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Abstract

Using the dismantling of the Multi-fibre Arrangement quotas on Chinese textile and clothing products in conjunction with China's accession to WTO, within firms adjustments to intensified low-wage competition is analyzed. Employing Danish employer-employee matched data supplemented with transaction-level data from between 1995 and 2007, the analysis shows a significant increase in skill and capital intensity associated with downsizing in response to heightened competition. Competition is found to negatively affect employment, value-added and intangible assets of the Danish firms, and firms are found to refocus their innovative efforts away from goods where China's competitive advantage becomes higher. The results show an important role of the distributional impact of low-wage competition within firms in restructuring the industry and support theories that indicate compositional changes in the scopes and operations of "Northern" firms in response to competition from "South".

JEL Classification: F16; F61; L25

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1 Introduction

Increased trade between advanced countries and low wage countries is one of the most important consequences of globalization, and has had a profound effect on the business environment of firms. As the macroeconomic shift unfolds, firms undertake internal structure changes in order to operate in the new environment. An understanding of such changes within firms is essential to evaluate the role of international trade in recent decades' evolution in advanced countries' economies and to understand the welfare consequences of policy changes that intensify foreign competition. But a lack of appropriate micro level data which can provide details on within firm changes at multiple margins and a scarcity of policy experiments that allow researchers to deduce causal implications impede sufficient empirical insight into within firm changes.[1]

By making use of the expiration of the Multi-fiber Arrangement (MFA) quotas for China due to its WTO membership, in this paper the impact of competition on firm strategies is analyzed. By providing empirical analysis of changes happening at several margins of adjustment in Danish textile and clothing (T&C) industry, including labor and product-level strategies within firms, the aim is to shed light on the type of restructuring happening in advanced countries' traditionally labor intensive manufacturing sectors faced with stiff competition from low-wage countries.

The Multi-fiber Arrangement (MFA) regulated world trade in textile and clothing from 1974 until 2005. Under this agreement a large portion of textile and clothing export from low wage developing countries to developed countries was subject to physical quotas. The arrangement served the purpose of providing 'temporary' protection for developed country textile and apparel industry against competition from developing country products. The Agreement on Textiles and Clothing under WTO provided a schedule for the gradual dismantling of the MFA

[1] Many recent studies focus on a relationship between import competition and productivity improvement within firms and plants. See Holmes and Schmitz (2010) for a recent review of this literature. Being the measured outcome of a number of changes within firms and plants, these studies do not provide particular insight into the inner workings of the firms and the changes that may or may not result in productivity improvement in response to competition.

quotas in four phases; Jan 1995, Jan 1998, Jan 2002 and Jan 2005. By being outside of the WTO during the 1990s, China did not benefit from the first two phases of quota abolishment. One of the immediate concrete changes that WTO membership brought to China was dismantling of the first three phases of MFA quotas on China in January 2002 and allowing it to benefit from the scheduled last phase in January 2005.

I make use of very detailed employee level data as well as transaction level product data. These data-sets are matched at the firm-level and are combined with more traditional firm-level accounting data. The resulting data-set is used to analyze the response of firms to heightened competition in the context of exogenous changes in the MFA quota system due to China's WTO accession. The empirical strategy in this paper directly utilizes the change in the trade policy, rather than relying on import measures that are potentially contaminated with domestic demand and supply factors.

To do that, first firms with product portfolios containing products that were subject to MFA quotas before the WTO accession of China are identified. Using the difference in differences approach, I then measure any disproportionate changes in such firms, when compared to other T&C manufacturing firms, in response to the quota removal experience after controlling for firm-fixed effects and aggregate shocks.

Since the MFA quotas were designed to protect developed markets specifically from low-wage country imports, low-wage competition is by nature disentangled from competition in general when examining the quota abolishment for China. Utilizing product-level information at the firm-level also allows disentangling any imported input effect from competition.

Both sales and value-added are found to be negatively affected by the intensified competition from China. The negative effect of competition is even more strongly manifested in employment. Specifically, employment in full-time units decreases disproportionately after the WTO accession of China, by about 20 %, among firms that had been protected from Chinese competition by MFA quotas. Disentangling any imported input effect using a triple difference approach also shows that firms, which produce MFA quota goods, are significantly less affected by the competition, if they also import MFA quota goods.

The analysis of employment characteristics shows that, the negative effect of competition on employment does not affect employees with different skills and occupations equally. After the WTO accession of China a 24 % disproportionate decline in the number of employees who have at most a high school diploma is documented among MFA quota goods manufacturers compared to other T&C manufacturing firms. The number of employees with college education, on the other hand, is found not to be affected by the competition. Exploiting education information further, the use of employees with skill education in T&C production (at the high school level), such as knitting or textile operators is found to be substantially negatively affected while the use of employees with T&C related technical design education (at the college level) is found to be positively affected by the competition. Further analysis reveals that the positive effect on the number of employees with T&C related technical design education is due to firms which both produce and import MFA goods. Analyzing employee occupations yields similar results. More specifically, a significant negative effect is documented on employees with base-level occupations that require basic skills, while no significant impact is found on occupations requiring professional and technical skills. These findings indicate possible changes in the production strategies of firms, that maybe firms limit their in-house production to technical and skill intensive products and product developments. These results are consistent with the models of factor proportions as in Helpman and Krugman (1985).

As a result of the differential effect of competition across employees with different education backgrounds, a significant concentration of highly skilled employees is found within affected firms. Within occupation groups the increase in skill-intensity disproportionately occurs within base-level occupations, where the lay-offs are concentrated, compared to professional and technical occupations. Competition is also found to have a significant positive effect on wages within firms. After controlling for selection within firms and unobservable worker characteristics, the significant positive effect is found to be accrued among professional and technical occupations and employees with a relatively high level of education. Controlling for the imported input effect shows that the positive wage effect is due to firms which are both producing and importing MFA quota goods.

Whether an increase in low-wage country imports causes decline in low-skill wages was an

important part of public debate in the context of the significant increase in income inequality observed in the 1990s in many advanced countries, including the US. The question re-gained its importance with intensified Chinese imports especially in developed countries in the wake of its WTO accession. Recent studies show the importance of low-wage country imports in causing reallocation between plants towards more capital-intensive (Bernard, et al. (2006)), or knowledge-intensive (Bloom et al. (2011)) establishments. Bloom et al. (2011) find that European firms increase their innovation activities as measured by patent counts and research and development (R&D) expenditure as a result of intensified competition from China. Utar and Ruiz (2011) find that while plant growth and employment in offshore plants of American companies located in Mexico declines significantly in response to heightened Chinese competition in the US market, competition also leads to increase in plant efficiencies, skill intensities and triggers sectoral reallocation away from lower value-added offshore sectors such as apparel. These studies provide empirical substance to the potential role of trade in explaining the within industry growth of skill demand in advanced countries.[2] Recently, Autor, et al. (2012) document the labor market outcomes of Chinese imports in the US and find a significant and negative effect of intensified Chinese imports on manufacturing employment, but no significant effects of Chinese imports on low-skill manufacturing wages. Using the removal of textile and clothing quotas for China due to its WTO membership as a quasi-experiment, the findings presented here on employment and wages support theirs, in that the stiff competition with low-wage countries operates more on the quantity margin within manufacturing sectors. These results are in line with the general structure of the Danish labor market, which is characterized by liberal rules for firing together with a high degree of unionization resulting in downwardly inflexible wages.[3]

The findings in this paper also complement Khandelwal et al. (2012) who show that due to an additional misallocation caused by the execution of the MFA quotas by the Chinese government, the removal of the MFA quotas resulted in a significant efficiency gain via a

[2]Among other recent studies on Chinese competition, Iacovone et al. (2010) find no effect of Chinese competition on innovative activities of firms including R&D expenditure among Mexican manufacturing firms.

[3]The Danish labor market model is generally referred as a 'flexicurity model'. It combines flexible hiring and firing with a generous social safety net and an extensive system of labor market activation policies.(Andersen, (2011))

substantial entry of more efficient Chinese exporters. Attributing an important role for these new, more efficient, entrants in the significant surge of the Chinese T&C exports and associated decline in prices, their results imply that the substantial negative impact of the quota removal experience on Danish producers, as shown in this paper, may have been smaller if the quotas were allocated by the Chinese government more efficiently.

Innovation is an important dimension of advanced country firms' response to increased low-wage country competition, and this link has rightly received focus in the literature. As MFA was a temporary system of protection, the European Commission has held that the textile and clothing industry in Europe can survive the stiff competition with low-wage country imports by concentrating on its strength, mainly on high quality and design oriented products, innovation and superior technology. The Commission advocated policies that encourage R&D in the industry such as facilitating the participation of small and medium T&C enterprises in EU funded R&D programs (European Commission Documents, (2004)). To contribute to an understanding of the link between the low-wage country competition and innovation, this paper includes analysis of firm assets, importantly intangible assets, as well as a measure of innovation.

While the physical assets of firms are not found to be negatively affected by the stiff Chinese competition, intangible assets are. The ratio of intangibles over total assets is also found to respond negatively to the intensified competition with Chinese products triggered by the MFA quota abolishment in 2002. The competition is found to trigger significant product droppings as well. High-end product images, trademarks, exclusive distribution rights etc. may have been harmed by the surge of significantly cheaper and similar versions (maybe even counterfeit products).[4] These findings may lend substance to European industrialists' complaints about the potential competitive harm of the rapid surge of Chinese textile and clothing products.[5]

[4]In 2008, about 200 million counterfeit items were detected at the European borders with the majority of cases involving articles of clothing and accessories. Two thirds of the counterfeit products seized at the European border in 2008 were produced in China. (United Nations Office on Drugs and Crime Report, (2010))

[5]In early 2004 the European Commission set up a High Level Group to produce recommendations on the future of textile and clothing industry in Europe. The group consists of top decision makers from textile and clothing industry. The group's first recommendation to deal with the challenges in the new 'quota-free' system was to increase the effectiveness of intellectual property rights. (European Commission Documents, (2004))

Import competition may drive innovation, if firms find it profitable to escape competition by introducing new products or upgrading already existing products. The empirical analysis in this study shows that, firms facing heightened competition from China under the quota-free environment increase their new product introductions within categories that were not covered by the MFA quotas. Firms are also found to diversify towards non T&C products. The results show that, while firms' incentive to introduce new products significantly increases with the heightened competition, firms are found to channel their innovative efforts away from products where China's competitive advantage is now higher.[6]

Competition from south could also trigger offshoring of basic skill jobs, which can result in increased skill-intensity within firms as in Grossman and Rossi-Hansberg (2008). Competition from south can also cause endogenous selection of products within firms as in Bernard, et al. (2010). Thoenig and Verdier (2003) show that with an increased threat of imitation by low-wage countries, firms in developed countries tend to respond by biasing the direction of their innovations towards technologies that are intensive in skilled labor. Results on the firms' product portfolio strategies and the significant concentration of skilled labor found within firms are in line with the notion of "defensive skill-biased innovation" as introduced by Thoenig and Verdier (2003).

In a related study, Thesmar and Thoenig (2000) develop a model to assess the interaction between organizational choice and the macroeconomy. The model is a Schumpeterian growth model a la Aghion and Howitt (1992) where the creative destruction rate measures the rate of product market instability. Firms' organization decisions rely on the tradeoff between efficiency and adaptability. The intuition is that firms have to pay high sunk costs to achieve high efficiency by investing in a highly tuned organization, but that such an organization is not adaptable. Conversely a less tuned organization with low (or no) sunk costs, but higher skill level is more adaptable. According to their model, markets with higher creative destruction should exhibit a higher share of skilled labor. The findings in this study on the negative effect

[6]Complementing the findings of Bernard et. al. (2006), that shows US firms switch industries to escape competition from low-wage countries, these results show that the product mixes of the firms are endogenous and respond to the competition. Hence studies that link import competition to productivity, while fixing the product mix of firms, may produce biased results. See for example De Loecker (2011).

of competition on intangible assets as well as increased product turnover within firms indicate that product instability, or in the Schumpeterian language, the 'creative destruction rate' increases with heightened competition with China. The findings of increased concentration of skilled and educated workers within firms due to Chinese competition provide empirical support of Thesmar's and Thoenig's (2000) theoretical argument.

The rest of the paper is organized as follows: In the next two sections a description of data sets used and an overview on Danish T&C industry and trade policy are provided. An empirical analysis of the effect of the MFA quota expiration for Chinese goods on Danish imports is presented next. In section 5 the empirical model is outlined, and results are interpreted in section 6 followed by additional analysis and conclusions in sections 7 and 8.

2 Data

For the purpose of this study firm-level data on Danish textile and clothing industry are combined with employer-employee matched data and transaction level domestic and foreign sales data. The data-sets are from Statistics Denmark (Danmarks Statistik). The details of the data-sets and constructing of the matched data-set are explained in the appendix.

The traditional firm-level variables such as sales, total wages, capital assets, investment, full-time equivalent number of employees (fte), etc. are from the longitudinal firm accounting data. This data-set is complemented with detailed employee characteristics that are compiled from person-level data (IDA) with matched employer code. Firm accounting data contains all firms that employ at least 0.5 full-time equivalent labor. The person-level data-set covers all people between the ages 15 to 70. So the resulting main data-set is comprehensive with respect to both T&C firms in Denmark and their employees.[7] After cleaning out firms with low quality data, the final data-set is comprised of around 1100 unique T&C firms between 1995 and 2007 with 43 % of them in clothing and the rest in textile industry.

Firms' product information is compiled from domestic and international trade data-sets. Do-

[7]Due to data cleaning procedures some of the very small firms (with single employees) and firms with multiple entry and exits are cleaned out from the final data-set.

mestic data contains 10-digit product-firm-year level domestic firm sales of domestically produced products for all manufacturing firms that have 10 or more employees. The international data-set is compiled from Danish customs records; it contains 8-digit product-firm-destination-year level international transactions for all firms with any size. Since domestic trade data is not available after 2005 and does not contain data for firms with less than 10 employees, the product portfolio analysis is based on a sample that consists of 875 firms between 1995 and 2005.

Quota information is reported in the SIGL (Système Intégré de Gestion de Licenses) database which is constructed by the European Commission and is publicly available. The SIGL manages licences for imports of textiles, clothing, footwear and steel to the EU. The textile and clothing license database is classified according to 163 grouped quota categories defined by the EU. These categories are mapped to CN 8 digit products as appropriate. The CN codes corresponding to quota categories are based on Combined Nomenclature 1999. Since firms that produce quota category goods in 1999 are identified as treated firms in the main empirical specification, changes in CN categories across the years do not affect the identification of treated firms. But quota category products based on CN-1999 are linked back and forth through years using correspondence tables linking CN 1995 through CN 2007 as provided by the European Commission-Eurostat. A total of 158 CN 8-digit products are identified as being the subject of 2002 quota abolishment for China (phase I, II, and III).[8] These goods constitute about 9 % of both the total textile and clothing import and export in Denmark during the sample period. 389 CN 8-digit product categories are identified as being the subject of 2005 quota abolishment. The 2005 quota goods constitute about 20 % of the total Danish textile and clothing imports and 17 % of the total textile and clothing export. Firms that produce the MFA goods are identified using firm id's that are reported as part of the domestic and foreign sales data sets.

[8] Annex I of the "Council Regulation (EEC) No 3030/93 of 12 October 1993 on common rules for imports of certain textile products from third countries" is used as a main reference for the concordance between quota categories and the CN 8-digit products. The annex is available at the SIGL.

3 Perspective on T&C Industry and Trade Policy

3.1 Overview of the Danish Textile and Clothing Industry

Europe's T&C industry is dominated by a large number of small and medium-sized enterprises, with the average company employing 19 employees in 1999 as reported by Stengg (2001). Most companies are privately owned, and a few are listed on the stock exchange. Danish T&C resembles overall European T&C industry. The average number of employees is found to be 20 during the sample period of 1995-2007. All firms in the sample are private firms and around 26 % of them are proprietorships and 91 % of the firms are single plants on average.[9]

A restructuring in Danish and also in European industry overall has been happening since the 1980s due to increasing competition with low wage countries. From 1980 to 1995 the European textile industry lost 47 % of work places, while the corresponding figure for clothing is 40 % (Stengg (2001)). Similarly over the period 1973 to 2002 the loss of jobs amount to 50000 in the Danish T&C industry (Olsen et al. (2004)). Typical manual processes such as sewing, folding, packing, and cutting have been moving abroad during the period, while more capital intensive processes such as dyeing, printing, weaving, knitting and spinning as well as design, logistics and distribution have remained within Denmark to a large extent (Olsen et al. (2004)).

3.2 Evolution of The MFA Quota System

When GATT was signed in 1948, world trade in textile and clothing was excluded from the agreement. Trade in T&C was governed by bilateral agreements. As the number of agreements grew, the Multi-fibre Arrangement was introduced in 1974 to govern the world trade in textile and clothing. For the EU, most MFA quotas were negotiated for the bloc as a whole, and since 1993 any member state specific restrictions were removed and the quotas started to be managed at the EU level. In 1995 the Agreement on Textiles and Clothing (ATC) replaced the MFA, and provisions were made for phasing it out in four steps over a period of 10 years, - at

[9]Firm ownership-type information is available only between 1999 and 2006. So 26 % is the average across these years. There is a very little change between the years (min. 25.7 %, max. 27.6 %). Single-plant information is based on the whole sample (1995-2007).

the beginning of 1995, 1998, 2002 and 2005. Based on the volume of imports in 1990, quotas were to be eliminated equivalent to 16 % of 1990 imports at the beginning of 1995, 17 % at the beginning of 1998, 18 % at the beginning of 2002, and the remaining 49 % at the beginning of 2005.

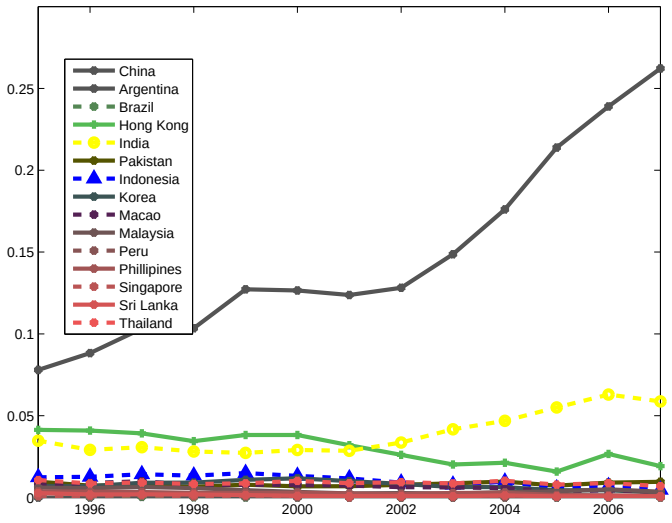

Figure 1: Import shares of China and other developing countries subject to MFA quotas in Danish Textile and Clothing Imports 1995-2007 (Source: Statistics Denmark)

Between 1986 and 1994 the EU executed MFA quotas towards 19 countries. These were Argentina, Brazil, China, Czechoslovakia, Hong Kong, Hungary, India, Indonesia, the Republic of Korea, Macao, Malaysia, Pakistan, Peru, Philippines, Poland, Romania, Singapore, Sri Lanka and Thailand. Under ATC the selection of MFA products to be integrated into the normal WTO system was left to the importing countries. The EU started its phasing out process by integrating mainly products or MFA categories with no quotas vis-à-vis WTO members. The same approach was chosen by the USA. During the first two phases, the EU

integrated 34 MFA categories, but only very few existing quotas vis-à-vis WTO members (OETH, (2000). For example, among the major exporting countries that face MFA quotas neither India nor Indonesia faced any quotas that were subject to phase I or II removal.[10] No quota had been imposed on imports from Pakistan that was subject to removal under Phase II. Only one quota category regulating imports from Pakistan was removed in Phase I, and this category had a 0 % utilization.

But during the same time the EU also liberalized quotas mainly on a bilateral basis for neighboring countries in Eastern Europe (under the Europe Agreements) and in the Mediterranean. In 1997 about 70 % of the total EU import value of textiles and clothing was imported without any quantitative restrictions, while the other 30 % was imported under quota. The exporting countries with the highest quota utilization were China, India, Pakistan and Indonesia (OETH, 2000). In 1998 China's share of T&C import in Denmark was a little over 10 % compared to 2.8 %, 0.7 % and 1.3 % respectively for India, Pakistan and Indonesia. By 2007 China's share reached 26 %, while the respective shares of India, Pakistan and Indonesia were 6 %, 1 %, and 0.5 %.

4 The Impact of the MFA Quota Abolishment on Chinese Imports in Denmark

As shown in figure 1, imports in textile and clothing from China into Denmark has increased significantly with the WTO membership of China. In order to quantify the increase in Chinese imports attributable to MFA quota removal, transaction level import data between 1995 and 2007 in those goods that are subject to MFA quotas are aggregated into country (k), 8-digit product (j) and year (t) level. Goods subject to 2002 quota abolishment for China (phase I-II-III goods) are denoted with $MFAQ2$ while goods subject to 2005 quota abolishment for China

[10]For Indonesia all active quotas imposed were subject to Phase IV removal except 2 quotas (category 21 and category 33) which were subject to Phase III and were removed in 2002. Similarly for India, no quotas were in place that were subject to Phase I and II removal. There were only 2 quota categories that were subject to Phase III removal (category 24 and category 27) and were removed in 2002. The remaining 15 categories for India were removed in 2005.

are denoted with $MFAQ5$. Collectively the goods covered by all four phases are denoted with the variable MFAQ. $Dum02_t$ and $Dum05_t$ are the time dummies:

$$Dum02_t = 1 \quad \text{if YEAR} \geqslant 2002$$
$$Dum02_t = 0 \qquad otherwise$$

similarly,

$$Dum05_t = 1 \quad \text{if YEAR} \geqslant 2005$$
$$Dum05_t = 0 \qquad otherwise$$

.

$$lnX_{kjtn} = \alpha_0 + \alpha_1 Dum02_t * China + \sum_{kj} \delta_{kj}^{FP} Country_k * Product_j + \sum_{tn} \delta_{tn}^{YI} Year_t * Industry_n + \epsilon_{kjt} \tag{1}$$

Equation 1 is estimated separately among phase 1 to 3 goods (MFAQ2) and phase 4 goods (MFAQ5) imports. X_{kjtn} is the variable of interest; physical amount/quantity and unit price respectively for imported good j coming from country k at year t. Subscript n denotes industry, 'textile', or 'apparel'. Unit prices are not deflated in these regressions but instead industry by year fixed effects are included to account for industry specific shocks including inflation rates and exchange rate variations. The results, presented in Table 1, indicate that quotas were binding for China as the quantity of imports from China increases substantially with removal of those quotas. The coefficient in column (a) of Panel A indicates a more than 5 times disproportionate increase of the Chinese imports in the 2002 quota goods in comparison to imports from other countries of the same 8-digit goods. As the quota limitation disappears, products imported from China get cheaper as well. The coefficients in the unit price regressions indicate 26 % and 17 % disproportionate declines in unit prices of the Chinese goods in response

to 2002 and 2005 quota removal respectively.[11] Brambilla, et al. (2010) show similar results regarding the quota removal experience in the US data. Unit prices may decline as a result of a new equilibrium, which is reached with no quantity limitation. Part of the unit price decline could also be due to changes in the quality of the products in response to the relaxation of the quota restrictions. However, examining Chinese T&C exports during the MFA quota removal period, Khandelwal et al. (2012) find that most of the decline in the unit prices was due to the entry of more efficient Chinese firms into the export market rather than quality downgrading.

Table 1: MFAQ Imports

	Textile and Apparel Products	Textile and Apparel Products
Panel A: MFAQ2 Products (1995-2007)		
	(a)	(b)
Variables	Log Quantity	Log Price
Dum02*China	1.837***	-0.302***
	(0.154)	(0.038)
Year By Industry Fixed Effect	yes	yes
Product (CN-8) by Country Fixed Effect	yes	yes
Number of Observation	25383	25383
F	21.135	20.782
Panel B: MFAQ5 Products (1995-2007)		
Variables	Log Quantity	Log Price
Dum05*China	1.303***	-0.184***
	(0.100)	(0.030)
Year By Industry Fixed Effect	yes	yes
Product (CN-8) by Country Fixed Effect	yes	yes
N	57301	57301
F	45.802	41.255

Robust standard errors are reported in parentheses. They are clustered for each CN 8 digit product categories and country pair. Clustering by only country leads smaller standard errors, and available upon request. Constant is included but not reported. In panel A the sample consists of products for which quotas for China were removed in 2002 (phase I, II, III categories, MFAQ2); the sample in panel B consists of products for which quotas for China were removed in 2005 (under the phase IV, MFAQ5). Transaction level import data set is between 1995-2007 and it is aggregated into CN-8 product and country categories for each year. Data source: Statistics Denmark

It is possible that China merely replaces other import partners of Denmark from the developing world without significantly affecting the prices and hence without significantly increasing the

[11] As mentioned in the previous section most of the existing quotas imposed on developing countries other than China were subject to removal in Phase IV (2005). So China's relatively stronger response to the 2002 quota removal could be explained by the fact that China stood out in the number and importance of quotas removed in 2002.

competition for the Danish producers at home. To see if the surge of Chinese imports has any significant effect on average import prices, import data is aggregated into 8-digit product-year level and equation 2 is estimated, where $MFAQ2_j$ and $MFAQ5_j$ are indicator variables that take 1 if product j is a product, for which quotas on Chinese imports to the EU were removed in 2002 and 2005 respectively.

$$lnP_{jt} = \alpha_0 + \alpha_1 Dum02_t * MFAQ2_j + \alpha_2 Dum05_t * MFAQ5_j + \sum_j \delta_j^P Product_j + \sum_{tn} \delta_{tn}^{YI} Year_t * Industry_n + \epsilon_{jt} \quad (2)$$

lnP_{jt} is the logarithm of the unit price of imported product j at year t. The results presented in Table 2 column (a) indicate that both 2002 and 2005 quota removals are associated with a significant decline (about 14 % and 8 % respectively) in the unit prices of goods that were subject to quota restrictions for China. When the dummy variable for all the phases combined (MFAQ) is included (column b), the interaction variable indicates a 10 % on average disproportionate decline in prices of all quota goods after the WTO accession of China.

Table 2: Trade Data (1995-2007): All T&C Imports

Sample	Textile and Apparel Products	
	(a)	(b)
Variables	Log Price	Log Price
$Dum02 * MFAQ2_j$	-0.155***	
	(0.043)	
$Dum05 * MFAQ5_j$	-0.081**	
	(0.031)	
$Dum02 * MFAQ_j$		-0.101***
		(0.025)
Year By Industry Fixed Effect	yes	yes
Product (CN8) Fixed Effect	yes	yes
Number of Observation	15823	15823
Number of (CN8) Products	1632	1632
F	12.715	13.450

Robust standard errors are reported in parentheses. They are clustered for each CN-8 digit product categories. A constant is included but not reported. Transaction level import data set is between 1995-2007 and it is aggregated into CN-8 product categories for each year. Data source: Denmark Statistics.

Notice that cheaper imported goods in the domestic market is not the only way that Chinese competition can affect the Danish producers. Danish manufacturers are also expected to face

intensified competition with China in export markets such as in other EU countries and in the US due to the end of differential treatment of China with its WTO membership. Conducting the same product-level analysis in export data confirms a negative effect of the MFA quota removal experience on Danish exports. The results, which are presented in Table A-1 in the appendix, also suggest that the negative effect on exports of the quota removals is reflected in prices for the 2002 removal, while it is reflected in volume for the 2005 quota removal.

5 Empirical Strategy

Rather than relying on import measures that are contaminated with domestic demand and supply factors, the empirical strategy in this paper directly focuses on a change in the trade policy, which is the MFA quota abolishment. Since the MFA quotas were designed to protect developed markets specifically from low-wage country imports, low-wage competition is by nature disentangled from competition in general when examining the quota abolishment for China. The fact that the quota removal for T&C products did not happen as part of the economy-wide trade liberalization policy also helps releasing the results from general equilibrium effects and spillovers of other industries.

To examine the effect of the expiration of the Multi-fiber Arrangement (MFA) quotas for China, the empirical strategy exploits the exogenous trade shock due to China's accession to the WTO which drove the removal of T&C quotas for China. As described in section 3, in the mid-90s, China was by far the most important import supplier to Denmark among developing countries exposed to MFA quotas. Before China became a WTO member, all firms producing goods protected from Chinese competition by MFA quotas faced a potential threat. This threat became real, and competition intensified, with the WTO membership of China, which allowed China to enjoy immediate removal of textile quotas on its products. But during the long period of China's negotiation for membership, mainly with the US and EU, there was a great deal of uncertainty about the membership and its timing.[12] The first step of the removal of quotas on

[12] "China's entry into the WTO is far from a foregone conclusion. It has been trying to join the multilateral trading system since 1986. Its hopes have been disappointed many times before."–quoted from an article titled "China and WTO" published in the Economist in April 1, 1999. This uncertainty was a recurring message

Chinese T&C was in January 2002, immediately after the membership. At that point there was no longer any uncertainty, either, regarding the timing and coverage of the next (and the final) round of quota removal, scheduled for 2005.[13] Hence the empirical strategy utilizes the uncertainty associated with the WTO accession of China.

In 1999, 32 % of the firms were found to produce at least one MFA good. The majority, more than 85 percent, of the firms that produce MFAQ2 (Phase I-II-III) products are also found to produce MFAQ5 (Phase IV) products.[14] Due to significant overlap among MFAQ2 and MFAQ5 producers as well as a lack of uncertainty regarding the timing and the extent of Phase IV after China's membership, a group of firms that are most threatened by Chinese competition is defined by all firms producing any MFAQ products and is indicated by the variable $MFAQProd_{it}$.

By constructing the share of MFAQ goods in firms' product portfolio or total sales, it is also possible to create a continuous measure of competition which takes into account the extent of exposure to the competition. Continuous measures are denoted with the word 'share' in the respective variable name; e.g. $MFAQRevShare_{it}$ denotes the share in overall sales of firm i in year t generated by goods that were subject to quotas for China under MFA, and $MFAQProdShare_{it}$ denotes the ratio of the number of MFA quota products to the total number of products. Measuring the extent of exposure to competition using the intensity of MFA products, $MFAQProdShare_{it}$, may be more relevant in linking competition with changes in the production organization of firms such as the occupation characteristics while $MFAQRevShare_{it}$ may be more suitable in analyzing firm sizes. The dummy variable, $MFAQProd_{it}$, on the other hand can perform better when analyzing the impact of competi-

conveyed in articles about the negotiation published in the Economist from 1999 until the end of 2001. See also The Economist (2000a) and The Economist (2000b).

[13] Due to excessive surge of Chinese imports in the first few months of 2005 at the EU ports in response to the final phase of the quota removal, the EU re-negotiated the quotas with China and they agreed on additional export quotas (governed by the Chinese government) on certain T&C categories until 2008. Those categories, as specified by the European Commission, are excluded from the MFAQ5 group. This event is popularly referred to and publicized as the "Bra War".

[14] Out of 640 firms in 1999, 112 were found to produce MFAQ2 goods and 191 were found to produce MFAQ5 goods. 206 were found to produce either MFAQ2 or MFAQ5 goods.

tion on strategic decision changes such as new product introductions, where one may suspect a possible non-linear relationship between the degree of competition and the outcome variable.[15] So while keeping $MFAQProd_{it}$ as a default treatment variable, results with all three measures are presented as appropriate.

As time goes by, some of the firms that produce MFA goods may respond to the increased Chinese competition by dropping products with a high level of Chinese comparative advantage. Firms which continue to produce such goods could be the stronger or more competitive ones, who are able to differentiate themselves. Such selection within the treatment group produces biased results. To prevent that, the treatment group is set as those firms which in 1999, before China's WTO accession, produced goods that were subject to MFA quotas for China. Respective dummy variables are indicated by dropping the t subscript and adding 99 at the end of the variable name; e.g. $MFAQProd99_i$ is the dummy variable that takes 1 if firm i is found to have produced any MFA quota goods in 1999.

By exploiting the exogenous shocks to the competitive environment, the three main regressions that are used to understand the response of firms to the competition are then as follows.

$$X_{it} = \alpha_0 + \alpha_1 * MFAQProd99_i * Dum02_t + \sum_i \delta_f^F Firm_i + \sum_t \delta_t^Y Year_t + \epsilon_{it} \quad (3)$$

$$X_{it} = \alpha_0 + \alpha_1 * MFAQProdShare99_i * Dum02_t + \sum_i \delta_f^F Firm_i + \sum_t \delta_t^Y Year_t + \epsilon_{it} \quad (4)$$

$$X_{it} = \alpha_0 + \alpha_1 * MFAQRevShare99_i * Dum02_t + \sum_i \delta_f^F Firm_i + \sum_t \delta_t^Y Year_t + \epsilon_{it} \quad (5)$$

As defined earlier, $MFAQProdShare99_i$ is the ratio of the number of MFA quota products that firm i produced in 1999 to the total number of products in year 1999 and $MFAQRevShare99_i$

[15] See for example Aghion et al. (2005) for a theory and evidence on a possible non-linear relationship between competition and innovation.

is the share of sales that is generated from MFA quota goods in year 1999 and X is the variable of interest.[16] By interacting with the WTO time dummy, the purpose is to capture the response of firms to the increased competition. The aggregate trends in the industry are controlled for by using year fixed effects. Note that this empirical approach does not address potential spillovers from MFA producers on other T&C and non T&C firms. It also focuses on the adjustments that take place in response to the change in competitive environment, not the dynamics of those adjustments.[17] The EU wide T&C trade regime, being relatively liberal, was designed to keep a globalization pressure on firms, and, as mentioned previously, Danish T&C firms in general were already adjusting to increased low-wage competition. The empirical analysis here focuses on the disproportionate impact on the MFA producers by controlling for the aggregate trends. It is possible that firms which produced the MFA quota goods are systematically different than the rest of the firms. The panel aspect of the data-set allows for control of the firm fixed effects that can be correlated with the regressors and thus further help to reduce the endogeneity concerns in the empirical analysis. The coefficient estimates for α_1 will measure the impact of intensified low-wage competition due to the abolishment of textile quotas from 2002 associated with China's entry to the WTO.

6 Results

As competition intensifies with Chinese products due to the removal of textile quotas starting from 2002, Danish firms' may loose market share in affected goods so the impact on firms' size is investigated first. Possible impact on within firm organization, firms' assets and product introductions is examined next.

[16] As mentioned in section 3, product portfolios of firms are constructed using domestic production/sales and international trade data sets. Since only firms with 10 or more employees are included in the domestic production/sales data set, the treatment group may miss some very small firms that do not trade internationally. The possible absence of such firms in the treatment group may cause under estimation of the effect of competition.

[17] See, for example, Threinen (2012) analyzing the dynamics of the US textile firms' investment behavior in response to the MFA quota removal.

6.1 The Impact of Competition on the Size of Northern Firms

Table 3 in columns (a), (b), (c) and (d) presents the results for the estimation of equations 3-5 where the dependent variables are the logarithm of firm turnover (sales), the logarithm of value added, the full-time equivalent number of employment (in logarithm) and the logarithm of the number of employees that are on the payroll and actively work respectively. Competition from China triggered by the removal of MFA quotas is found to have negative effects on these variables. On average, the group of firms that produced MFA quota protected goods in 1999 experience an 11 % disproportionate decline in their sales after 2001 in comparison to others. The impact is higher on value-added, with a 13 % disproportionate decline. When the extent of exposure to the competition is taken into account (panels B and C), the magnitudes gets larger with larger difference between the turnover and the value-added coefficient estimates. The employment coefficients indicate a significant and negative employment impact of the removal of MFA quotas on Danish T&C industry. Focusing on the top panel, the coefficient in column (c) indicates that employment in full-time units decreases disproportionately after the WTO accession of China, by about 19 %, among firms that are the most vulnerable to the competition. The respective coefficient in column (d) is also negative and significant, indicating an about 17 % disproportionate decline in the number of employees.[18]

Since both employment and sales are expected to respond to the competition in a continuous manner, the cross-sectional differences in intensities of the exposure can provide an additional source of identification in equations 4 and 5. The results with the continuous version of the treatment group presented at the bottom panel of Table 3 confirm this. The greater the intensity of sales and the number of products under MFA protection in 1999, the more the decline in firms' sales, value added and employment.

The difference between the magnitudes of the impact on sales and value-added can indicate a possible increase in production fragmentation, since competition may lead firms to move part of the production processes out of the firm. But the difference can also be due to decline in markups. Similarly, the difference between the magnitudes of the impact on value-added and

[18]The differences in magnitudes in the coefficients indicate that the adjustment is both made at the extensive margin as firms fire employees but also at the intensive margin by decreasing the hours of work.

employment can indicate a possible increase in labor productivity. In order to investigate the second order implications of competition imposed downsizing, the impact of competition on production fragmentation and labor productivity is analyzed and the results are presented in Table A-2 in the Appendix. In column (a) of Table A-2, the dependent variable is the logit transformation of value added divided by the gross value of output. The difference in difference coefficient is found to be negative and significant in both panel B and C, confirming that the competition with China decreases the contribution of Danish firms on their sales. In column (b) the dependent variable is empirical markup which is defined as the logit transformation of value added minus labor costs over gross value of output. The coefficient is not found to be significant indicating Danish firms' contribution to their sales decreased independently from possible decline in their markups. Finally in column (c) the dependent variable is the logarithm of the labor productivity, and the results show that competition with Chinese goods increase the labor productivity of Danish firms as they downsize. The coefficient in column (c) of Panel A indicates that labor productivity increases disproportionately after the WTO accession of China, by about 10 %, among firms that produced MFA quota goods in 1999.

6.2 The Impact of Competition on Within Firm Organization

6.2.1 Occupation and Education Characteristics

The analysis shows that intensified competition with China brought on by the MFA quota removal causes firms to decrease their value-added and the level of employment. Within firms does the competition affect everybody's likelihood of loosing his/her job to the same extent?

Thoenig and Verdier (2003) and Thesmar and Thoenig (2000) both show theoretically that increased competition can lead to a change in within firm organization that biasses towards skilled labor. Recently Bloom et al. (2011) find that Chinese competition is associated with an increase in IT intensity and patent counts among a sample of European manufacturers. If the competition causes upgrading, or if firms outsource more and concentrate on certain types of production activities, one expects to see differential impacts of competition across different types of occupations and employees with different education levels. This is investigated next.

Table 4 presents results on occupation characteristics.[19] The dependent variable in column a is the logarithm of 1 plus the number of employees with auxiliary occupations (such as in cleaning services, transportation services, guard services) or base-level occupations (such as machine operators in the production facility).[20] The coefficients are found to be negative and significant in all panels. The dependent variable in column b is the logarithm of 1 plus the number of employees with base-level occupations only. The coefficient is negative and significant with slightly larger magnitudes than the corresponding coefficients in column a, indicating an about 15 % decline in the number of employees who occupy jobs that require basic level skills. In column c the analysis of employees with top and intermediate level occupations (jobs that require professional and technical skills) is presented and the results do not indicate any significant impact of low-wage competition on high-level occupations.

These results may indicate a possible change in the structure of the production within firms. Firms may decrease their production activities on more standard goods while they outsource more and focus on non-production activities such as technical designs, product developments and marketing. This type of structural change should manifest itself in the educational backgrounds of the employees as well.

In Table 5 in column (a) the dependent variable is (1 plus) the logarithm of the number of employees in a firm who have at least some college level education.[21] The coefficients across the panels are found to be positive but not significant indicating no significant impact of competition on the number of employees with college schooling. The impact of competition on the number of employees in a firm who have at most a high school diploma is analyzed

[19]The labour data set (IDA) contains categorization of the position that an employee holds within a firm. The Danish statistics created the Danish version of the ISCO-88, called DISCO-88 in 1996 to replace the previous categorization. So there is a discontinuity between the codes between pre and post 1996 data. Hence the sample starts with 1996 for this analysis. See the appendix for more details.

[20]For higher or more specialized occupation and education levels the number of zeros - companies with no such employees - increases. Because of this, the transformation 1 plus the number of employees across different occupation and education categories is used when taking logarithms. The results are robust to using the count data without any transformation with a non-linear estimator to account for the over dispersion.

[21]The educational backgrounds of the employees are derived from the 8-digit code variable that shows the highest completed education of the person. Since this code is not available for 2007, year 2007 data are not used in the analysis of education characteristics. See the appendix for details on this code and related variables.

in column (b).[22] The respective difference in difference coefficients are found to be negative and significant at the 1 percent level. The magnitude in panel A indicates an about 24 % disproportionate decline after the WTO accession of China in the number of employees with at most high school diploma among firms that manufacture MFA quota goods compared to other firms. The analysis of the number of employees in a firm who have skill education (vocational training) in textile and clothing production is presented in column (c). This includes skill education as textile operator, clothing operator, and knitting operator among others.[23] The results in all panels of Table 5 in column (c) show a significant negative impact of Chinese competition on production workers. The coefficient estimate at the top panel indicates a 16 % disproportionate decline in employees with production floor training among affected firms. Finally in column (d) the analysis for the number of employees in a firm who have textile and clothing related technical design education is presented. This type of education is at the college level so it is a subset of college educated employees. This education includes industrial design, product development and textile and garment technologists. The coefficient estimates show a positive and significant impact of low-wage competition on technical design employees.

These findings indicate that Chinese competition with Danish T&C industry hits the base level occupations such as production workers heavily while the number of employees with professional and technical occupations and college education appears not to be much affected. Thus an asymmetric impact of competition from a low-wage country is found on different types of employees, indicating that the competition cause compositional changes within firms. These results also provide supporting empirical evidence on the theoretical channels proposed in Thesmar and Thoenig (2000) and Thoenig and Verdier (2003).

The disproportionate effect of competition on low skill employees is likely to cause an increase in

[22] In Denmark, a high school diploma requires 12 years of schooling after pre-school education. This category does not include skill education in technical high schools. See footnote 23.

[23] Skill education in Denmark is provided by the technical high schools (after 9 years of mandatory schooling) and involves several years of formalized training including both schooling and apprenticeship. For example being a tailor requires between 3 years and 3 years and 4 months skill education or being an industry operator requires between 2 years and 2 years and 8 months education depending on additional qualifications. Employees are identified with skill education in textile and clothing production based on having completed such an education. See appendix for the complete description of education variables.

skill-intensities within firms. Table A-3 in the appendix present the results with skill-intensity measures. In column (a), the dependent variable is the logarithm of the number of college educated people over the total number of employees in a given firm. Both with the indicator variable showing whether a firm has produced any good protected by Chinese imports under MFA in 1999 and with the variables indicating the share of those goods in the total number of products and sales in 1999, the difference in difference coefficients are found to be positive and significant at the 1 percent level. The magnitude of the coefficient in the top panel indicates a 27 percent or an about 5 percentage point disproportionate increase in the share of college educated employees. The results with the dependent variable being the logarithm of the wage share of college educated employees are presented in column (b), and they are robust.

Caroli and Van Reenen (2001) argue that organizational change should be followed by a declining demand for less skilled labor and that new organizational structures often involve decentralization of authority. Such decentralization should come with an increase in skill-intensity especially among lower-ranked occupations. To see if skill-intensity increase is disproportionate within specific occupation groups, an analysis of the education backgrounds and experience levels within occupation groups is presented in Table A-4 in the appendix. The results show clearly that the average education level as well as the average experience of employees increase significantly within base-level occupations while there are no corresponding changes within high-ranked occupations. The finding that increased average education and experience level is especially relevant within basic skill required jobs can indicate decentralization of authority in accordance with 'lean production' principles. The results here are in line with the hypothesis that increased trade with China induces organizational changes that involve further decentralization.

6.2.2 Wages

The analysis shows that competition with China cause compositional changes within firm at the expense of less skilled employees. There is a growing concern in advanced countries that less skilled workers' relative earning potential has been declining together with their ability to secure jobs.

In Table 6 results are presented for the impact of competition on average wages. The dependent variable in column (a) is the logarithm of average hourly wage among all employees within firms. The results show a positive and significant effect of the low wage country competition on average hourly wages within firms. This is not surprising, since competition imposed lay-offs are documented to be concentrated among relatively less skilled employees. In order to be able to control for worker characteristics in columns (b) through (e) results for the same analysis at the worker level are presented. In column (b) the coefficient indicates an about 5 % disproportionate increase in wages among firms that are the most vulnerable to the competition. In column (c) detailed worker characteristics are included: workers' age, work experience, gender, immigration status, as well as occupation and education dummies[24]. Estimates in column (c) show that the worker characteristics are all important in explaining wages, but the coefficient of interest, although smaller in magnitude, is still positive and significant. In columns (d) and (e) the diff-in-diff coefficient is interacted with occupation and education categories. The results show that wage gain is accrued mostly among the professional occupations and among college educated employees. Table 7 present the results with worker fixed effects to additionally control for unobservable worker characteristics. The results are robust.[25]

To the extent that some firms are both producers and importers of MFA quota goods, the positive effect found on wages of skilled employees or employees holding professional and technical positions may be due to the benefits experienced by those firms on their imports. Hummels et al. (2011), using the same data-sets, but focusing on a sample of bigger Danish manufacturers across all manufacturing industries, find a positive association between firms' own import intensity and wages of college educated employees. If the competition triggers offshoring of base-level jobs, offshoring, as shown in Grossman and Rossi-Hansberg (2008), can drive an increase in the productivity of jobs at home, which in turn may cause an increase in real wages. Organizational changes could also bring increase in wages. Firms' re-organization to be more adaptable to the changing competitive environment by flattening hierarchies may involve in-

[24]The reference group consists of employees with vocational education in unspecified occupations

[25]Results from the analysis using the continuous treatment measure are presented in the supplemental appendix and they are robust.

crease in wages as shown in Caliendo and Rossi-Hansberg (2012).[26] In general, the finding that competition with low wage locations leads to an adjustment at the quantity margin rather than downward adjustment on the wages of low-skilled employees within manufacturing is in line with the general structure of the Danish labor market with low cost of hiring and firing for firms.

6.3 The Impact of Competition on Firms' Assets and Products

6.3.1 The Structure and Intensity of Capital

One of the main arguments of European T&C industrialists over the surge of Chinese imports was the harm from those products to the value of 'high end' product images by providing closely similar products with significantly cheaper price. While this type of harm would not show up in physical assets, it may have an effect on firms' intangible assets.

Table 8 presents the analysis of firms' assets where the dependent variables are the logarithm of tangible assets, intangible assets, investment and capital per labor respectively in columns a through d.[27] While the value of tangible assets are not found to be significantly affected by the competition, competition is found to have negative impact on intangible assets. But the results are only weakly significant at the top panel. Investment is found to be affected negatively by the competition. This could be due to the possible sensitivity of investments to cash flows of firms, which may in turn be a result of imperfect financial markets. When MFA revenue share is used to distinguish the intensity of competition among treated firms, the investment effect is bigger in magnitude and found to be significant at the 1 percent level, confirming the ties between investment and cash flows of firms. Competition with Chinese products in the T&C industry is also found to cause an increase in the capital labor ratio; this is due to the decline

[26]The results are also in line with Thesmar and Thoenig (2000) which shows that organizational change triggered by product market instability can drive an increase in wages of skilled workers along with an increase in the share of skilled workers.

[27]Tangible assets include the value of plants, machinery and other technical installations, lands, buildings, furniture and office equipment. Intangible assets are assets intended for long term ownership or use by the company. It includes licenses, trademarks, copyrights, exclusive distribution rights, software, goodwill, etc. Intangible asset information is collected as part of the accounting statistics (Regnskabsdata).

in labor rather than an increase in the capital assets as suggested by the results in column (a) of Table 8 and in Table 3.

The results in Table 8 do not indicate a strong effect on intangible assets. It is likely that the impact on actual values of licenses and trademarks occurs after Chinese products penetrated the market. So if we limit our attention to the 2002 quota removal experience, a stronger effect may be observed.[28] The results in Table 9, where the competition measure is adjusted for the goods that were subject to 2002 quota abolishment for China, corroborate this proposition. The coefficient estimate in column a of panel A indicates that decline in the value of intangible assets were disproportionately higher by about 46 % on average for those firms that are the most receptive to increased competition by the 2002 quota abolishment. Similarly, in column b, the dependent variable is a measure of firm scale as defined by the logit transformation of the ratio of intangible assets over total assets. The result indicates a strong negative effect of competition from China on firm scale. The results in panel B, when the competition proxy is taken as the share of goods that were subject to 2002 quota removal for China, are also robust. These results could be due to a decrease in the value of trademarks and licenses as cheaper and similar products (and maybe imitations) from China penetrate the markets. It could also be that firms drop products as a result of the competition. Note that penetration of cheaper products in the market may also affect firms' innovative activities. This is investigated next.

6.3.2 Product Droppings and Introducing New Products

The impact of competition on firms' incentive to introduce new products, and to drop products is investigated in Table 10. Dropped products are defined as products that were not produced in future years, and it is not defined if the firm appears in the data set for the last time. Similarly new products are defined as products that were not produced by the firm in previous

[28] It is also possible that differences in intermediate goods' share in 2002 and 2005 quota categories contributes to this result, assuming that brand values and similar intangible assets are more intimately related to final goods. In 1999, only 12 % of the 2002 MFA categories in Danish import can be classified as intermediate goods, while this ratio is 30 % for the 2005 MFA categories in 1999. It is important to note, however, that both of these ratios decrease substantially as the Chinese share in these categories increases during the sample period. Broad product classification of products as intermediate goods is based on BEC Rev. 3. (Author's calculation.)

years. If the firm appears in the data-set for the first time, then this variable is not defined.[29] The sample is 1996-2004 because 2005 is the last year of the domestic transaction data-set so dropped products are not defined in 2005, and new products are not defined in 1995. In consequence this analysis is limited to the 2002 quota removal experience.[30] Since the likelihood of introducing new products, or dropping products is expected to increase as firms' product portfolios get larger, size quintiles, where the size is measured as the number of products, are controlled for in these regressions.

Table 10 presents the results.[31] In column (a) the analysis of dropped products, as defined by CN 8-digit code, is presented and the diff-in-diff coefficient is found to be positive and significant at the 1 percent level in the top panel. When the share of MFAQ2 products is used to distinguish the intensity of competition among treated firms (Panel B), although bigger in magnitude, the coefficient estimate becomes only significant at the 10 percent level. It may be easier for firms to drop their affected products if the quota products constitute a tiny portion of their overall portfolio, since otherwise a more substantial adjustment is needed. The analysis of new product introductions is presented in column (b). The coefficient estimate is positive and significant at the 5 percent level, indicating a positive effect, on average, of competition on the introduction of new products. The threatened group are firms that have MFAQ2 products (phases I-II-III) in their product portfolio in 1999. So one expects that their innovation activities are negatively affected among MFA quota categories due to Schumpeterian forces. However, as argued in Bloom et al. (2011), competition with China can trigger innovative activities of firms towards goods where China's comparative advantages are lower. To address this, new product introductions among non-MFA quota categories are

[29]Note that the possible time trends due to the construction of the variables are controlled for using time fixed effects in the empirical analysis.

[30]The results are robust to conducting the analysis focused on exporters while using the full sample period (1993-2007) and classifying new and dropped exported products and constructing the treatment variable as firms who export MFAQ goods in 1999. They are available upon request.

[31]Because of the zeros arising from no new or dropped products, the transformation $1 + New/DroppedProducts_{it}$ is used when taking logarithms where $New(Dropped)Products_{it}$ is the number of product introductions/droppings by firm i at year t. The addition of unity is arbitrary, but equal to the sample mean of the counts. An alternative approach is to use the count data without any transformation with a non-linear estimator. The results obtained from fixed effect negative binomial models are robust.

investigated in column (c) of Table 10 and the coefficient estimates are significant and larger than in column (b). The coefficient in Panel A of column (c) indicates that the treated firms have 25 % more new product introductions in non-quota categories than the other firms in the quota-free environment. These results are in line with Arrowian theories that propose a positive relationship between competition and innovation.[32],[33] It is also possible that competition with low-wage country products cause Danish T&C firms to diversify towards non-T&C products. The results for the number of new products in non T&C fields presented in column (d) confirm this. The coefficient estimate is positive and significant at the 1 percent level, indicating a more than 38 % disproportionate increase in the number of product introductions outside of T&C industry among treated firms. As a result of the competition Danish firms steer away from goods in which the Chinese comparative advantage (and that of other low-wage countries) is now higher, even towards products outside of T&C.

Since new products are defined for 2005, Table 11 presents the analysis of the new product introductions including both the 2002 and the 2005 quota removals, with the sample being 1996-2005. The results are robust. The analysis shows that Danish manufacturers increase new product introductions in response to the intensified low-wage competition away from affected products.

[32] Arrow (1962) emphasizes the importance of the market size effect in firms' incentive to innovate that for a monopolist, innovation simply replaces one profitable investment with another, and this raises the opportunity cost of innovating, something that Arrow called the replacement effect. See for example, Schmidt (1997), Aghion et al.'s (2005) escape competition, Bloom, et al. (2010), which all share the basic insight of Arrow (1962).

[33] The magnitude differences in the respective coefficients in columns (b) and (c) indicate that competition generally discourages innovative activities within MFA categories now facing the stiff competition, also confirming the Schumpeterian insight. The result for new product introductions within MFA categories shows a negative effect. They are available upon request.

7 Additional Analysis and Robustness Checks

7.1 The Role of Imports

Some firms producing products protected by MFA quotas may use other MFA protected goods as inputs. It is also possible that some treated firms may have adjusted to the general trend of competition by strengthening non-production activities and offshoring labor-intensive parts of their products. In both cases the firms are both importers and producers of MFA quota goods. Removing quotas may have been a mixed blessing for such 'producer-importer' firms, and their existence among treated firms would be expected to mute the negative effect of the heightened low-wage competition. To disentangle the potential import effect on firms that are threatened by Chinese competition, a triple difference-in difference analysis is used.

$$X_{it} = \alpha_0 + \alpha_1 * MFAQProd99_i * Dum02_t + \alpha_2 * MFAQImported99_i * Dum02_t + \alpha_3 * MFAQImported99_i * MFAQProd99_i * Dum02_t + \sum_i \delta_i^F Firm_i + \sum_t \delta_t^Y Year_t + \epsilon_{it} \quad (6)$$

$MFAQImported99_i$ is the indicator variable that shows if a firm imports any MFA quota goods in 1999. In equation 6 the coefficient of interest is α_3 as it measures the variation in the dependent variable specific to MFAQ producers (relative to non-MFAQ producers) among MFAQ importers (relative to non MFAQ importers) in the years after the WTO accession of China.

The difference-in-difference-in-difference results for employment, value-added and occupation and education characteristics of employees are presented in Tables A-5 and A-6. All of the triple difference coefficients are found to be positive and they are significant for the full-time equivalent number of employees, value-added, the number of employees in professional level jobs, college educated employees and employees with technical design education. They indicate that firms that were producing MFA protected goods are less (negatively) affected by the competition if they were also importing MFA protected goods. As the results in Table A-6 reveal, the skill upgrading and compositional changes within producer-importers occur as

expansion in the number of college educated employees, and people in the technical design jobs, rather than by increase in intensity of skilled employees associated with downsizing.

Table A-7 present the triple difference analysis of hourly wages at the worker level. Together with the results presented in Tables 6 and 7, the results imply that both the selection within firms triggered by the competition and the import effect is behind the positive effect on wages. Once the worker fixed effects are included in column (c) of Table A-7 the diff-diff coefficient is found to be almost zero and the triple difference coefficient is found to be positive, although not statistically significant, and close in magnitude to the diff-in-diff coefficient found in column (a) of Table 7. These results show the importance of being able to disentangle import effect from the competition when analyzing import competition.

These results indicate that using industry-level imports as a proxy for import competition, whether the proxy is constructed firm-specific or not, may cause attribution of benefits from import and offshoring to the competition effect when quantifying the impact of competition. This shows the importance of being able to disentangle import effects from the competition when analyzing import competition.

7.2 Robustness Checks

The difference in difference setting using long time series may cause under-estimation of standard errors due to serial correlations in the dependent variables. In order to address this potential problem, the analysis is also conducted with data aggregated into two periods: pre- and post-WTO. This approach, as argued by Bertrand, et al. (2004), works well in taking care of the serial correlation problem. If the results with aggregate data do not support the main results it would be an indication of under-estimated standard errors. Tables from A-8 to A-12 in the appendix present the results with two period data and they are robust. Results with aggregate data indicate 18 % and 21 % disproportionate declines in sales and value-added respectively among MFA goods producers after 2002. Results in Table A-9 indicate that, from 2002 the numbers of employees with at most high school diploma and with base-level occupations decrease by about 16 % and 38 % respectively in the T&C industry in general. But the impacts on MFA goods producers are disproportionately higher by about 34 % and 24 %

respectively.

The first two phases of MFA quota abolishment were in 1995 and 1998. As explained in section 3, only a few existing quotas were actually removed under these two phases, of which none were utilized at a rate above 50 %. Although China was not able to benefit from these phases, it is important to see whether previous MFA quota removal had any significant impact on the treated firms. This is also important in validating the empirical approach. Table A-13 presents year by year changes in employment since 1995 including by occupation and education categories for firms that produced MFA quota protected goods in 1995. These results confirm that a significant impact was not present until 2002.

The significant overlap between the groups of firms affected by the 2002 and the 2005 quota removals together with a lack of shock accompanying the 2005 quota removal as well as a lack of data that can help to separate firm-level outcomes across different products makes the empirical strategy in this paper analyze simultaneously the effects of both quota removals. Results treating both quota removals separately are in line with the main results presented in the paper and are available on request. The results are also robust to employing a two stage least squares method where Chinese competition is proxied with the firm-specific Chinese import measure based on firms' 1999 product portfolio and instrumenting it with the quota dummies. These results are also available on request.

8 Concluding Remarks

I construct a new data-set that provides detailed information on within firm adjustments in employment and product strategies for Danish Textile and Clothing industry. The sample period allows one to exploit the removals of MFA quotas after the WTO accession of China and the resulting intensification of Chinese (or "low wage country") competition.

First, firms with product portfolios containing products that were subject to MFA quotas before the WTO accession of China are identified. Then, using the difference in differences approach, any disproportionate changes are measured in such firms in response to the quota removal experience, after controlling for firm-fixed effects and aggregate shocks.

The results show significant negative impact of Chinese competition on firm value-added, and employment. Competition is also shown to induce substantial compositional changes within firms. Particularly, employees with lower level of education (high school or less) and production floor workers are found to have the highest likelihood of being laid off due to competition, while employees with college education and with professional and technical skill required occupations are not found to be affected by the competition. The results thus show a significant increase in skill intensity of firms. More specifically the proportion of employees with college education increases disproportionately by about 5 percentage point among MFA quota goods producers in response to the competition. When education levels of employees are analyzed within occupation categories, it is found that the base-level occupations experience a disproportionate increase in skill intensity as measured by education levels. These findings may imply a certain flattening of the firms' organizations in accordance with lean production principles. An associated significant increase in average wages is also documented. After controlling for observable and unobservable worker characteristics, the wage gain is found to be accrued among professional and technical occupations as well as among college educated employees. When effects from imported MFA goods on affected firms are disentangled, it is shown that this wage gain is due to firms who are both importers and producers of MFA quota goods.

Increased competition triggered by the 2002 quota removal is found to cause substantial negative effect on firms' intangible assets. Firms directly affected by competition are also found to drop their existing products disproportionately. While firms' incentive to introduce new products significantly increases with the heightened competition, they are found to channel their innovative efforts away from products where China's competitive advantage is now higher.

These results may indicate that competition induced innovation may not compensate for the loss in intangible assets inflicted by competition, and they provide a cautionary note to the literature that emphasizes the positive link between Chinese competition and innovation. The results also provide empirical support for the notion of 'defensive skilled biased innovation'. The results altogether show an important role of the distributional impact of low-wage competition within firms in restructuring the industry.

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9 Tables and Figures

Table 3: Sales and Employment

Sample	Textile and Apparel Manufacturers (1995-2007)			
Panel A				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQProd99_i * Dum02_t$	-0.114*	-0.132*	-0.212***	-0.188***
	(0.055)	(0.057)	(0.054)	(0.053)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7274	7252	7213	7319
Number of Firms	1093	1093	1093	1155
F	3.226	6.642	10.902	11.316
Panel B				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQProdShare99_i * Dum02_t$	-0.143	-0.216*	-0.352***	-0.309***
	(0.083)	(0.087)	(0.092)	(0.089)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7274	7252	7213	7319
Number of Firms	1093	1093	1093	1155
F	3.111	6.691	10.795	11.161
Panel C				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQRevShare99_i * Dum02_t$	-0.156*	-0.212**	-0.274***	-0.233**
	(0.077)	(0.082)	(0.080)	(0.078)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7274	7252	7213	7319
Number of Firms	1093	1093	1093	1155
F	3.255	6.506	10.511	10.882

Robust standard errors are reported in parentheses. They are clustered for firms. The constant is included but not reported. The dependent variable in column a is the natural logarithm of the firm turnover (revenue). The dependent variable in column b is the natural logarithm of the value-added. In column c, the dependent variable is the logarithm of the full-time equivalent number of employees. In column d, the dependent variable is the logarithm of the number of employee head-count. Sales, value-added and FTE information is from Regnskabsdata and head-count information is from IDA, Statistics Denmark.

Table 4: The Impact of Competition on Employment By Major Occupation Groups

Sample	Textile and Apparel Manufacturers (1996-2007)		
	(a)	(b)	(c))
Variable	Auxiliary and Base Level Occupations	Base Level Occupations	Professional and Technical Occupations
$MFAQProd99_i * Dum02_t$	-0.155*	-0.166*	-0.029
	(0.063)	(0.066)	(0.043)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	6624	6624	6624
Number of Firms	1095	1095	1095
F	35.690	35.756	4.652
$MFAQProdShare99_i * Dum02_t$	-0.276**	-0.298**	-0.059
	(0.100)	(0.103)	(0.074)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	6624	6624	6624
Number of Firms	1095	1095	1095
F	36.176	36.154	4.637
$MFAQRevShare99_i * Dum02_t$	-0.196*	-0.214*	-0.053
	(0.088)	(0.094)	(0.073)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	6624	6624	6624
Number of Firms	1095	1095	1095
F	36.214	36.062	4.636

Robust standard errors are reported in parentheses. They are clustered for firms. The constant is included but not reported. The dependent variable in column (a) is the logarithm of the number of employees that are classified as doing basic skill required jobs (e.g. stationary machinery operators) or no specific skill required jobs employees (e.g. cleaning people, guards) plus 1. The dependent variable in column (b) is the logarithm of the number of employees that are classified as doing basic skill required jobs plus 1. The dependent variable in column (c) is the logarithm of the number of employees that are classified as top-level employees (e.g. engineers) and intermediate-level employees, (e.g. laboratory technician, computer programmer) plus 1. Since the occupation classifications have changed in 1996, there is a structural break in occupation variables between 1995 and 1996. So the 1995 data are not used in this analysis. The source of the data is persondata (IDA), Statistics Denmark.

Table 5: The Impact of Competition on Employment By Education

Sample	Textile and Apparel Manufacturers (1995-2006)			
	(a)	(b)	(c)	(d)
Variable	Employees with at least College Education	Employees with at most High School Education	Employees with T&C Production Education	Employees with T&C Technical Design Education
$MFAQProd99_i * Dum02_t$	0.059	-0.275***	-0.169***	0.098**
	(0.040)	(0.048)	(0.038)	(0.032)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	6893	6893	6893	6893
Number of Firms	1121	1121	1121	1121
F	2.322	18.457	4.007	3.207
$MFAQProdShare99_i * Dum02_t$	0.103	-0.398***	-0.234***	0.114*
	(0.069)	(0.088)	(0.065)	(0.047)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	6893	6893	6893	6893
Number of Firms	1121	1121	1121	1121
F	2.320	17.102	3.791	3.177
$MFAQRevShare99_i * Dum02_t$	0.096	-0.294***	-0.167**	0.088*
	(0.065)	(0.073)	(0.060)	(0.044)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	6893	6893	6893	6893
Number of Firms	1121	1121	1121	1121
F	2.328	16.992	3.504	3.171

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column a is logarithm of the number of employees with at least some college level education plus 1. The dependent variable in column b is the logarithm of the number of employees with at most high school diploma plus 1. The dependent variable in column c is the logarithm of the number of employees with textile and clothing production training such as textile machine operator plus 1. The dependent variable in column d is the logarithm of the number of employees with textile and clothing related technical design education plus 1. The data sample is between 1995 and 2006. 2007 is not used because 8 digit education variable where the education characteristics variables derived from is not available that year. The source of the data is persondata (IDA), Statistics Denmark.

Table 6: The Impact of Competition on Wages: Firm and Worker Level with Firm fixed effects

Sample	Textile and Apparel Manufacturers (1996-2006)				
	Log of Avg. Hourly Wage	Log of Hourly Wage			
	(a)	(b)	(c)	(d)	(e)
$MFAQProd99_i * Dum02_t$	0.046***	0.052***	0.037***		
	(0.012)	(0.012)	(0.010)		
Gender Dummy			0.192***	0.192***	0.192***
			(0.007)	(0.007)	(0.007)
Immigrant Dummy			0.009***	0.009***	0.009***
			(0.003)	(0.003)	(0.003)
Log Age			0.103***	0.103***	0.103***
			(0.011)	(0.011)	(0.011)
Work Experience			0.008***	0.008***	0.008***
			(0.001)	(0.001)	(0.001)
College and Above Dummy			0.094***	0.094***	0.088***
			(0.008)	(0.008)	(0.008)
Below High School Dummy			-0.035***	-0.035***	-0.032***
			(0.008)	(0.008)	(0.008)
Auxiliary Occupations			-0.135***	-0.131***	-0.135***
			(0.012)	(0.013)	(0.012)
Base Level Occupations			-0.058***	-0.053***	-0.059***
			(0.008)	(0.009)	(0.009)
Professional Occupations			0.136***	0.134***	0.135***
			(0.009)	(0.010)	(0.009)
Executives			0.398***	0.403***	0.398***
			(0.019)	(0.020)	(0.019)
$MFAQProd99_i * Dum02_t *$ Unspecified Occup				0.049*	
				(0.021)	
$MFAQProd99_i * Dum02_t *$ Auxiliary Occup				0.036*	
				(0.014)	
$MFAQProd99_i * Dum02_t *$ Base level Occup				0.025**	
				(0.009)	
$MFAQProd99_i * Dum02_t *$ Professional Occup				0.058***	
				(0.015)	
$MFAQProd99_i * Dum02_t *$ Executives				0.030	
				(0.029)	
$MFAQProd99_i * Dum02_t *$ Below High School					0.013
					(0.009)
$MFAQProd99_i * Dum02_t *$ Vocational					0.043***
					(0.011)
$MFAQProd99_i * Dum02_t *$ College and Above					0.069***
					(0.017)
Year Fixed Effects	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes
N	5998	102561	100926	100926	100926
Number of firms	1041	1034	1033	1033	1033
F	9.89	33.137	162.460	150.506	148.194

Robust standard errors are reported in parentheses. They are clustered for firms. The analysis only covers full-time employees. The dependent variable in column a is the logarithm of average hourly wages within firms. The dependent variable in column b through e is the logarithm of hourly wages. Professional occupations are top and intermediate level occupations. The gender dummy takes 1 for males and zero otherwise. The immigrant dummy takes 1 for immigrants and zero otherwise. The source of the data is persondata (IDA), Statistics Denmark.

Table 7: The Impact of Competition on Wages: Worker Level with Worker Fixed Effects

Sample	Textile and Apparel Manufacturers (1996-2006)		
Dependent Variable	Log of Hourly Wage (a)	Log of Hourly Wage (b)	Log of Hourly Wage (c)
$MFAQProd99_i * Dum02_t$	0.027**		
	(0.009)		
$MFAQProd99_i$	-0.022**	-0.022**	-0.021**
	(0.007)	(0.007)	(0.007)
$MFAQProd99_i * Dum02_t *$ Unspecified Occup		0.019	
		(0.011)	
$MFAQProd99_i * Dum02_t *$ Auxiliary Occup		0.024*	
		(0.010)	
$MFAQProd99_i * Dum02_t *$ Base Level Occup		0.018*	
		(0.008)	
$MFAQProd99_i * Dum02_t *$ Professional Occup		0.071***	
		(0.012)	
$MFAQProd99_i * Dum02_t *$ Executives		-0.000	
		(0.018)	
$MFAQProd99_i * Dum02_t *$ Below High School			-0.005
			(0.008)
$MFAQProd99_i * Dum02_t *$ High School and Vocational			0.037***
			(0.009)
$MFAQProd99_i * Dum02_t *$ College and Above			0.074***
			(0.012)
Year Fixed Effects	yes	yes	yes
Worker Fixed Effects	yes	yes	yes
N	102561	102561	102561
Number of Firms	1034	1034	1034
F	26.928	24.376	24.207

Robust standard errors are reported in parentheses. They are clustered for firms. The analysis only covers full-time employees. The dependent variable in column a is the logarithm of average hourly wages within firms. The dependent variable in column b through e is the logarithm of hourly wages. Professional occupations are top and intermediate level occupations. The source of the data is persondata (IDA), Statistics Denmark.

Table 8: Firms' Assets

Panel A				
Sample	Textile and Apparel Manufacturers (1995-2007)			
	(a)	(b)	(c)	(d)
Variable	Log Capital	Log Intangible Assets	Log Investment	Log Capital Per Labor
$MFAQProd99_i * Dum02_t$	0.023	-0.307*	-0.205*	0.225**
	(0.088)	(0.130)	(0.093)	(0.084)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7115	5845	6598	7054
Number of Firms	1083	1052	1071	1083
F	14.843	81.865	31.933	16.035
Panel B				
	(a)	(b)	(c)	(d)
Variable	Log Capital	Log Intangible Assets	Log Investment	Log Capital Per Labor
$MFAQProdShare99_i * Dum02_t$	0.020	-0.221	-0.345*	0.361**
	(0.130)	(0.207)	(0.147)	(0.137)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7115	5845	6598	7054
Number of Firms	1083	1052	1071	1083
F	14.842	83.783	31.924	15.977
Panel C				
	(a)	(b)	(c)	(d)
Variable	Log Capital	Log Intangible Assets	Log Investment	Log Capital Per Labor
$MFAQRevShare99_i * Dum02_t$	-0.046	-0.341	-0.399***	0.217
	(0.115)	(0.188)	(0.119)	(0.119)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7115	5845	6598	7054
F	14.845	83.783	32.604	15.871

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column a is the logarithm of the physical capital assets. The dependent variable in column b is the logarithm of the intangible assets. The dependent variable in column c is the logarithm of the total investment in physical assets. The dependent variable in column d is the logarithm of the physical capital per full-time equivalent labor. Data source: Regnskabsdata, Statistics Denmark.

Table 9: Intangible Assets and Firm Scale

Panel A		
Sample	Textile and Apparel Manufacturers (1995-2007)	
	(a)	(b)
Variable	Log Intangible Assets	Firm Scale
$MFAQ2Prod99_i * Dum02_t$	-0.621***	-0.624***
	(0.168)	(0.160)
Year Fixed Effects	yes	yes
Firm Fixed Effects	yes	yes
N	5845	5845
Number of Firms	1052	1052
F	81.756	102.564
Panel B		
	(a)	(b)
Variable	Log Intangible Assets	Firm Scale
$MFAQ2RevShare99_i * Dum02_t$	-1.175***	-1.188***
	(0.347)	(0.336)
Year Fixed Effects	yes	yes
Firm Fixed Effects	yes	yes
N	5845	5845
Number of Firms	1052	1052
F	83.724	105.453

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column (a) is the natural logarithm of the value of intangible assets. The dependent variable in column (b) is the logit transformation of the ratio of intangible assets over total assets. Data source: Regnskabsdata, Statistics Denmark.

Table 10: New Product Introductions and Droppings

Panel A Sample	Textile and Apparel Manufacturers 1996-2004			
	(a)	(b)	(c)	(d)
Variables	Log Number of Dropped Products	Log Number of New Products	Log Number of New Non-MFA Products	Log Number of New Non T&C Products
$MFAQ2Prod99_i * Dum02_t$	0.483***	0.179**	0.222**	0.321***
	(0.079)	(0.069)	(0.067)	(0.066)
Size (# of products) Quintile II	0.501***	0.546***	0.459***	0.217***
	(0.041)	(0.035)	(0.036)	(0.035)
Size (# of products) Quintile III	1.002***	1.092***	0.999***	0.517***
	(0.044)	(0.044)	(0.047)	(0.044)
Size (# of products) Quintile IV	1.642***	1.879***	1.741***	1.059***
	(0.058)	(0.054)	(0.058)	(0.063)
Size (# of products) Quintile V	2.475***	2.816***	2.678***	1.874***
	(0.072)	(0.070)	(0.073)	(0.083)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	3101	3220	3220	3220
Number of Firms	676	715	715	715
F	144.090	192.030	161.697	70.223
Panel B				
	(a)	(b)	(c)	(d)
$MFAQ2ProdShare99_i * Dum02_t$	0.637*	0.448**	0.501**	0.477*
	(0.252)	(0.168)	(0.170)	(0.191)
Size (# of products) Quintile II	0.497***	0.541***	0.454***	0.213***
	(0.042)	(0.035)	(0.035)	(0.035)
Size (# of products) Quintile III	0.981***	1.083***	0.989***	0.503***
	(0.046)	(0.043)	(0.046)	(0.043)
Size (# of products) Quintile IV	1.593***	1.861***	1.719***	1.026***
	(0.059)	(0.053)	(0.056)	(0.061)
Size (# of products) Quintile V	2.450***	2.802***	2.662***	1.856***
	(0.073)	(0.069)	(0.072)	(0.082)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	3118	3238	3238	3238
Number of Firms	682	722	722	722
F	145.875	197.860	167.424	72.147

Robust standard errors are reported in parentheses. They are clustered for firms. The product definitions are at the 8-digit CN. A dropped product is defined as a product that a firm stopped selling that current year, not observed to sold by the firm in subsequent years. For firms that appear the last time in the data-set, dropped product indicator takes missing value. A new product is defined as a product that a firm started to sell/export that current year, which is not observed to be produced by the firm in previous years. If the firm appears in the data the first time, then this variable is not defined. Since new products are not defined in 1995 and dropped products are not defined in 1995, the sample period is taken as 1996-2004. Data source: Domestic and Foreign Trade Data Sets, Statistics Denmark.

Table 11: New Product Introductions

Sample	Textile and Apparel Manufacturers 1996-2005		
Variables	Log Number of New Products	Log Number of New Non-MFA Products	Log Number of New Non T&C Products
$MFAQProd99_i * Dum02_t$	0.114*	0.160**	0.218***
	(0.052)	(0.052)	(0.053)
Size (# of products) Quintile II	0.524***	0.443***	0.220***
	(0.034)	(0.035)	(0.034)
Size (# of products) Quintile III	1.075***	0.984***	0.511***
	(0.043)	(0.046)	(0.043)
Size (# of products) Quintile IV	1.826***	1.686***	1.019***
	(0.051)	(0.055)	(0.061)
Size (# of products) Quintile V	2.772***	2.630***	1.815***
	(0.067)	(0.068)	(0.078)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	3490	3490	3490
Number of Firms	735	735	735
F	190.167	162.087	69.931
Panel B			
	(a)	(b)	(c)
$MFAQProdShare99_i * Dum02_t$	0.141	0.214**	0.198*
	(0.076)	(0.076)	(0.086)
Size (# of products) Quintile II	0.519***	0.437***	0.213***
	(0.034)	(0.035)	(0.034)
Size (# of products) Quintile III	1.066***	0.974***	0.495***
	(0.043)	(0.045)	(0.042)
Size (# of products) Quintile IV	1.814***	1.671***	0.997***
	(0.051)	(0.055)	(0.059)
Size (# of products) Quintile V	2.767***	2.623***	1.811***
	(0.067)	(0.068)	(0.078)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	3509	3509	3509
Number of Firms	742	742	742
F	191.109	165.548	71.450

Robust standard errors are reported in parentheses. They are clustered for firms. The product definitions are at the 8-digit CN. Data source: Domestic and Foreign Trade Data Sets, Statistics Denmark. A new product is defined as a product that a firm started to sell/export that current year, which is not observed to be produced by the firm in previous years. If the firm appears in the data the first time, then this variable is not defined.

APPENDIX

A Additional Analysis

Table A-1: Trade Data (1995-2007): All T&C Exports

Sample	Textile and Apparel Products	
	(a)	(b)
Variables	Log Price	Log Value
$Dum02 * MFAQ2_j$	-0.135**	-0.171
	(0.045)	(0.108)
$Dum05 * MFAQ5_j$	-0.052	-0.340***
	(0.043)	(0.093)
Year By Industry Fixed Effect	yes	yes
Product (CN8) Fixed Effect	yes	yes
Number of Observation	14387	14387
Number of (CN8) Products	1583	1583
F	3.606	7.865

Robust standard errors are reported in parentheses. They are clustered for each CN-8 digit product categories. A constant is included but not reported. Transaction level export data set is between 1995-2007 and it is aggregated into CN-8 product categories for each year. Source: Statistics Denmark.

Table A-2: Production Fragmentation and Productivity

Sample	Textile and Apparel Manufacturers 1995-2007		
	Fragmentation Measure	Empirical Markup	Log Labor Productivity
	(a)	(b)	(c)
$MFAQProd99_i * Dum02_t$	-0.019	-0.019	0.097**
	(0.060)	(0.045)	(0.036)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
F	19.471	17.977	15.739
N	7247	7078	7212
Number of Firms	1093	1087	1093
Panel B			
	(a)	(b)	(c)
$MFAQProdShare99_i * Dum02_t$	-0.195**	-0.103	0.194**
	(0.064)	(0.081)	(0.061)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
F	20.783	17.991	16.099
N	7247	7078	7212
Number of Firms	1093	1087	1093
Panel C			
	(a)	(b)	(c)
$MFAQRevShare99_i * Dum02_t$	-0.163**	-0.092	0.122*
	(0.055)	(0.068)	(0.049)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
F	20.526	17.958	15.920
N	7247	7078	7212
Number of Firms	1093	1087	1093

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column a is the logit transformation of value added divided by the gross value of output. The dependent variable in column b is the logit transformation of value added minus labor costs over gross value of output. The dependent variable in column c is the logarithm of the sales over the full-time unit of employment. Source: Statistics Denmark.

Table A-3: Skill Intensity

Sample	Textile and Apparel Manufacturers (1995-2006)	
	(a)	(b)
Variable	Log College Educated Share	Log College Educated Wage Share
$MFAQProd99_i * Dum02_t$	0.239***	0.169*
	(0.060)	(0.068)
Year Fixed Effects	yes	yes
Firm Fixed Effects	yes	yes
N	3366	3270
Number of Firms	684	677
F	14.921	12.918
$MFAQProdShare99_i * Dum02_t$	0.515***	0.431***
	(0.116)	(0.120)
Year Fixed Effects	yes	yes
Firm Fixed Effects	yes	yes
N	3366	3270
Number of Firms	684	677
F	15.638	13.393
$MFAQRevShare99_i * Dum02_t$	0.389***	0.337***
	(0.093)	(0.095)
Year Fixed Effects	yes	yes
Firm Fixed Effects	yes	yes
N	3366	3270
Number of Firms	684	677
F	15.890	13.559

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column a is logarithm of the share of employees with at least some college level education. The dependent variable in column b is logarithm of the share of the total wages to the college educated over total wages. The data sample is between 1995 and 2006. 2007 is not used because 8 digit education variable where the education characteristics variables are derived from is not available that year. The source of the data is persondata (IDA), Statistics Denmark.

Table A-4: The Impact of Competition on the Within Occupation Composition

Sample	Textile and Apparel Manufacturers (1996-2006)			
	(a)	(b)	(c)	(d)
Variable	Log College Rate Among Base Level Jobs	Log Average Experience Among Base Level Jobs	Log College Rate Among Professional Level Jobs	Log Average Experience Among Professional Level Jobs
$MFAQProd99_i * Dum02_t$	0.278**	0.182***	0.039	-0.102*
	(0.088)	(0.041)	(0.058)	(0.044)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	1539	5236	1992	3565
Number of Firms	373	992	459	750
F	8.435	28.667	1.786	15.949
$MFAQProdShare99_i * Dum02_t$	0.514**	0.274***	0.041	-0.140
	(0.169)	(0.059)	(0.127)	(0.111)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	1539	5236	1992	3565
Number of Firms	373	992	459	750
F	8.894	27.304	1.908	16.240
$MFAQRevShare99_i * Dum02_t$	0.308*	0.224***	0.052	-0.077
	(0.139)	(0.046)	(0.101)	(0.079)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	1539	5236	1992	3565
Number of Firms	373	992	459	750
F	9.005	28.691	1.857	15.726

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column a is the logarithm of the share of college level employees among base level occupations. The dependent variable in column b is the logarithm of the average work experience of employees who have basic level occupations. The dependent variable in column c is the logarithm of the share of college level employees who have professional and technical skill required occupations. The dependent variable in column d is the logarithm of the average work experience of employees who have professional and technical skill required occupations. Data source: IDA, Statistics Denmark.

Table A-5: Import Channel I

Variable	(a) Log FTE	(b) Log Value Added	(c) Log Base Level Occupations	(d) Log Professional Occupations
$MFAQProd99_i * Dum02_t$	-0.313**	-0.204*	-0.241	-0.197**
	(0.102)	(0.104)	(0.126)	(0.062)
$MFAQImported99_i * Dum02_t$	-0.268**	-0.273**	-0.044	-0.010
	(0.094)	(0.101)	(0.113)	(0.052)
$MFAQImported99_i * MFAQProd99_i * Dum02_t$	0.350*	0.319*	0.132	0.223*
	(0.142)	(0.149)	(0.178)	(0.092)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7213	7252	6624	6624
Number of Firms	1093	1093	1095	1095
F	10.179	6.274	30.997	4.933

Robust standard errors are reported in parentheses. They are clustered for firms. In column a, the dependent variable is the logarithm of the full-time equivalent number of employees. In column b, the dependent variable is the logarithm of the value added. In column (c) the dependent variable is the logarithm of the number of occupied jobs that are at the basic skill level plus 1. In column d, the dependent variable is the logarithm of the number of occupied jobs that are intermediate level or above plus 1. Data Source: Statistics Denmark.

Table A-6: Import Channel II

Variable	(a) No of Employees with at least College Ed.	(b) No of Employees with at most High School Ed.	(c) No of Employees with T&C Production Ed.	(d) No of Employees with T&C Tech. Design Ed.
$MFAQProd99_i * Dum02_t$	-0.103	-0.243**	-0.180**	-0.016
	(0.072)	(0.094)	(0.069)	(0.028)
$MFAQImported99_i * Dum02_t$	-0.004	-0.170*	-0.079	-0.031
	(0.060)	(0.069)	(0.050)	(0.040)
$MFAQImported99_i * MFAQProd99_i * Dum02_t$	0.210*	0.100	0.079	0.172**
	(0.102)	(0.122)	(0.093)	(0.062)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	6893	6893	6893	6893
Number of Firms	1121	1121	1121	1121
F	2.365	16.838	3.646	3.015

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column (a) is the logarithm of the number of employees with at least some college schooling plus 1. The dependent variable in column (b) is the logarithm of the number of employees with at most high school diploma plus 1. The dependent variable in column (c) is logarithm of the number of employees with T&C production training plus 1. The dependent variable in column (d) is the logarithm of the number of employees with textile and clothing related technical design education plus 1. Data Source: Statistics Denmark.

Table A-7: Import Channel III

Variable	(a) Log of Hourly Wages	(b) Log of Hourly Wages	(c) Log of Hourly Wages
$MFAQProd99_i * Dum02_t$	0.003	0.007	0.003
	(0.016)	(0.013)	(0.012)
$MFAQImported99_i * Dum02_t$	-0.006	0.003	0.003
	(0.012)	(0.012)	(0.011)
$MFAQImported99_i * MFAQProd99_i * Dum02_t$	0.059**	0.035*	0.026
	(0.021)	(0.017)	(0.015)
$MFAQProd99_i$			-0.019*
			(0.008)
$MFAQImported99_i$			-0.003
			(0.007)
Worker Level Controls	yes	yes	no
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	no
Worker Fixed Effects	no	no	yes
N	102561	100926	102561
Number of Firms	1034	1033	1034
F	28.835	117.638	23.786

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable is the logarithm of hourly wages. Worker controls are gender, immigration status, no high school diploma, and college education dummies as well as the logarithm of person's age, and the work experience. The sample period is 1996-2006. Source: Statistics Denmark.

Table A-8: Pre-Post Analysis with Aggregate Data I

Panel A Sample				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQProd99_i * Dum02_t$	-0.181**	-0.210**	-0.274***	-0.261***
	(0.066)	(0.065)	(0.065)	(0.060)
$Dum02_t$	0.032	-0.067	-0.073	-0.137***
	(0.037)	(0.036)	(0.039)	(0.030)
Firm Fixed Effects	yes	yes	yes	yes
N	1605	1603	1603	1667
Number of Firms	1093	1093	1093	1155
F	4.014	14.876	23.746	40.464
Panel B				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQProdShare99_i * Dum02_t$	-0.200*	-0.295***	-0.403***	-0.405***
	(0.088)	(0.088)	(0.102)	(0.091)
$Dum02_t$	0.007	-0.088*	-0.098**	-0.157***
	(0.035)	(0.035)	(0.036)	(0.029)
Firm Fixed Effects	yes	yes	yes	yes
N	1605	1603	1603	1667
Number of Firms	1093	1093	1093	1155
F	3.318	18.484	23.288	44.208
Panel C				
	(a)	(b)	(c)	(d)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor
$MFAQRevShare99_i * Dum02_t$	-0.223*	-0.295**	-0.293***	-0.295***
	(0.100)	(0.096)	(0.082)	(0.077)
$Dum02_t$	0.010	-0.088**	-0.112**	-0.172***
	(0.034)	(0.033)	(0.036)	(0.029)
Firm Fixed Effects	yes	yes	yes	yes
N	1605	1603	1603	1667
Number of Firms	1093	1093	1093	1155
F	2.733	14.363	24.015	44.389

Robust standard errors are reported in parentheses. The dependent variable in column a is the natural logarithm of the firm turnover (revenue). The dependent variable in column b is the natural logarithm of the value-added. The dependent variable in column c is the natural logarithm of the profit. In column d, the dependent variable is the logarithm of the full-time equivalent number of employees. In column e, the dependent variable is the logarithm of the number of employee head-count. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods. Data Source: Statistics Denmark.

Table A-9: Pre-Post Analysis with Aggregate Data II

Panel A Sample	(a) Employees with	(b) Employees with	(c) Employees with	(d) Employees with
Variable	at most High School Ed.	T&C Production Education	Base-level Occupations	Professional-level Occupations
$MFAQProd99_i * Dum02_t$	-0.343***	-0.202***	-0.240***	-0.122*
	(0.057)	(0.041)	(0.065)	(0.048)
$Dum02_t$	-0.162***	-0.022	-0.381***	-0.054**
	(0.026)	(0.015)	(0.030)	(0.019)
Firm Fixed Effects	yes	yes	yes	yes
N	1631	1631	1605	1605
Number of Firms	1121	1121	1095	1095
F	68.887	18.714	136.907	11.837
Panel B Sample	(a) Employees with	(b) Employees with	(c) Employees with	(d) Employees with
Variable	at most High School Ed.	T&C Production Education	Base-level Occupations	Professional-level Occupations
$MFAQProdShare99_i * Dum02_t$	-0.491***	-0.306***	-0.407***	-0.151
	(0.093)	(0.075)	(0.098)	(0.080)
$Dum02_t$	-0.193***	-0.038*	-0.395***	-0.068***
	(0.026)	(0.015)	(0.030)	(0.019)
Firm Fixed Effects	yes	yes	yes	yes
N	1631	1631	1605	1605
Number of Firms	1121	1121	1095	1095
F	68.617	15.917	142.355	11.453
Panel B Sample	(a) Employees with	(b) Employees with	(c) Employees with	(d) Employees with
Variable	at most High School Ed.	T&C Production Education	Base-level Occupations	Professional-level Occupations
$MFAQRevShare99_i * Dum02_t$	-0.352***	-0.245***	-0.285***	-0.117
	(0.078)	(0.070)	(0.083)	(0.079)
$Dum02_t$	-0.212***	-0.046**	-0.412***	-0.073***
	(0.026)	(0.015)	(0.030)	(0.019)
Firm Fixed Effects	yes	yes	yes	yes
N	1631	1631	1605	1605
Number of Firms	1121	1121	1095	1095
F	69.199	14.479	146.411	11.211

Robust standard errors are reported in parentheses. They are clustered for firms. The dependent variable in column (a) is the logarithm of the number of employees with at most high school diploma plus 1. The dependent variable in column (b) is logarithm of the number of employees with T&C production training plus 1. The dependent variable in column (c) is the logarithm of the number of employees that are classified as doing basic skill required jobs plus 1. The dependent variable in column (d) is the logarithm of the number of employees that are classified as doing professional and technical skill required jobs and executives plus 1. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods (subject to their availability). Data Source: Statistics Denmark.

Table A-10: Pre-Post Analysis with Aggregate Data III

Panel A Sample	(a)	(b)	(c)
Variable	Log College Rate	Log Average Work Experience	Log Hourly Wage
$MFAQProd99_i * Dum02_t$	0.167	0.047*	0.053***
	(0.089)	(0.022)	(0.014)
$Dum02_t$	0.287***	0.257***	0.019*
	(0.060)	(0.015)	(0.010)
Firm Fixed Effects	yes	yes	yes
N	946	1659	1634
Number of Firms	684	1149	1135
F	34.985	336.212	27.032
Panel B			
	(a)	(b)	(c)
Variable	Log College Rate	Log Average Work Experience	Log Hourly Wage
$MFAQProdShare99_i * Dum02_t$	0.461**	0.107**	0.076**
	(0.176)	(0.036)	(0.023)
$Dum02_t$	0.272***	0.256***	0.024**
	(0.054)	(0.014)	(0.009)
Firm Fixed Effects	yes	yes	yes
N	946	1659	1634
Number of Firms	684	1149	1135
F	35.693	327.832	21.396
Panel C			
	(a)	(b)	(c)
Variable	Log College Rate	Log Average Work Experience	Log Hourly Wage
$MFAQRevShare99_i * Dum02_t$	0.336*	0.098**	0.058**
	(0.150)	(0.030)	(0.019)
$Dum02_t$	0.298***	0.257***	0.026**
	(0.051)	(0.013)	(0.009)
Firm Fixed Effects	yes	yes	yes
N	946	1659	1634
Number of Firms	684	1149	1135
F	34.870	330.824	21.590

Robust standard errors are reported in parentheses. The dependent variable in column a is the logarithm of the share of employees with at least some college level education over total number of employees in a given firm. The dependent variable in column b is the logarithm of the average work experience of employees in a given firm. The dependent variable in column c is the logarithm of the average hourly salary. It does not include the benefits. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods (subject to their availability). Data Source: Statistics Denmark.

Table A-11: Pre-Post Analysis with Aggregate Data IV

Panel A			
	(a)	(b)	(c)
Variable	Log Tangible Assets	Log Intangible Assets	Log Investment
$MFAQProd99_i * Dum02_t$	-0.127	-0.492**	-0.292*
	(0.108)	(0.153)	(0.116)
$Dum02_t$	0.043	-0.376***	0.096
	(0.057)	(0.076)	(0.071)
Firm Fixed Effects	yes	yes	yes
N	1589	1514	1574
Number of Firms	1083	1052	1071
F	0.711	33.685	3.183
Panel B			
	(a)	(b)	(c)
Variable	Log Tangible Assets	Log Intangible Assets	Log Investment
$MFAQProdShare99_i * Dum02_t$	-0.251	-0.527*	-0.453*
	(0.171)	(0.267)	(0.189)
$Dum02_t$	0.040	-0.443***	0.073
	(0.054)	(0.073)	(0.066)
Firm Fixed Effects	yes	yes	yes
N	1589	1514	1574
Number of Firms	1083	1052	1071
F	1.083	30.622	2.885
Panel C			
	(a)	(b)	(c)
Variable	Log Tangible Assets	Log Intangible Assets	Log Investment
$MFAQRevShare99_i * Dum02_t$	-0.232	-0.606*	-0.438**
	(0.142)	(0.236)	(0.139)
$Dum02_t$	0.038	-0.431***	0.071
	(0.054)	(0.071)	(0.065)
Firm Fixed Effects	yes	yes	yes
N	1589	1514	1574
Number of Firms	1083	1052	1071
F	1.333	31.965	5.219

Robust standard errors are reported in parentheses. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods (subject to their availability). Data Source: Statistics Denmark.

Table A-12: Pre-Post Analysis with Aggregate Data V

Panel A Sample Variable	(a) Log Number of New Products	(b) Log Number of New Non-MFA Products	(c) Log Number of New Non T&C Products	(d) Log Number of Dropped Products
$MFAQ2Prod99_i * Dum02_t$	0.183*	0.250***	0.416***	0.513***
	(0.075)	(0.074)	(0.073)	(0.082)
$Dum02_t$	0.042	0.071	0.145***	0.249***
	(0.040)	(0.040)	(0.040)	(0.040)
Size (# of products) Quintile II	0.381***	0.385***	0.287***	0.452***
	(0.083)	(0.076)	(0.072)	(0.088)
Size (# of products) Quintile III	0.961***	0.911***	0.590***	0.899***
	(0.096)	(0.094)	(0.091)	(0.129)
Size (# of products) Quintile IV	1.614***	1.530***	1.009***	1.460***
	(0.125)	(0.125)	(0.115)	(0.133)
Size (# of products) Quintile V	2.261***	2.183***	1.776***	2.277***
	(0.139)	(0.137)	(0.152)	(0.158)
Firm Fixed Effects	yes	yes	yes	yes
N	1038	1038	1038	997
Number of Firms	715	715	715	676
F	68.123	69.657	59.161	89.996

Panel B Variable	(a) Log Number of New Products	(b) Log Number of New Non-MFA Products	(c) Log Number of New Non T&C Products	(d) Log Number of Dropped Products
$MFAQProd99_i * Dum02_t$	0.184**	0.252***	0.375***	0.363***
	(0.067)	(0.067)	(0.066)	(0.069)
$Dum02_t$	0.000	0.013	0.073	0.215***
	(0.049)	(0.048)	(0.046)	(0.044)
Size (# of products) Quintile II	0.374***	0.375***	0.267***	0.427***
	(0.084)	(0.076)	(0.071)	(0.096)
Size (# of products) Quintile III	0.982***	0.940***	0.623***	0.917***
	(0.097)	(0.093)	(0.089)	(0.137)
Size (# of products) Quintile IV	1.608***	1.522***	0.982***	1.415***
	(0.122)	(0.119)	(0.110)	(0.142)
Size (# of products) Quintile V	2.226***	2.135***	1.690***	2.177***
	(0.136)	(0.133)	(0.138)	(0.163)
Firm Fixed Effects	yes	yes	yes	yes
N	1038	1038	1038	997
Number of Firms	715	715	715	676
F	71.263	74.147	63.909	88.872

Robust standard errors are reported in parentheses. A new product is defined as a product that a firm started to sell/export that current year, which is not observed to be produced by the firm in previous years. A dropped product is defined as a product that a firm stopped selling that current year, not observed to sold by the firm in subsequent years. The logarithm transformation is applied after taking the mean values of original variables across 1996-2001 and 2002-2004 periods. Data set Data Source: Statistics Denmark.

Table A-13: The Impact of Competition on Employment (Year By Year Changes)

Sample	Textile and Apparel Manufacturer Firms		
	(a)	(b)	(c)
Variable	Log No of Employees	Log No of Base Level Jobs	Log No of Employees with at most High School Diploma
$MFAQProd95_i * 1996$	-0.059	–	-0.076
	(0.043)		(0.044)
$MFAQProd95_i * 1997$	-0.017	-0.000	-0.051
	(0.052)	(0.041)	(0.055)
$MFAQProd95_i * 1998$	-0.054	-0.062	-0.071
	(0.056)	(0.051)	(0.056)
$MFAQProd95_i * 1999$	-0.101	-0.074	-0.120
	(0.071)	(0.064)	(0.067)
$MFAQProd95_i * 2000$	-0.060	-0.024	-0.134
	(0.071)	(0.067)	(0.069)
$MFAQProd95_i * 2001$	-0.097	-0.075	-0.143*
	(0.071)	(0.076)	(0.072)
$MFAQProd95_i * 2002$	-0.204**	-0.165*	-0.256**
	(0.079)	(0.081)	(0.078)
$MFAQProd95_i * 2003$	-0.210*	-0.079	-0.288***
	(0.088)	(0.098)	(0.082)
$MFAQProd95_i * 2004$	-0.314***	-0.165	-0.421***
	(0.094)	(0.102)	(0.088)
$MFAQProd95_i * 2005$	-0.289**	-0.204	-0.430***
	(0.094)	(0.108)	(0.089)
$MFAQProd95_i * 2006$	-0.292**	-0.237*	-0.418***
	(0.105)	(0.117)	(0.097)
$MFAQProd95_i * 2007$	-0.328**	-0.292*	–
	(0.108)	(0.129)	
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
N	7319	6624	6893
Number of Firms	1155	1095	1095
F	6.248	19.719	10.581

Robust standard errors are reported in parentheses. They are clustered for firms. In column a, the dependent variable is the logarithm of the number of employee head-count. In column b, the dependent variable is the logarithm of the number of base-level occupations plus 1. In column c, the dependent variable is the logarithm of the number of employees with at most high school diploma plus 1. $MFAQProd95_i$ is an indicator variable that takes 1 if firm i is found to produce MFA quota goods in 1995. Data Source: Statistics Denmark.

B Constructing Matched Data Sets for the Textile and Clothing Industry

The data sets used in this study are compiled from different sources mainly within Danmark Statistik. The main data sets are international trade data-set (Udtræk Udenrigshandel), domestic trade data-set (Udtræk Varestatistik), firm accounting data-set (Udtræk Regnskabsdata) and person data-set (Udtræk Persondata / IDA). Detailed information regarding the content, coverage as well as the variable definitions of these data-sets can be found at http://www.dst.dk/da/Statistik/dokumentation/times.aspx. Quota information is reported in the SIGL (Système Intégré de Gestion de Licenses) database and is available online at http://trade.ec.europa.eu/sigl/index.html. A brief summary of the content and coverage of the confidential data-sets is provided below.

The International trade data-set (Udtræk Udenrigshandel): The international trade data set is compiled from the Danish Customs records. Each shipment record includes the date of the shipment, the value of the shipment, the product code (The Combined Nomenclature (CN)-8 digit), the name of the product, weight of the shipment, unit of weight and, when relevant, quantity information as well as a unique firm identifier. Statistics Denmark aggregated these shipment records into annual shipments for each triplet of product (CN-8 digit), country and firm. As provided by Statistics Denmark, the international transaction data-set does not have a truncation at the firm-level as it covers the universe of Danish firms' transactions between 1993 and 2007. However, only product shipments of 10,000 kr (approx. 1700 USD) or more are included in the data set. Unit prices are calculated using uniform measures of weight/quantity for each product.

Domestic trade data (Udtræk Varestatistik): The industry's sales of products are recorded in the 10-digit product classification. The first 8 digits of the classification of goods is always identical to the combined nomenclature. This data-set is available for the period 1995-2005. Only firms with employment of 10 people or more two years prior to current (statistics) date are included in this survey.

Firm Accounting data (Udtræk Regnskabsdata): Business statistics data are compiled from

survey results of firms that take part in an annual financial survey as well as from the annual tax reports, vat reports, and annual reports from incorporated companies. The general business statistics include only firms that employ at least a 0.5 FTE (full-time equivalent employment) employment and/or have had estimated earnings of a certain size. Earnings thresholds are estimated differently for different industries.[34]. However, some of the data for small firms may be subject to imputation. This data-set is available starting from 1995. Only manufacturing, construction and retail sectors are included until 1998. In 1998, the wholesale trade sector is included and starting from 1999 it covers almost all sectors including mining, and all business service sectors.[35]

Integrated Database for Labour Market Research (IDA): A longitudinal yearly data-set of persons (age 15-70) are merged with establishments. It contains establishment and industry codes, education-level, wages, type of jobs, work experience, age, and other person classifications. For a complete description see the Danmarks Statistik document at http://www.dst.dk/da/Statistik/dokumentation/Times/ida-databasen.aspx.

All of the data-sets are accessed through the LMDG (Labor Market Development and Growth) project sponsored servers, and the routine cleaning procedures have been executed both by the Danish Statistics employees but also by the LMDG. For the details of the cleaning procedures conducted by the LMDG project, see Bunzel (2008).

B.1 Firm-Level Values

Raw materials, intermediate goods, capital goods, electric, gas, water, and output deflators provided by the Danish Statistik are used to deflate the nominal variables. Wages are deflated using cpi. Sales and output values are deflated separately for textile and apparel producers using the output deflators. Value-added information is derived by the author using the following formula: [turnover+work performed for own purposes and capitalized+(end of year inventory-

[34]In the wholesale trade sectors, the limit of earnings is typically over at 500,000 Danish Kroner, while in the manufacturing industry, it ranges between 150,000 and 200,000 Danish Kroner.

[35]Starting from 1999, the data-set includes hospitality, transportation, telecommunication, real estate, rental services, information technology services, research and development services, and other consultancy and business services. It does not include agriculture, financial sector, public, education and medical service sectors.

beginning inventory)-[purchase of raw materials + energy + subcontracting expenses]. Values, except hourly wages, are expressed in thousands year 2000 constant Danish Kroner. Hourly wages are expressed in constant 2000 Danish kroner. Physical capital assets include plant, machinery, technical installations, land, buildings, and other equipments such as computers, and office furniture. Table B-1 and B-2 present summary statistics for firm-level variables from Regnskabsdata and IDA data-sets.

Table B-1: Summary Statistics I

Source	Regnskabsdata				
Variables	N	Median	Mean	Standard Deviation	Sample
Turnover	7275	5092.5	21560.3	54842.8	1995-2007
Value Added	7275	2675.0	9766.5	24030.3	1995-2007
Profit	7275	239.9	1252.7	7047.5	1995-2007
Total Assets	7275	3564.0	17970.2	68447.1	1995-2007
Capital	7275	928.0	5271.7	21617.9	1995-2007
Investment	7275	131.8	1052.2	6645.0	1995-2007
Firm Age	6738	13.0	15.3	12.2	1995-2007
Full-time Equivalent Labor	7275	5.9	18.0	39.4	1995-2007
Average Full Wage (Per Person)	7213	261.8	275.4	108.5	1995-2007

Values are expressed in constant 2000 prices in thousand Danish kroner. Source: Statistics Denmark.

Table B-2: Summary Statistics II

Source	IDA				
Variables	N	Median	Mean	Standard Deviation	Sample
Head-Count Labor	7319	7.0	20.0	41.3	1995-2007
Vocational Educ. and Above	6893	3.0	9.0	19.5	1995-2006
High School and Below	6893	4.0	10.5	22.1	1995-2006
Executives and Employers	7319	1.0	1.2	1.9	1996-2007
Top and Mid Level Occupations	7319	0.0	2.7	7.3	1996-2007
Base Level Occupations	6624	3.0	10.9	27.3	1996-2007
Auxiliary Occupations	6624	0.0	1.5	5.2	1996-2007
Unspecified Occupations	6624	2.0	3.0	6.7	1996-2007
Average Hourly Wage	7074	142.3	144.9	36.1	1995-2007

Values are expressed in constant 2000 prices in Danish kroner. Source: Statistics Denmark.

B.2 Employee Characteristics (IDA)

Every person is attached a code regarding his/her status within the firm. In order to comply with the major groupings of the the International Standard Classification of Occupations Codes (ISCO-88), The Danish statistics created the Danish version of the ISCO-88, called DISCO-88 in 1996 to replace the previous categorization. So there is a discontinuity between the codes between pre and post 1996 data and so the analysis of occupation characteristics do not include

the year 1995 data. Inactive people in the payroll such as retirees, employees on leave as well as owners' spouses are dropped before calculating the employment characteristics for each firm.

The classifications of occupations are derived from the variable 'pstill2'. Occupation categories are 'employer', 'executive', 'top-level employee', 'intermediate-level employee', 'auxiliary employee' and 'unspecified'. The professional and technical occupations in the analysis correspond to the 'pstill2' codes 32, and 34 which are top-level professional employees and intermediate level professional and technical employees, respectively. The classification of base-level occupations corresponds to the pstill2 value 35, which includes work that requires basic level skills, such as office work or operating different types of stationary machinery. The classification of auxiliary employee (employees with no skill requirement) refers to the pstill2 value 36, which includes works such as cleaning services, delivery services, guard work, and transport work. The last grouping, which corresponds to the pstill2 value 37, contains unclassified occupations due to various reasons.

The educational backgrounds of employees are obtained from the 8-digit education code, 'hffsp', that shows the person's maximum completed education level combined with professional training. Since 8-digit education codes are not reported in 2007, the relevant education variables are not constructed for that year. The first two digits of the code indicate the main education groups. The group of people with at most high school diploma refers to a hffsp value in the first two digits of at 25 or below. The group of people with at least some college schooling refers to a hffsp value in the first two digits equal to or larger than 40. Employees with professional training (college level) in technical design in textile and clothing industry corresponds to hffsp value 405985, it includes industrial designer, model engineering, product developer, textile and garment engineering training. Employees with production training in textile and clothing industry corresponds to hffsp values 355880 and 355890, it includes clothing operator, fashion craft, hand stitchers, cutter, tailor, knitting operator, textile operator, textile worker etc..Skill or vocational training in Denmark is provided by the technical high schools (after 9 years of mandatory schooling) and involves several years of formalized training including both schooling and apprenticeship. For example being a tailor requires between 3 years and 3 years and 4 months skill education or being an industry operator requires between 2 years and 2

years and 8 months education depending on additional qualifications.

In the labor (IDA) data-set, for each employed person there is a unique firm identifier provided for the employer. Using this firm identifier, extracted information from IDA is merged with the Firm Accounting Data Set for each year. Only a couple of observations in the firm accounting data are left unmatched from this matching.

B.3 Product Characteristics

The product classifications are based on The Combined Nomenclature (CN). It is comprised of the Harmonized System (HS) nomenclature with further European Community subdivisions. The first 6-digit of the classification matches with the Harmonized System. A detailed description of the CN codes can be found at http://udr.dst.dk/nomenklatur/index.aspx. Export data between 1993 and 2007 and domestic sales data between 1995 and 2005 are merged to construct product portfolios of firms. The first 8 digits of the product categories in the domestic sales data are the same as the combined nomenclature (CN) as reported in the international trade data. Quota categories for China which are reported in the SIGL (Système Intégré de Gestion de Licenses) database are assigned the CN codes based on CN-1999. This is done by going over the description of each quota category as well as each CN-8 digit product and confirming it using Annex I of the "Council Regulation (EEC) No 3030/93 of 12 October 1993 on common rules for imports of certain textile products from third countries" which reports the CN-2009 corresponding of the quota categories. The annex is available at the SIGL. The resulting CN corresponding of the quotas for China are linked back and forth through years using correspondence tables linking CN 1995 through CN 2007 as provided by the European Commission-Eurostat. Most of the quotas for China were utilized above 90 % but there were some additional quotas designed only for China which involved silk and rami fabrics. Since some of these additional quotas were not utilized, the empirical analysis focuses on quotas for China that were utilized at at least 10 % prior to their removals. Assignments of the CN codes to the quota categories are available from the author.

Product classifications as new products or dropped products are made according to the 8-digit classification. Products are defined in CN-8 digit in the analysis if not otherwise stated.

Analyses with 6-digit product classification are also available upon request. Table B-3 presents summary statistics. The median number of 8-digit products produced among the Textile and Apparel firms is 7. About 41 % of the firms are found to produce between 1 and 5 products as shown in Table B-4. Table B-5 also shows the transition probabilities for firms between the number of products they produce. For firms producing 1 to 5 products in one period, the probability of producing 1 to 5 products in the next period is about 84 percent.

Table B-3: Summary Statistics III

Source	Custom and Domestic Sales Data Sets				
Variables	N	Median	Mean	Standard Deviation	Sample
Number of 8-digit Products	4236	7	17.139	28.748	1995-2005
Number of 6-digit Products	4236	6	15.466	25.118	1995-2005
Number of New Products	3491	2	6.471	12.372	1996-2005
Number of New Non-MFAQ Products	3491	2	5.480	10.817	1996-2005
Number of New Non-T&C Products	3491	0	2.408	7.094	1996-2005
Number of New Modifications	3466	0	0.793	1.849	1996-2005
Number of Dropped Products	3538	2	5.534	11.533	1995-2004

Source: Statistics Denmark.

Table B-4: Distribution of Firms Over the Number of Products

Sample	Textile and Apparel Manufacturers 1995-2005					
# of 8-digit products	**1-5**	**6-10**	**11-15**	**16-20**	**21-25**	**25+**
Percentages	41.10	16.50	10.16	6.76	4.98	20.50

Source: Statistics Denmark.

Table B-5: Transition Matrix between the Number of Products

	Number of Products at $t+1$					
# of 8-digit products at t	**1-5**	**6-10**	**11-15**	**16-20**	**21-25**	**25+**
1-5	83.65	11.21	2.40	1.20	0.21	1.34
6-10	24.44	47.01	18.29	6.15	1.37	2.74
11-15	6.87	27.16	38.21	14.03	6.27	7.46
16-20	6.90	7.33	20.26	35.78	14.22	15.52
21-25	3.61	4.22	9.04	17.47	30.72	34.94
25+	1.88	1.25	1.88	2.51	8.15	84.33

Source: Statistics Denmark.