangladesh's market share actually becomes negative. In the case of Pakistan the impact of China's market gain on change of Pakistan's market share is negative for unit values higher than 14.2832 USD/kg. Using these results it can be argued that Bangladesh and Pakistan survived the competition from China as they produce in very low price categories

Table 10: Unit Value Bangladesh

	(1)	(2)	(3)	(4)
	UnitValueBD2005	Δ MKTShareCN	UnitValue Δ MKT	Δ MKTShareBD
UnitValueBD1999	0.620*** (7.38)	0.0000569 (0.30)	0.0152 (1.45)	
Quotas	2.352 (1.03)	0.0889*** (3.68)	0.432 (1.32)	
UnitValueQuotas	-0.269 (-1.32)	0.00400*** (3.05)	0.104*** (3.36)	
UnitValueBD2005				-0.000497 (-1.08)
Δ MKTShareCN				0.186** (2.06)
UnitValue Δ MKT				-0.0161** (-2.18)
Cons	4.410** (3.07)	0.0305 (1.31)	0.281 (0.72)	0.0109 (1.68)
<i>N</i>	640	643	640	639

t statistics in parentheses

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

which are located further from the main Categories of China's export industry. They also offer lower relative price in this categories compared to China.⁹ It is interesting to see that the countries/producers can survive from China's competition by producing products which are not close substitute to Chinese goods. Product segmentation can insulate countries from China not only in the higher priced categories but also in the very low priced categories.

⁹Table 18 and 19 in the appendix shows the results for how relative price compared to China affects China's impact on these two countries' market shares

Table 11: Unit Value Pakistan

	(1)	(2)	(3)	(4)
	UnitValuePK2005	Δ MKTShareCN	UnitValue Δ MKT	Δ MKTSharePK
UnitValuePK1999	0.528*** (4.31)	-0.0000235 (-0.36)	-0.0104 (-1.02)	
Quotas	-5.313 (-0.79)	0.121*** (6.28)	-0.0705 (-0.11)	
UnitValueQuotas	0.233 (0.39)	0.000614** (2.11)	0.143** (2.10)	
UnitValuePK2005				0.000000675 (0.01)
Δ MKTShareCN				0.0817*** (5.07)
UnitValue Δ MKT				-0.00572*** (-11.60)
_cons	5.686* (2.24)	0.0396 (1.24)	0.210 (1.02)	-0.0107 (-1.44)
<i>N</i>	536	554	536	536

t statistics in parentheses

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

6.3 Product Segmentation Based on Unit Value: Further Explanation

Figure 1 and 2 show the unit values(USD/kg) of the top ten product categories with largest market shares in Europe for Bangladesh and Pakistan using 2005 data¹⁰. For both of these countries, as market share goes up, the unit value gradually declines. Bangladesh enjoys highest market share in SIC 2311 category 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 hypothesis further using a unit value distribution for different countries in my sample. Figure 3 and 4 shows the unit value distribution of Bangladesh, China, India, USA and Mexico in 1999 and 2005. Out of these countries Bangladesh and India are two developing countries which do not lose market share to China. USA and Mexico lose significant market share to China. As it can be seen both USA and Mexico have a wider distribution compared to Bangladesh and India and they are more on the right compared to this two countries and also compared to China both in 1999 and 2005. However compared to 1999 China's unit value distribution moves slightly to the left in 2005 as Chinese prices dropped after MFA phase out[Brambilla et al., 2010].

Figure 5 and 6 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 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 loses market share to China significantly and it's distribution is wider compared to the other two and has a mean higher than China. In this example having a smaller mean and narrower distribution consists with less negative impact from China. Producing very low price product categories which are not close substitutes to Chinese goods can protect countries from negative effect of China's market gain.

¹⁰Figure 9 and 10 in appendix shows their relative prices for these same categories

Figure 1: Unit Value(USD/kg) of Bangladeshi Products for the top 10 Categories with Largest

Market Share

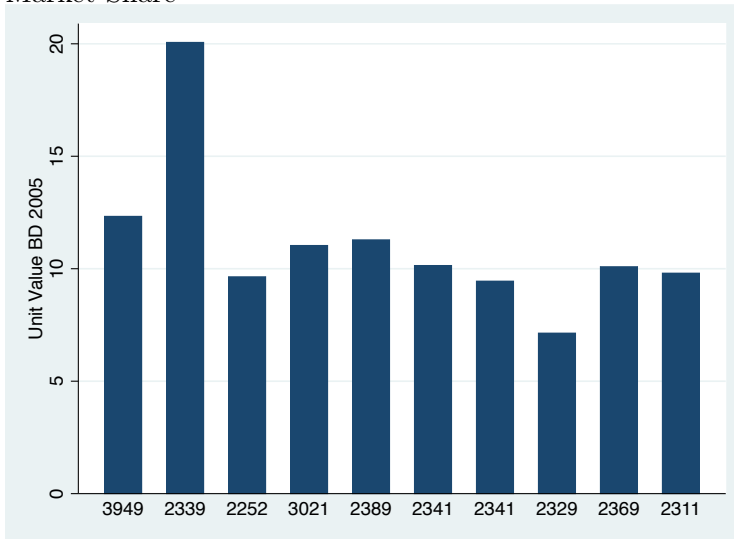


Figure 2: Unit Value(USD/kg) of Pakistani Products for the top 10 Categories with Largest

Market Share

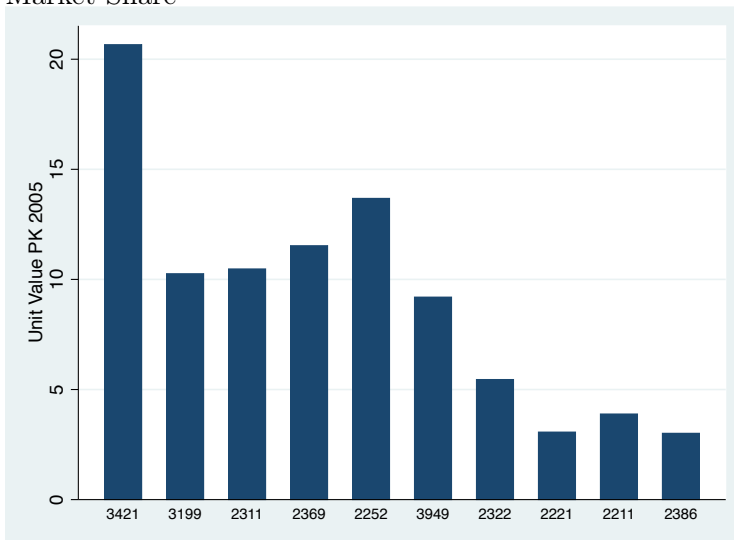


Figure 3: Unit Value Distribution of Bangladesh, China, India, USA and Mexico 1999

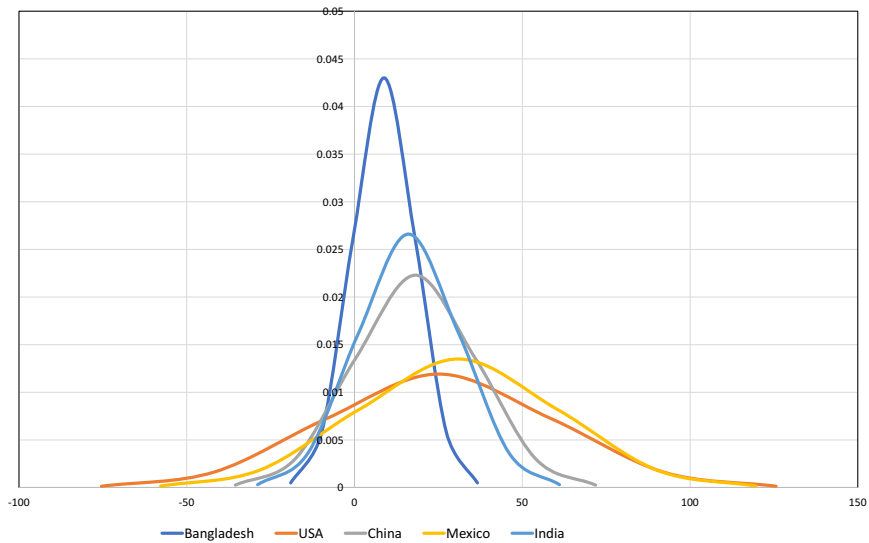


Figure 4: Unit Value Distribution of Bangladesh, China, India, USA and Mexico 2005

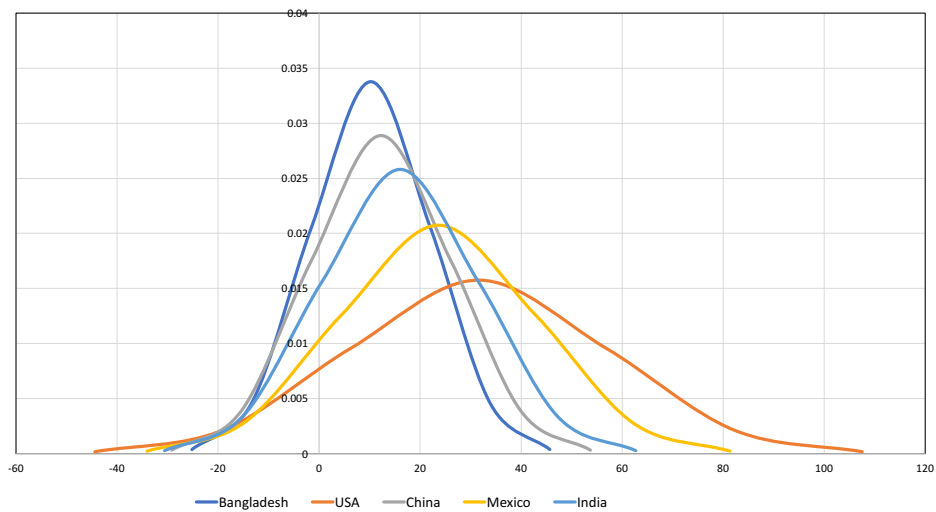


Figure 5: Unit Value Distribution of Bangladesh, Indonesia, China and Pakistan 1999

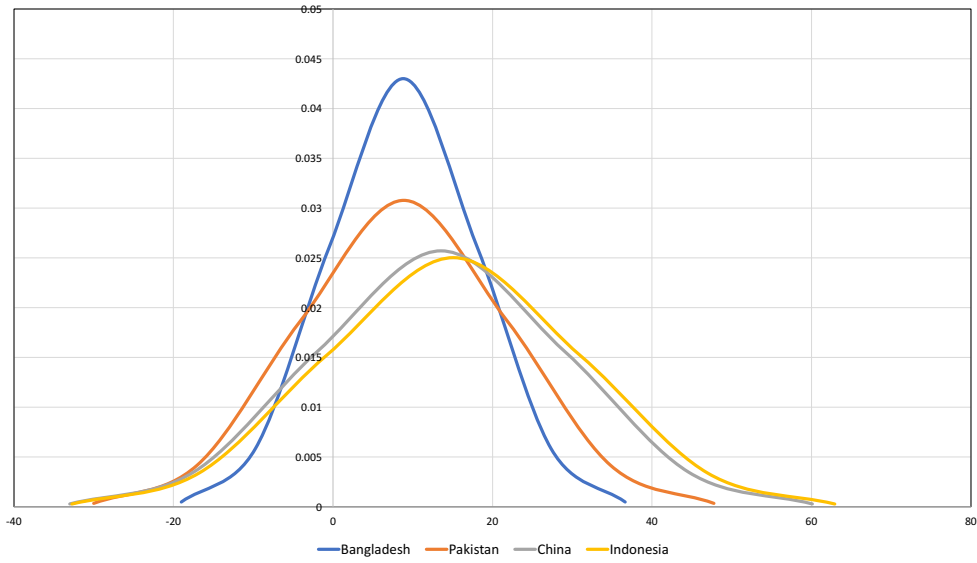
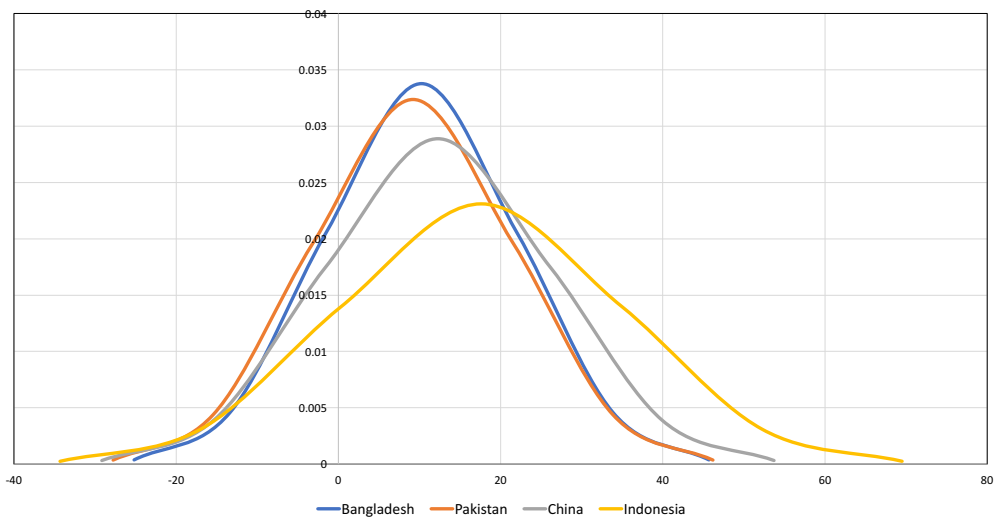


Figure 6: Unit Value Distribution of Bangladesh, Indonesia, China and Pakistan 2005



6.4 Regression and Results of Product Segmentation Based on Elasticity of Demand

The product segmentation can also be based on elasticity of demand of the product categories. I use the import-demand elasticities of product categories of USA as a representative of the developed countries. The countries where Bangladesh and Pakistan export in this data sample have similar economic and cultural environment as USA. The elasticities found on the basis of consumers of USA are a good representative for these importing countries. The regression equation for this purpose is ,

$$\begin{aligned} \Delta MarketShare_{jkt}^i &= \phi_1 \Delta MarketShare_{jkt}^{CN} + \phi_2 Elasticity_{jkt} \\ &+ \phi_3 Elasticity_{jk} \cdot \Delta MarketShare_{jkt}^{CN} + \Delta f_{kt} + \Delta \varepsilon_{jkt} \end{aligned}$$

$Quota_{jk,t-5}$ and $Elasticity_{jk} \cdot Quota_{jk,t-5}$ are used as instruments for the first stage. Table 12 and 13 show the results for Bangladesh and Pakistan. Sigma stands for the variable import-demand elasticity. For both of them as the import-demand elasticity of products gets higher, they lose more market share. The categories where they maintain their market shares are not only the categories with lowest unit values but also the one with lower elasticity of demand or necessity goods. Contrary to Khandelwal (2003) and Schott (2005) this result shows that it was not only the luxury good producers but also producers of very low priced basic necessary products who survive the Chinese competition.

Table 12: Import-Demand Elasticity Results for Bangladesh

	(1)	(2)	(3)
	$\Delta\text{MKTShareCN}$	$\text{Sigma}\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareBD}$
Sigma	0.000448 (0.54)	0.0228*** (3.20)	0.000239 (0.24)
Quotas	0.168*** (3.81)	0.0732 (0.28)	
SigmaQuotas	-0.0108 (-0.85)	0.110** (1.26)	
$\Delta\text{MKTShareCN}$			0.0324 (0.39)
$\text{Sigma}\Delta\text{MKTShareCN}$			-0.0458* (-1.66)
Cons	0.0293 (1.27)	0.0179 (0.24)	0.00546 (0.92)
N	714	714	696

t statistics in parentheses

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

Table 13: Import-Demand Elasticity Results for Pakistan

	(1)	(2)	(3)
	$\Delta\text{MKTShareCN}$	$\text{Sigma}\Delta\text{MKTShareCN}$	$\Delta\text{MKTSharePK}$
Sigma	0.000431 (0.56)	0.0214*** (2.95)	0.0000669 (0.14)
Quotas	0.166*** (3.86)	0.0475 (0.18)	
SigmaQuotas	-0.0104 (-0.84)	0.119** (1.33)	
$\Delta\text{MKTShareCN}$			0.0269 (0.50)
$\text{Sigma}\Delta\text{MKTShareCN}$			-0.0281** (-2.14)
Cons	0.0293 (1.27)	0.0203 (0.27)	0.00435 (0.46)
N	715	715	711

t statistics in parentheses

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

6.5 Specialization in 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 also arises if along with specializing in different SIC categories compared to China, Bangladesh and Pakistan also specializes in different HS categories than China in these SIC categories. To check if Bangladesh and Pakistan produces in different HS categories in the SIC categories where they are not losing market share I introduce the variable

$$Overlap_{jkt}^i = \frac{OverLappedCategories}{TotalCategories}$$

Overlapped Categories is the number Of HS products country i produces in SIC category j that overlaps with China. TotalCategories is the total no of HS products that country i produces in SIC category j. The regression equation for this purpose,

$$\Delta MarketShare_{jkt}^i = \rho_1 \Delta MarketShare_{jkt}^{CN} + \rho_2 Overlap_{jkt}^i + \rho_3 Overlap_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN} + \Delta f_{kt} + \Delta \varepsilon_{jkt}$$

Same as previous regressions $Quota_{jk,t-5}$ and $Overlap_{jkt}^i \cdot Quota_{jk,t-5}$ are used as instruments for $\Delta MarketShare_{jkt}^{CN}$ and $Overlap_{jkt}^i \cdot \Delta MarketShare_{jkt}^{CN}$. Table 14 and 15 shows the results for Bangladesh and Pakistan. The coefficient of the interaction term is negative and significant. Lower value of overlap means Bangladesh and Pakistan are producing in more HS categories different than China. As the overlap term gets bigger for SIC categories, it means they are producing in more no of same HS categories as China. The highest value of the overlap term is 1, in which case all the HS categories that Bangladesh and Pakistan are producing are same as China. China can be producing in more HS categories. According to my result the interaction coefficient is negative and significant for both Bangladesh and Pakistan. As the percentage of overlapping gets bigger, they produce more percentage of categories overlapped with China, they lose more market share following the theory of product segmentation.

Table 14: Percentage of Overlap Results for Bangladesh

	(1)	(2)	(3)
	$\Delta\text{MKTShareCN}$	Overlap $\Delta\text{MKTShareCN}$	$\Delta\text{MKTShareBD}$
OverLap	-0.00273 (-0.44)	0.0187*** (4.45)	-0.0137*** (-3.12)
Quotas	0.106*** (5.71)	-0.0219*** (-4.57)	
OverLapQuotas	0.0609* (2.40)	0.195*** (6.97)	
$\Delta\text{MKTShareCN}$			0.0116 (0.32)
Overlap $\Delta\text{MKTShareCN}$			-0.106** (-2.14)
Cons	0.0298 (1.28)	0.0134 (0.63)	0.0138** (3.13)
<i>N</i>	700	700	691

t statistics in parentheses

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

Table 15: Percentage of Overlap Results for Pakistan

	(1)	(2)	(3)
	$\Delta\text{MKTShareCN}$	Overlap $\Delta\text{MKTShareCN}$	$\Delta\text{MKTSharePK}$
OverLap	-0.00311 (-0.52)	0.0184*** (4.62)	0.00240 (0.59)
Quotas	0.111*** (5.76)	-0.0176*** (-4.90)	
OverLapQuotas	0.0511* (2.24)	0.186*** (7.36)	
$\Delta\text{MKTShareCN}$			0.0203 (0.63)
Overlap $\Delta\text{MKTShareCN}$			-0.138** (-2.49)
Cons	0.0301 (1.28)	0.0142 (0.66)	0.0108 (1.37)
N	702	702	698

t statistics in parentheses

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

7 Conclusion

This paper examines the impact of China's trade integration on the market shares of its export competitors from the developing world. My motivation is to explain why the impact was different for different developing nations. I intend to find out why certain countries lost their market shares to China and why certain countries did not.

Using a sample of thirteen big exporters of apparel and textile to Europe, I find that only USA, Mexico and Indonesia lose market shares to China. In my subsample of six developing lower-middle countries out of these thirteen only Indonesia loses market share to China. Looking into the relative prices/ranks based on unit values of these six countries, I can infer that as the rank gets higher for a country of this sub-sample it loses more market share to China. So the reason this countries were able to survive at the face of competition from China was because they were able to charge lower prices compared to all main exporters. It is also interesting to see that out of them five countries (Bangladesh, India, Sri Lanka, Pakistan and Vietnam) that have lower capital per labor than China does not lose market share to China. Indonesia which has a higher capital per labor ration than China ends up losing market share significantly. Using a combined dataset for all six countries, I find that they lose market share to China as the capital-labor ratio gets higher based on country capital intensity and product category capital intensity.

I also find that out of the sub-sample of six developing countries, Bangladesh and Pakistan are the ones with the lowest average unit values and the unit value played an important role in insulating them from China's impact. For these two countries, for higher unit values the positive relationship between China's market share and their market share becomes smaller and even negative. It can be concluded that for Bangladesh and Pakistan, one of the reasons why they did not get affected by China's market gain is the fact that most of their products are different than China's main category of products. As they mostly produce in the

very low price categories (lower than the main categories of China's production), they were insulated from China by the logic of product segmentation. I use a simple model of distance in product space and used a regression of unit value interacted with change in Chinese market share to prove this hypothesis. Their lower unit value products where they do not lose market share are also the ones which are very inelastic or necessary goods.

I also find that they are producing in different HS categories compared to China in these lower valued and less elastic SIC categories. This is in fact one of the most interesting findings of this paper. The argument of 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 like China can also be used for very low-priced product categories.

Further investigations can be done regarding China's impact on developing countries' market shares and specially on the topic of product segmentation. It would be interesting to see if China's competitiveness has actually reduced the growth rate in number of products instead of actual market share. It will answer how the change in number of products in each SIC category is affected by change in Chinese market share. It will help me figure out that though Bangladesh kept growing its market share for most of its products, if China's entry actually discouraged it from producing in more categories.

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8 Appendix

Table 16: Price Competition: Bangladesh, Indonesia and India

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta\text{PriceCN}$	$\Delta\text{PriceBD}$	$\Delta\text{PriceCN}$	$\Delta\text{PriceID}$	$\Delta\text{PriceCN}$	$\Delta\text{PriceIN}$
Quotas	0.688		3.268		3.347	
	(0.14)		(0.42)		(0.42)	
$\Delta\text{PriceCN}$		-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)
<i>N</i>	713	713	715	623	715	659

t statistics in parentheses

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

Table 17: Price Competition: Sri Lanka, Pakistan and Vietnam

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta\text{PriceCN}$	$\Delta\text{PriceLK}$	$\Delta\text{PriceCN}$	$\Delta\text{PricePK}$	$\Delta\text{PriceCN}$	$\Delta\text{PriceVN}$
Quotas	3.360		3.267		3.268	
	(0.43)		(0.42)		(0.42)	
$\Delta\text{PriceCN}$		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)
<i>N</i>	715	550	715	715	715	538

t statistics in parentheses

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

Table 18: Relative Price Compared To China for Bangladesh

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

t statistics in parentheses

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

Table 19: Relative Price Compared To China for Pakistan

	(1)	(2)	(3)	(4)
	RelPrice2005	Δ MKTShareCN	RelPrice2005	Δ MKTSharePK
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)
Δ MKTShareCN				-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)
<i>N</i>	706	708	706	702

t statistics in parentheses

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

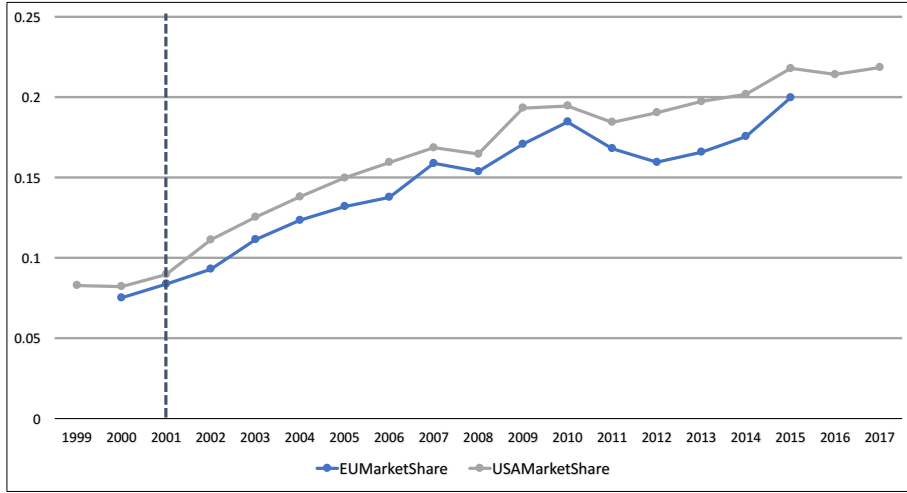
Figure 7: Rank Based on GDP per Capita and Capital/Labor Ratio (Lower to Higher)

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
Thailand	2893	8
Tunisia	3194	9
Turkey	7384	10
Mexico	7986	11
EU	29108	12
USA	44237	13

Country	Capital/Labor Ratio (USD/Person)	Rank 2005
Bangladesh	7.001107167	1
Sri Lanka	7.883680237	2
Pakistan	8.252321224	3
India	8.537979338	4
Vietnam	9.451512626	5
China	12.53585977	6
Indonesia	12.70858605	7
Thailand	12.78659247	8
Tunisia	12.78964132	9
Mexico	12.85640795	10
USA	12.94807372	11
Turkey	13.20886331	12

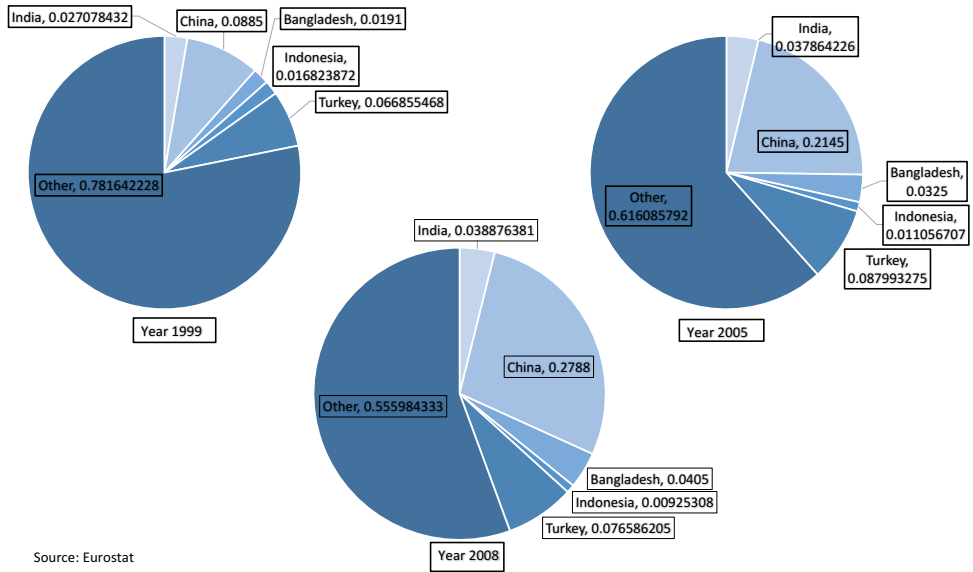
Source: World Bank, Penn World Table 9.0

Figure 8: China's Market Share in Import by Europe and USA



Source: UN Comtrade & Euro Stat Database

Figure 9: Market Share of the Top 5 Exporters of Textile and Apparel to Europe



Source: Eurostat

Figure 10: Relative Price of Bangladeshi Products for the top 10 Categories with Largest

Market Share

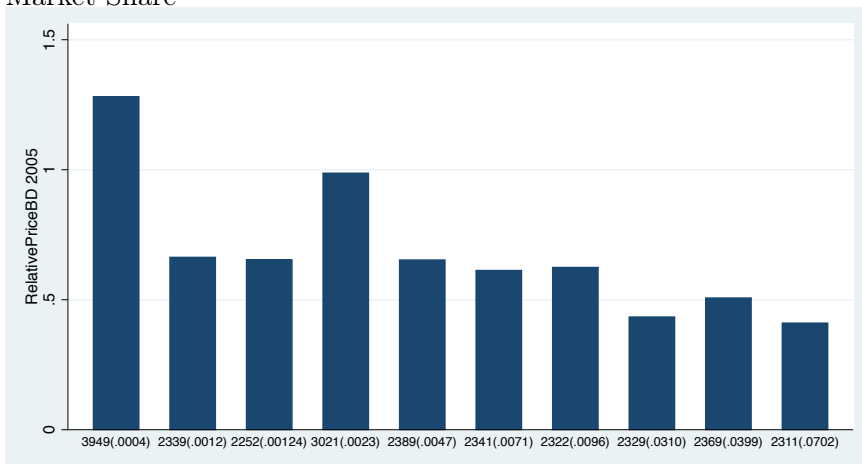


Figure 11: Relative Price of Pakistani Products for the top 10 Categories with Largest Market

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