When the Floodgates Open: "Northern" Firms' Response to Removal of Trade Quotas on Chinese Goods

Hale Utar*

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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 covering 1995 to 2007, the analysis shows a significant change in the workforce composition of firms 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".

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*Department of Economics, Bielefeld University, Universitaetsstr. 25, 33615, Bielefeld, Germany. email: haleutar@gmail.com. The analysis was conducted while the author was visiting the Labor Market Dynamics and Growth Center (LMDG) at the University of Aarhus. LMDG is a Dale T Mortensen Visiting Niels Bohr professorship project sponsored by the Danish National Research Foundation. The author thanks Dale Mortensen and Henning Bunzel for facilitating access to the confidential database of Statistics Denmark and for their support. Partial financial support from the Colorado European Union Center of Excellence is acknowledged with appreciation. The author also thanks Jae Bin Ahn, David Hummels and Murat Ungor as well as the conference and seminar participants of IIOC 2012, CAED 2012, Koc Winter Workshop 2012, the ES Winter Meeting 2013, Bielefeld University and 9th Danish International Economics Workshop for insightful comments and suggestions.

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 the consequences of policies 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 MFA regulated world trade in T&C from 1974 until 2005. Under this agreement a large portion of T&C export from low-wage developing countries to developed countries was subject to physical quotas. The arrangement provided 'temporary' protection for developed country T&C industry against competition from low-wage country products. The Agreement on Textiles and Clothing under WTO set a schedule for the gradual dismantling of the MFA 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.

[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.

For the purpose of this study detailed employee level data and transaction level product data 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 directly utilizes the change in trade policy, rather than relying on import measures that are potentially contaminated with domestic demand and supply factors.

I first use transaction-level import data to show that the MFA quota abolishment for China led to a substantial increase in Chinese imports in Denmark. 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 (DID) approach, I then measure any disproportionate changes in such firms, when compared to other T&C manufacturing firms, in response to the quota removal 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. Because of international production sharing, it is also important to separate imports/offshoring effects from low-wage competition. Utilizing product-level information at the firm-level 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 is even stronger in employment. Specifically, employment in full-time units decreases disproportionately after the WTO accession of China, by about 19 %, 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 with 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 not 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 negatively affected, while the use of employees with T&C related technical design education (at the college level) is positively affected by the competition. Similarly, a significant negative effect is documented on employees with basic skill-level occupations, while there is no significant impact on occupations requiring professional and technical skills. These findings indicate possible changes in the production strategies of firms, who may limit their in-house production to technical and skill intensive products and developments and 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. The competition also has a significant positive effect on wages within firms, which, after controlling for selection within firms and unobservable worker characteristics, 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 reveals that the positive effects on both wages and the number of employees with T&C related technical design education are due to firms that both produce and import 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 increase in income inequality observed in the 1990s in many advanced countries, including the US. The question re-gained importance with intensified Chinese imports in the wake of the 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 (2013) find that while plant growth and employment in offshore plants of American companies located in Mexico decline, Chinese competition in the US market also leads to increase in plant efficiencies, skill intensities and triggers sectoral reallocation towards higher value-added offshore sectors. 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. (2013) 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 T&C quotas for China due to its WTO membership as a quasi-experiment, the findings presented here on employment and wages support theirs, in that competition with low-wage countries mostly operates 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]

One of the main arguments of European T&C industrialists over the surge of Chinese imports was the harm to the value of 'high end' product images from closely similar products with significantly cheaper prices. The results show that intangible assets declined substantially in response to the MFA quota abolishment in 2002.[4] The competition is also found to cause significant product droppings which probably contributed to the loss of intangible assets. These findings may lend substance to European industrialists' complaints about the potential competitive harm of the rapid surge of Chinese T&C products.[5] This study also shows that firms facing heightened competition under the quota-free environment increase introduction of products in categories that were not covered by the MFA quotas and diversify their portfolios towards non T&C products.[6]

[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 to 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)).

[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 T&C industry in Europe. The group consists of top decision makers from T&C 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)).

[6]Complementing the findings of Bernard et. al. (2006), which show that US firms switch industries to escape competition from low-wage countries, these results show that the product mixes of 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).

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). It 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 shifting their innovative efforts 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).

This paper is also related to the literature that examines the effects of globalization on firms' organization, including Thesmar and Thoenig (2000), Guadalupe and Wulf (2010) and Caliendo and Rossi-Hansberg (2012). Thesmar and Thoenig (2000) show in a Schumpeterian growth model à la Aghion and Howitt (1992) that through a tradeoff between achieving efficiency and staying adaptable to changing environment, firms choose a more skill-intensive organization in markets with stronger product market competition. The findings in this paper support their theoretical arguments.

The findings in this paper also complement Khandelwal et al. (2013) who show that due to misallocation of the MFA quotas by the Chinese government, their removal resulted in a significant efficiency gain via entry of more efficient Chinese exporters. Attributing importance to these new, more efficient, entrants in the surge of Chinese T&C exports and associated decline in prices, their results imply that the negative impact of the quota removal on Danish producers shown in this paper may have been smaller, had the quotas been allocated more efficiently by the Chinese government.

The rest of the paper is organized as follows: The next section describes the data used in the study. Section 3 begins with an overview of Danish T&C industry and trade policy, continues to document the effect of the MFA quota expiration for Chinese goods on Danish imports and then presents the empirical strategy for the firm-level analysis. Results are presented and interpreted in section 4 followed by additional analysis and conclusions in sections 5 and 6.

2 Data

For the purpose of this study firm-level data on Danish T&C industry are combined with employer-employee matched data and transaction level domestic and foreign sales data. The data-sets are from Statistics Denmark. Key to matching the data-sets is a unique ID for each firm common to all data-sets. Details on constructing the data-sets are provided in Appendix B.

The traditional firm-level variables such as sales, total wages, capital assets, 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 ages 15 to 70. So the resulting data-set is comprehensive with respect to both T&C firms in Denmark and their employees. 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.[7]

Firms' product information is compiled from domestic production and international trade data-sets. The domestic production data-set 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 the domestic data-set 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 based on Combined Nomenclature 1999.[8] Quota

[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.

[8] Annex I of the "Council Regulation (EEC) No 3030/93 of 12 October 1993 on common rules for imports of certain

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). 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, which are reported as part of the domestic and foreign sales data sets.

3 Empirical Framework and Strategy

3.1 Empirical Framework

3.1.1 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, 26 % of them are proprietorships and 91 % of the firms are single plants on average.[9]

A restructuring in Danish and 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 50,000 in the Danish T&C

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.

[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).

industry. This loss was associated with typical manual processes such as sewing, folding, packing and cutting being moved abroad. More capital intensive processes such as dyeing, printing, weaving, knitting, spinning and design have remained within Denmark to a large extent (Olsen et al. (2004)).

3.1.2 Evolution of The MFA Quota System

Due to its political sensitivity as a traditionally labor intensive industry, world trade in textile and clothing was excluded from the agreement when GATT was signed in 1948 and continued to be governed by bilateral agreements. As the number of agreements grew, the Multi-fibre Arrangement was introduced in 1974 to govern the world trade in T&C. Most MFA quotas for the EU were negotiated for the bloc as a whole, and since 1993 the quotas have been managed at the EU level, harmonizing any member state specific differences. 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. 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.

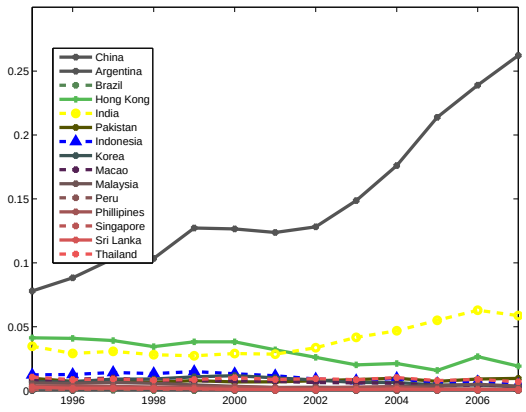

Figure 1: Import shares of China and other developing countries subject to MFA quotas in Danish Textile and Clothing Imports 1995-2007 (Source: Statistics Denmark)

Between 1986 and 1994 the EU instituted MFA quotas on 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. Both the EU and the USA started their phasing out processes by integrating mainly products or MFA categories with no quotas vis-à-vis WTO members. During the first two phases, the EU integrated 34 MFA categories, but removed few existing quotas vis-à-vis WTO members (OETH, (2000)). For example, among the major exporting countries facing MFA quotas neither India nor Indonesia had any quotas removed in Phase I or II.[10] No quota imposed on imports from Pakistan was removed under Phase II. Only one quota category regulating imports from Pakistan was removed in Phase I, and it had a 0 % utilization.

The exporting countries with the highest quota utilization were China, India, Pakistan and Indonesia (OETH, 2000). Figure 1 shows the evolution in T&C import shares of China compared to other developing countries subject to MFA quotas. 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 %.

3.1.3 The Impact of the MFA Quota Abolishment on Chinese Imports

As shown in figure 1, imports in T&C from China into Denmark has increased significantly with the WTO membership of China. Before examining the impact of the MFA quota removal for China on Danish T&C firms, the increase in Chinese imports attributable to MFA quota removal is quantified. To do that, transaction level import data between 1995 and 2007 in MFA quota goods 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 are denoted with $MFAQ5$. Collectively the goods covered

[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. Also for India there were only 2 quota categories that were subject to Phase III removal in 2002 (category 24 and category 27). The remaining 15 categories for India were removed in 2005.

by all four phases are denoted with the variable MFAQ.

$$lnX_{kjtn} = \alpha_0 + \alpha_1 * Dum02_t * China + c_k * \pi_j + \tau_t * \nu_n + \epsilon_{kjtn} \quad (1)$$

$$lnX_{kjtn} = \alpha_0 + \alpha_1 * Dum05_t * China + c_k * \pi_j + \tau_t * \nu_n + \epsilon_{kjtn} \quad (2)$$

$Dum02_t$ and $Dum05_t$ are 2002 and 2005 time dummies that take 1 on and after the respective year and zero otherwise. Equation 1 is estimated using phase 1 to 3 goods (MFAQ2) and equation 2 is estimated using phase 4 goods (MFAQ5) imports. X_{kjtn} is the variable of interest; quantity and unit price respectively for imported good j coming from country k at year t. Subscript n denotes industry, 'textile', or 'apparel'. Country by product, $c_k * \pi_j$, fixed effects are included. Unit prices are not deflated in these regressions but instead industry by year fixed effects, $\tau_t * \nu_n$, are included to account for industry specific shocks including inflation rates and exchange rate variations. The results, presented in Table 1, show that quotas were binding for China. 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. But examining Chinese T&C exports during the MFA quota removal period, Khandelwal et al. (2013) 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.

[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.

Table 1: MFAQ Imports

Panel A: MFAQ2 Products (1995-2007)		
	(a)	(b)
Variables	Log Quantity	Log Price
Dum02*China	1.837***	-0.302***
	(0.154)	(0.038)
Number of Obs.	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)
Number of Obs.	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 only by country leads to smaller standard errors. A constant term is included but not reported. All specifications include year by industry and product (CN-8) by country fixed effects. The transaction level import data set covers 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 thus without significantly increasing the 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 3 is estimated.

$$lnP_{jt} = \alpha_0 + \alpha_1 Dum02_t * MFAQ2_j + \alpha_2 Dum05_t * MFAQ5_j + \pi_j + \tau_t * \nu_n + \epsilon_{jt} \qquad (3)$$

Here $MFAQ2_j$ 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} 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 with abolished MFA quotas for China. Using the dummy variable for all the phases combined, MFAQ (column b), a 10 % on average disproportionate decline is found 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)
Number of Obs.	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 term is included but not reported. All specifications include year by industry and product (CN-8) fixed effects. The transaction level import data set covers 1995-2007 and it is aggregated into CN-8 product and country categories for each year. Data source: Statistics Denmark.

Danish manufacturers are also expected to face intensified competition with China in export markets such as other EU countries and 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 2002 quota removal mostly affects the price margin of the Danish exporters while the 2005 quota removal's effect is mainly on the volume of exports.

3.2 Empirical Strategy

To examine the firm-level effects of the expiration of the 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 the quotas. By directly utilizing the exogenous shock to the competitive environment, the empirical strategy here does not rely on import measures that are potentially contaminated with domestic demand and supply factors. 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.

As shown, China was by far the most important import supplier to Denmark in the mid-90s among developing countries exposed to MFA quotas. Removal of MFA quotas for China depended on whether and when it would join the WTO. But during the long period of China's negotiation for WTO 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 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.

Across firm variation in exposure to intensified Chinese competition at the removal of MFA quotas is due to the fact that not all firms in the industry produced these goods. In 1999 32 % of the firms in the sample were producing at least one MFA good. The majority, more than 85 %, of the firms that produce MFAQ2 (Phase I-II-III) are also found to produce MFAQ5 (Phase IV).[14] Due to the significant overlap among MFAQ2 and MFAQ5 producers as well as the 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.

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. To prevent biased results from such selection within the treatment group, the treatment group is set as those firms which in 1999, before China's WTO accession,

[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 on April 1, 1999. This uncertainty was a recurring theme in articles 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 producing MFAQ2 and 191 were producing MFAQ5. 206 were found to produce either MFAQ2 or MFAQ5.

produced goods that were subject to MFA quotas for China and the following simple equation is estimated.[15]

$$X_{it} = \alpha_0 + \alpha_1 * Comp99_i * Dum02_t + \delta_i + \tau_t + \epsilon_{it} \tag{4}$$

Here X is the variable of interest. The variable $Comp99_i$ is a firm-level variable that shows the exposure to the competition of firm i in 1999. By interacting it 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, τ_t. It is possible that firms which produced MFAQ are systematically different than the rest of the firms. The panel aspect of the data-set allows for control of the firm fixed effects, δ_i, 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.

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 MFAQ and removing quotas may have been a mixed blessing for them. So their presence in the treatment group would be expected to mute the negative effect of the heightened low-wage competition. To disentangle the potential import effect on treated firms a triple difference analysis is used.

$$\begin{aligned} X_{it} = \alpha_0 + \alpha_1 * Comp99_i * Dum02_t + \alpha_2 * MFAQImp99_i * Dum02_t + \\ \alpha_3 * MFAQImp99_i * Comp99_i * Dum02_t + \delta_i + \tau_t + \epsilon_{it} \end{aligned} \tag{5}$$

$MFAQImp99_i$ is the indicator variable that shows if a firm imports any MFA quota goods in 1999. In equation 5 the coefficient of interest is α_3 as it measures the variation in the dependent variable

[15] All the results are robust to setting alternative dates before the event took place, such as 1995 or 1998. The results are also robust to setting the treatment group to firms that produced any MFAQ in any of the years until 1999.

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.

Three alternative measures are used for $Comp99_i$. The default measure is $MFAQProd99_i$ which takes 1 if firm i produced any MFAQ in 1999.[16] By constructing the share of MFAQ in firms' product portfolio or total sales, it is also possible to create continuous measures of competition which take into account the degree of exposure. Accordingly the two other alternative measures are: $MFAQProdShare99_i$ is the ratio of the number of MFAQ that firm i produced in 1999 to the total number of products in year 1999 and $MFAQRevShare99_i$ is the share of sales that is generated from MFAQ in 1999. Measuring the extent of exposure to competition using the intensity of MFA products may be more relevant in linking competition with changes in the production organization of firms such as the occupation characteristics. $MFAQProd99_i$ on the other hand can perform better when analyzing the impact of competition 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.[17] So results with all three measures are presented as appropriate.

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.[18] 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 goods producers by controlling for the aggregate trends.

[16] As mentioned in section 3, product portfolios of firms are constructed using domestic production and international trade data sets. Since only firms with 10 or more employees are included in the domestic production 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 Aghion et al. (2005) for a theory and evidence on a possible non-linear relationship between competition and innovation.

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

4 Results

As Danish firms are expected to loose market share in goods for which quotas are removed, the impact on firms' size is investigated first. An examination of firms' organizational response to the changes in business environment follows.

4.1 The Impact of Competition on the Size of Northern Firms

Table 3 presents the results of the estimation of equation 4 for the logarithms of firm turnover (sales), value added, full-time equivalent number of employment, the number of employees that are on the payroll and actively work, capital and investment. Competition from China triggered by the removal of MFA quotas is found to have negative effects on the sizes of the Danish firms. Firms that were protected by MFA quotas experience an 11 % average disproportionate decline in sales after 2001 in comparison to others. The effect is higher on value-added, with a 13 % disproportionate decline. Columns (c) and (d) show a significant and negative employment impact of the removal of MFA quotas on Danish T&C industry. The coefficient in column (c) in the top panel indicates that employment in full-time units decreases disproportionately after the WTO accession of China, by about 19 %, among the firms that are most vulnerable to the competition. The coefficient in column (d) is also negative and significant, indicating an about 17 % disproportionate decline in the number of employees.[19]

When the intensity of exposure to the competition is taken into account (panels B and C), the cross-sectional differences among the affected firms provide an additional source of identification. 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 results do not show any affect on capital but the competition negatively affects investment. This could be due to sensitivity of investment 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 significant at

[19]The differences in columns (c) and (d) may 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.

the 1 percent level, confirming the ties between investment and cash flows of firms.

The difference in impacts on sales and value added may be due to a possible increase in production fragmentation where firms outsource part of the production. But the difference can also be due to decline in markups. Similarly, the difference in impacts on value added and employment can indicate a possible increase in labor productivity. These second order implications of competition driven downsizing are analyzed and the results are presented in Table A-2 in the Appendix. The table shows that the competition with China decreases the contribution of the Danish firms on their sales and indicates that this happens independently from possible decline in their markups. The competition is also found to increase the labor productivity of the Danish firms by about 10 % as they downsize. It also causes an increase in the capital labor ratio due to the decline in labor as suggested by the results in Table A-2 and in Table 3.

4.2 The Impact of Competition on Within Firm Organization

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 or non-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.

4.2.1 Occupation and Education Characteristics

Table 4 columns (a)-(c) present results on occupation characteristics.[20] There is a significant and negative effect of the competition on the number of employees with auxiliary occupations (such as in cleaning services, transportation services, guard services) or base-level occupations (such as

[20]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 in the codes between pre and post 1996 data. Hence the sample starts with 1996 for this analysis. See the appendix for more details.

machine operators in the production facility).[21] The disproportionate decline in the number of employees who occupy jobs that require basic level skills is about 15 % (column b). On the other hand the number of employees occupying jobs that require professional and technical skills is not significantly affected by the low-wage competition. 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.

Columns (d)-(g) of Table 4 present the analysis of education characteristics.[22] The coefficients across the panels for the number of employees in a firm who have at least some college level education are found to be positive but not significant. The impact of competition on the number of employees in a firm with at most a high school diploma, on the other hand, is negative and significant with an about 24 % decline (panel A, column e).[23] The number of employees in a firm with skill education in T&C production (textile operator, clothing operator, etc..) declines disproportionately by about 16 % among affected firms.[24] Finally the impact of the low-wage competition on the number of employees with T&C related technical design education is positive and significant. This education, which is at the college level, includes industrial design, product development and textile and garment technologists.

[21]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.

[22]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.

[23]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 24.

[24]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 B for the complete description of education variables.

The results uncover an asymmetric impact of competition from a low-wage country on different types of employees, indicating that the competition causes compositional changes in firms' workforce. These results also provide supporting empirical evidence for the theoretical channels proposed in Thesmar and Thoenig (2000) and Thoenig and Verdier (2003). The effect of competition on low skill employees is likely to cause an increase in skill-intensities within firms. 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.

Table A-3 in the appendix confirm that skill-intensities within firms increase, as measured both by the share of college educated employees in a firm and by the wage share of college educated employees. Column (a) in the top panel shows a 27 percent or an about 5 percentage point disproportionate increase in the share of college educated employees. An analysis of compositional changes within occupation groups also shows clearly that the average education level and experience of employees increase significantly within base-level occupations while no such increase is found within high-ranked occupations. The results are in line with the hypothesis that increased trade with China induces organizational changes that involve further decentralization.

4.2.2 Wages

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. The results in Table 5 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. To control for worker characteristics, the same analysis at the worker level is presented in columns (b) through (e). In column (b) the coefficient indicates an about 5 % disproportionate increase in wages among firms that are the most vulnerable to the competition. After controlling for detailed worker characteristics in column (c) (workers' age, work experience, gender, occupation and education), the coefficient of interest, although smaller

in magnitude, is still positive and significant.[25] In columns (d) and (e) the diff-in-diff coefficient is interacted with occupation and education categories. The results show that the wage gain is accrued mostly among the professional occupations and among college educated employees. Columns (f)-(h) present the results with worker fixed effects to additionally control for unobservable worker characteristics. The results are robust.[26]

As some firms are both producers and importers of MFA quota goods, the positive effect on wages of skilled and professional employees may be due to the benefits to 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 industries, find a positive association between firms' own import intensity and wages of college educated employees. The competition may trigger offshoring of base-level jobs. Offshoring, as shown in Grossman and Rossi-Hansberg (2008), can increase 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 increase in wages as shown in Caliendo and Rossi-Hansberg (2012).[27] 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.

4.3 The Role of Imports

The triple difference results for employment, value-added and occupation and education characteristics of employees are presented in Table 6. All the triple difference coefficients are positive and are significant for the full-time equivalent number of employees, the number of employees in professional level jobs, college educated employees, employees with technical design education and for hourly wages. They indicate that firms that were producing MFAQ are less (negatively) affected

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

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

[27]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.

by the competition if they were also importing MFAQ. The results reveal that 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.

The results on hourly wages show that both the selection within firms triggered by the competition and the import effect is behind the positive effect on wages. The DID coefficient is almost zero in every specification and the triple difference coefficient is positive and significant.

Using import measures as a proxy for import competition may cause attribution of benefits from import and offshoring to the competition effect when quantifying the impact of competition. These results show the importance of being able to disentangle import effects from the competition when analyzing import competition.

5 Additional Analysis and Robustness Checks

5.1 Firms' Intangibles and Products Churning

As MFA was a temporary system of protection, the European Commission has held that the T&C industry in Europe can survive the competition with low-wage country imports by concentrating 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)). On the other hand, one of the main arguments of European T&C industrialists over the surge of Chinese imports was the harm to the value of 'high end' product images by closely similar products with significantly cheaper price.

Table A-4 presents an analysis of firms' intangibles and product churning. 2005 is the last year of the domestic production data-set so dropped products are not defined in 2005, and new products are not defined in 1995. In consequence the analysis is limited to the 2002 quota removal, with the sample being 1996-2004.[28] The results show a negative effect of competition from China on

[28]The dropped products variable is products that were not sold in future years, and it is not defined if the firm appears in the data set for the last time. Similarly new products are products that were not sold by the firm in

intangible assets and firm scale as defined by the logit transformation of the ratio of intangible assets over total assets.[29] This 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. Cheaper products in the market may also affect firms' incentive to introduce new products. Columns (c)-(f) of Table A-4 show that competition with low-wage country products cause Danish T&C firms to drop products and diversify away from T&C products.[30]

5.2 Robustness Checks

The DID setting with long time series may cause under-estimation of standard errors due to serial correlations in the dependent variables. In order to address this 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. Under-estimation of standard errors is indicated if results with aggregate data and the main results do not agree. Tables from A-5 to A-7 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-6 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.

As mentioned only a few quotas were actually removed under the first two phases of abolishment in 1995 and 1998. Of these none were utilized at a rate above 50 %. Although China did not benefit from these phases, examining whether previous MFA quota removal had any significant impact on the treated firms provides an additional validation of the empirical approach. Table A-8 presents

previous years. This variable is not defined if the firm appears in the data-set for the first time.

[29] 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).

[30] Since product churning 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 columns (c)-(f) of Table A-4. The analysis without controlling for size quintiles yields similar results, which are presented in the supplemental appendix.

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 there was no significant impact until 2002.

The strategy to analyze the effects of both quota removals simultaneously is based on the significant overlap between the groups of firms affected by the 2002 and 2005 quota removals with a lack of data that can help to separate firm-level outcomes across different products and on the lack of shock accompanying the last quota removal. Results treating both quota removals separately are in line with the results presented here and are available in the supplemental appendix. 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, which is based on firms' 1999 product portfolio and instrumented with the quota dummies. These results are also available in the supplemental appendix.

6 Concluding Remarks

By constructing a new data-set that provides detailed information on within firm adjustments for Danish Textile and Clothing industry and exploiting the removal of MFA quotas after the WTO accession of China, I analyze the impact of Chinese (or "low wage country") competition on advanced country manufacturers.

The results show significant negative impact of Chinese competition on firm value-added, and employment. Competition is also shown to induce substantial compositional changes in firms' workforce, as firms disproportionately shed employees with lower education levels and production floor workers, while retaining college educated employees. Together with the observation that base-level occupations experience a disproportionate increase in skill intensity as measured by education levels, these findings may imply flattening of the firms' organizations in accordance with lean production principles.

College educated, professional and technical employees gain from wage increases, which, when effects from imported MFA goods on treated firms are disentangled, are shown to come from firms that are both importers and producers of MFA quota goods. Producer-importers are also the firms

that provide the skill demand that leave educated and professional employees unaffected by the competition. These results highlight the importance of separating the import/outsourcing channel when analyzing low-wage competition.

Additional analyses show that increased competition triggered by the 2002 quota removal has negative effect on firms' intangible assets. Firms directly affected by competition are also found to drop their existing products and channel their innovative efforts away from products where China's competitive advantage is now higher.

The findings on the negative effect of the competition on intangible assets and of increased product turnover within firms indicate that product instability, or in the Schumpeterian language: the 'creative destruction rate', increases with heightened competition with China. Together with the findings of increased concentration of skilled and educated workers within firms due to Chinese competition, these findings provide empirical support of the idea that competitive pressures from low-wage countries forces firms to adapt more flexible and skill oriented organizational forms (Piore and Sabel (1984), Thesmar and Thoenig (2000)).

Competition induced innovation may not compensate for the loss in intangible assets inflicted by competition, and these results provide a cautionary note to the literature that emphasizes the positive link between low-wage 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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7 Tables

Table 3: Sales and Employment, Capital

Sample	Textile and Apparel Manufacturers (1995-2007)					
	(a)	(b)	(c)	(d)	(e)	(f)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor	Log Capital	Log Investment
Panel A						
$MFAQProd99_i * Dum02_t$	-0.114*	-0.132*	-0.212***	-0.188***	0.023	-0.205*
	(0.055)	(0.057)	(0.054)	(0.053)	(0.088)	(0.093)
F	3.226	6.642	10.902	11.316	14.843	31.933
Panel B						
$MFAQProdShare99_i * Dum02_t$	-0.179*	-0.254**	-0.391***	-0.343***	-0.003	-0.374*
	(0.090)	(0.094)	(0.100)	(0.096)	(0.140)	(0.161)
F	3.179	6.811	10.816	11.205	14.849	31.960
Panel C						
$MFAQRevShare99_i * Dum02_t$	-0.172*	-0.229**	-0.288***	-0.249**	-0.073	-0.407**
	(0.083)	(0.087)	(0.085)	(0.084)	(0.118)	(0.127)
F	3.276	6.521	10.467	10.837	14.865	32.597
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes
N	7274	7252	7213	7319	7115	6598
Number of Firms	1093	1093	1093	1155	1083	1071

Robust standard errors are reported in parentheses. They are clustered for firms. A constant term is included but not reported. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively. 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. The dependent variable in column e is the logarithm of the physical capital assets. The dependent variable in column f is the logarithm of the total investment in physical assets. Sales, value-added, FTE, capital and investment information is from Regnskabsdata and head-count information is from IDA, Statistics Denmark. All specifications include year and firm fixed effects.

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

Sample	Textile and Apparel Manufacturers						
	1996-2007			1995-2006			
	Occupation Characteristics			Education Characteristics			
Variable	(a) Auxiliary and Basic Level Occupations	(b) Basic Level Occupations	(c) Professional and Technical Occupations	(d) Employees with College Education	(e) Employees with High School Education	(f) Employees with T&C Production Education	(g) Employees with T&C Tech. Design Education
Panel A							
$MFAQProd99_i * Dum02_t$	-0.155*	-0.166*	-0.029	0.059	-0.275***	-0.169***	0.098**
	(0.063)	(0.066)	(0.043)	(0.040)	(0.048)	(0.038)	(0.032)
F	35.690	35.756	4.652	2.322	18.457	4.007	3.207
Panel B							
$MFAQProdShare99_i * Dum02_t$	-0.309**	-0.327**	-0.076	0.086	-0.427***	-0.244***	0.110*
	(0.106)	(0.111)	(0.077)	(0.072)	(0.097)	(0.068)	(0.050)
F	36.295	36.158	4.623	2.313	16.974	3.770	3.156
Panel C							
$MFAQRevShare99_i * Dum02_t$	-0.208*	-0.221*	-0.051	0.090	-0.303***	-0.168**	0.093
	(0.093)	(0.101)	(0.074)	(0.070)	(0.078)	(0.064)	(0.048)
F	36.201	35.957	4.636	2.322	16.857	3.471	3.164
Year Fixed Effects	yes	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes	yes
N	6624	6624	6624	6893	6893	6893	6893
Number of Firms	1095	1095	1095	1121	1121	1121	1121

Robust standard errors are reported in parentheses. They are clustered for firms. A constant term is included but not reported. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively. 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 the occupation analysis (columns a, b, c). The dependent variable in column d is the logarithm of the number of employees with at least some college level education plus 1. The dependent variable in column e is the logarithm of the number of employees with at most high school diploma plus 1. The dependent variable in column f 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 g 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 for education variables. 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. All specifications include year and firm fixed effects.

Table 5: The Impact of Competition on Wages: Firm and Worker Level

Sample	Textile and Apparel Manufacturers (1996-2006)							
	Log of Avg. Hourly Wage	Log of Hourly Wage						
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
$MFAQProd99_i * Dum02_t$	0.046***	0.052***	0.037***			0.027**		
	(0.012)	(0.012)	(0.010)			(0.009)		
$MFAQProd99_i$						-0.022**	-0.022**	-0.021**
						(0.007)	(0.007)	(0.007)
$MFAQProd99_i * Dum02_t *$ Unspecified Occup				0.051*			0.019	
				(0.020)			(0.011)	
$MFAQProd99_i * Dum02_t *$ Auxiliary Occup				0.037*			0.024*	
				(0.014)			(0.010)	
$MFAQProd99_i * Dum02_t *$ Base level Occup				0.025**			0.018*	
				(0.009)			(0.008)	
$MFAQProd99_i * Dum02_t *$ Professional Occup				0.056***			0.071***	
				(0.015)			(0.012)	
$MFAQProd99_i * Dum02_t *$ Executives				0.028			-0.000	
				(0.030)			(0.018)	
$MFAQProd99_i * Dum02_t *$ Below High School					0.012			-0.005
					(0.009)			(0.008)
$MFAQProd99_i * Dum02_t *$ Vocational					0.042***			0.037***
					(0.011)			(0.009)
$MFAQProd99_i * Dum02_t *$ College and Above					0.068***			0.074***
					(0.017)			(0.012)
Year Fixed Effects	yes	yes	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	no	no	no
Worker Fixed Effects	no	no	no	no	no	yes	yes	yes
F	9.89	33.137	171.830	158.213	155.528	26.928	24.376	24.207
N	5998	102561	102561	102561	102561	102561	102561	102561
Number of Firms	1041	1034	1034	1034	1034	1034	1034	1034

Robust standard errors are reported in parentheses. They are clustered for firms. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively. 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 (h) is the logarithm of hourly wages. Professional occupations are top and intermediate level occupations. Specifications in columns (c), (d), (e) also include worker characteristics (gender dummy, the logarithm of worker's age, and tenure), education dummies (below high school, vocational, college and above) as well as occupation dummies (auxiliary, base level, professional occupations and executives). Please see the supplemental Appendix for the full results. The source of the data is persondata (IDA), Statistics Denmark.

Table 6: The Role of Imports

$Comp_i = MFAQProd99_i$				
Variable	(a) Log Value Added	(b) Log FTE	(c) Log Base Level Occupations	(d) Log Professional Occupations
$Comp_i * Dum02_t$	-0.191	-0.281**	-0.199	-0.199**
	(0.108)	(0.103)	(0.131)	(0.066)
$MFAQImp99_i * Dum02_t$	-0.226*	-0.304**	-0.032	-0.043
	(0.106)	(0.094)	(0.115)	(0.053)
$MFAQImp99_i * Comp_i * Dum02_t$	0.262	0.340*	0.067	0.247**
	(0.154)	(0.143)	(0.183)	(0.095)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
F	6.139	10.354	30.998	4.826
N	7252	7213	6624	6624
Panel B				
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.
$Comp_i * Dum02_t$	-0.137	-0.221*	-0.116	-0.007
	(0.074)	(0.097)	(0.065)	(0.031)
$MFAQImp99_i * Dum02_t$	-0.060	-0.172*	-0.082	-0.019
	(0.055)	(0.073)	(0.051)	(0.032)
$MFAQImp99_i * Comp_i * Dum02_t$	0.293**	0.077	0.002	0.147*
	(0.101)	(0.126)	(0.091)	(0.058)
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
F	2.500	16.784	3.604	2.968
N	6893	6893	6893	6893
Panel C				
Variable	(a) Log of Hourly Wages	(b) Log of Hourly Wages	(c) Log of Hourly Wages	(d) Log of Hourly Wages
$Comp_i * Dum02_t$	-0.010	-0.006	-0.005	-0.009
	(0.014)	(0.012)	(0.011)	(0.011)
$MFAQImp99_i * Dum02_t$	-0.004	0.004	0.007	0.003
	(0.013)	(0.013)	(0.014)	(0.012)
$MFAQImp99_i * Comp_i * Dum02_t$	0.071***	0.049**	0.042*	0.040**
	(0.021)	(0.017)	(0.018)	(0.014)
Worker Characteristics	yes	yes	yes	no
Education Controls	no	yes	yes	no
Occupation Controls	no	no	yes	no
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	no
Worker Fixed Effects	no	no	no	yes
F	29.378	122.332	156.740	24.495
N	102561	102561	102561	102561

Robust standard errors are reported in parentheses. They are clustered for firms. $Comp_i$ is $MFAQProd99_i$. In Panel A columns (a)-(d), the dependent variables are the logarithm of the value added, the logarithm of the full-time equivalent number of employees, the logarithm of the number of occupied jobs that are at the basic skill level plus 1, the logarithm of the number of employees that are classified as top and intermediate level employees plus 1. In Panel B columns (a)-(d), the dependent variables are: the logarithm of the number of employees with at least some college level education plus 1, the number of employees with at most high school diploma plus 1, the logarithm of the number of employees with vocational training in T&C production, the logarithm of the number of employees with T&C related technical design education plus 1. In Panel C columns a-d, the dependent variable is the logarithm of the hourly wage. Data Source: Statistics Denmark.

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. The 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, Productivity, Capital Per Labor

Sample	Textile and Apparel Manufacturers 1995-2007			
	(a) Fragmentation Measure	(b) Empirical Markup	(c) Labor Productivity	(d) Log Capital per Labor
Panel A				
$MFAQProd99_i * Dum02_t$	-0.019	-0.019	0.097**	0.225**
	(0.060)	(0.045)	(0.036)	(0.084)
F	19.471	17.977	15.739	16.035
Panel B				
$MFAQProdShare99_i * Dum02_t$	-0.215**	-0.114	0.198**	0.376*
	(0.066)	(0.088)	(0.066)	(0.149)
F	21.085	17.992	15.842	15.917
Panel C				
$MFAQRevShare99_i * Dum02_t$	-0.172**	-0.084	0.122*	0.201
	(0.058)	(0.073)	(0.052)	(0.123)
F	20.560	17.973	15.743	15.816
Year Fixed Effects	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes
N	7247	7078	7212	7054
Number of Firms	1093	1087	1093	1083

Robust standard errors are reported in parentheses. They are clustered for firms. A constant term is included but not reported. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively. 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 the gross value of output. The dependent variable in column c is the logarithm of the sales over the full-time unit of employment. The dependent variable in column d is the logarithm of the physical capital per full-time equivalent labor. Source: Statistics Denmark. All specifications include year and firm fixed effects.

Table A-3: Skill Intensity

Sample	Textile and Apparel Manufacturers (1996-2006)					
	(a)	(b)	(c)	(d)	(e)	(f)
Variable	Log College Educated Share	Log College Educated Wage Share	Log College Rate Among Base Level Jobs	Log Average Experience Among Base Level Jobs	Log College Rate Among Professional Jobs	Log Average Experience Among Professional Jobs
Panel A						
$MFAQProd99_i * Dum02_t$	0.220***	0.154*	0.278**	0.184***	0.039	-0.103*
	(0.059)	(0.068)	(0.088)	(0.041)	(0.058)	(0.045)
F	14.161	12.497	8.435	29.901	1.786	14.408
Panel B						
$MFAQProdShare99_i * Dum02_t$	0.520***	0.445***	0.561**	0.301***	0.100	-0.182
	(0.122)	(0.130)	(0.197)	(0.063)	(0.132)	(0.142)
F	14.860	13.138	8.582	28.294	1.825	15.567
Panel C						
$MFAQRevShare99_i * Dum02_t$	0.373***	0.312**	0.304	0.242***	0.019	-0.107
	(0.103)	(0.108)	(0.162)	(0.048)	(0.109)	(0.098)
F	14.330	12.465	8.538	29.718	1.912	14.761
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes
N	3031	2944	1539	4971	1992	3367
Number of Firms	637	631	373	969	459	729

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 the logarithm of the share of the total wages paid to college educated employees over total wages. The data sample is between 1995 and 2006. 2007 is not used because the 8 digit education variable, from which the education characteristics variables are derived, is not available that year. The dependent variable in column a is the logarithm of the share of college level employees in 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 in occupations where professional and technical skills are required. The dependent variable in column d is the logarithm of the average work experience of employees in occupations where professional and technical skills are required. The source of the data is persondata (IDA), Statistics Denmark.

Table A-4: Intangible Assets and Product Churning

Sample	Textile and Apparel Manufacturers (1996-2004)					
	(a)	(b)	(c)	(d)	(e)	(f)
Variable	Log Intangible Assets	Firm Scale	Log No of Dropped Products	Log No of New Products	Log No of New Non-MFA Products	Log No of New Non T&C Products
Panel A						
$MFAQ2Prod99_i * Dum02_t$	-0.536**	-0.506**	0.490***	0.170*	0.234***	0.311***
	(0.180)	(0.166)	(0.078)	(0.069)	(0.066)	(0.069)
F	104.725	128.208	169.676	163.374	138.907	64.055
Panel B						
$MFAQ2ProdShare99_i * Dum02_t$	-1.050	-1.099	0.818**	0.513**	0.630***	0.578**
	(0.643)	(0.607)	(0.271)	(0.189)	(0.188)	(0.214)
	106.548	130.795	163.706	166.850	143.513	64.182
Panel C						
$MFAQ2RevShare99_i * Dum02_t$	-1.115**	-1.103**	0.502*	0.322	0.415*	0.442*
	(0.366)	(0.349)	(0.199)	(0.181)	(0.169)	(0.184)
F	106.967	131.717	165.851	166.645	142.620	64.793
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes
N	4380	4380	3164	3196	3196	3196
Number of Firms	928	928	699	716	716	716

Robust standard errors are reported in parentheses. They are clustered for firms. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively. 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 to total assets. The product definitions are at the 8-digit CN level. A dropped product is defined as a product that a firm stopped selling that current year and is not observed to be 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 2005, the sample period is taken as 1996-2004. 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 columns (c)-(f). However, results with no controls for size quintiles are also robust and available in the supplemental appendix. Data source: Regnskabsdata, Statistics Denmark.

Table A-5: Pre-Post WTO Analysis with Aggregate Data I

Sample	T&C Manufacturers pre(1995-2001) and post(2002-2007) periods						
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Variable	Log Turnover	Log Value Added	Log FTE	Log Labor	Log Capital	Log Intangible Assets	Log Investment
Panel A							
$MFAQProd99_i * Dum02_t$	-0.181**	-0.210**	-0.274***	-0.261***	-0.127	-0.492**	-0.292*
	(0.066)	(0.065)	(0.065)	(0.060)	(0.108)	(0.153)	(0.116)
$Dum02_t$	0.032	-0.067	-0.073	-0.137***	0.043	-0.376***	0.096
	(0.037)	(0.036)	(0.039)	(0.030)	(0.057)	(0.076)	(0.071)
F	4.014	14.876	23.746	40.464	0.711	33.685	3.183
Panel B							
$MFAQProdShare99_i * Dum02_t$	-0.245**	-0.341***	-0.451***	-0.446***	-0.312	-0.553	-0.507*
	(0.094)	(0.094)	(0.112)	(0.099)	(0.184)	(0.293)	(0.207)
$Dum02_t$	0.011	-0.085*	-0.095**	-0.156***	0.046	-0.444***	0.075
	(0.035)	(0.035)	(0.036)	(0.029)	(0.054)	(0.073)	(0.066)
F	4.160	19.851	23.332	44.352	1.444	30.361	3.006
Panel C							
$MFAQRevShare99_i * Dum02_t$	-0.256*	-0.326**	-0.321***	-0.322***	-0.276	-0.591*	-0.454**
	(0.106)	(0.101)	(0.086)	(0.080)	(0.147)	(0.242)	(0.148)
$Dum02_t$	0.012	-0.087**	-0.112**	-0.172***	0.041	-0.438***	0.068
	(0.034)	(0.033)	(0.036)	(0.029)	(0.054)	(0.071)	(0.064)
F	3.156	14.836	24.866	45.578	1.753	31.760	4.925
N	1605	1603	1603	1667	1589	1514	1574
Number of Firms	1093	1093	1093	1155	1083	1052	1071

Robust standard errors are reported in parentheses. They are clustered for firms. 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 employee head-count. The dependent variable in column e is the logarithm of the physical capital assets. The dependent variable in column f is the logarithm of intangible assets. The dependent variable in column g is the logarithm of the total investment in physical assets. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods. All specifications include firm fixed effects. Data Source: Statistics Denmark.

Table A-6: Pre-Post Analysis with Aggregate Data II

Variable	(a) Basic Level Occupations	(b) Professional and Technical Occupations	(c) Employees with College Education	(d) Employees with High School Education	(e) Employees with T&C Tech. Design Education	(f) Employees with T&C Production Education	(g) Log of Avg. Hourly Wage
Panel A							
$MFAQProd99_i * Dum02_t$	-0.240***	-0.087	0.015	-0.343***	0.062*	-0.202***	0.053***
	(0.065)	(0.047)	(0.045)	(0.057)	(0.031)	(0.041)	(0.014)
$Dum02_t$	-0.381***	-0.048**	0.021	-0.162***	0.007	-0.022	0.019*
	(0.030)	(0.018)	(0.015)	(0.026)	(0.009)	(0.015)	(0.010)
F	136.907	8.548	1.274	68.887	2.893	18.714	27.032
Panel B							
$MFAQProdShare99_i * Dum02_t$	-0.440***	-0.137	0.042	-0.531***	0.068	-0.316***	0.080**
	(0.107)	(0.081)	(0.069)	(0.102)	(0.046)	(0.078)	(0.026)
$Dum02_t$	-0.394***	-0.056**	0.020	-0.193***	0.016	-0.039**	0.024**
	(0.030)	(0.018)	(0.016)	(0.026)	(0.010)	(0.015)	(0.009)
F	141.420	8.603	1.204	67.986	2.666	15.825	20.091
Panel C							
$MFAQRevShare99_i * Dum02_t$	-0.299***	-0.106	0.045	-0.374***	0.052	-0.252***	0.057**
	(0.089)	(0.080)	(0.068)	(0.081)	(0.042)	(0.074)	(0.020)
$Dum02_t$	-0.412***	-0.060***	0.019	-0.213***	0.018	-0.048**	0.027**
	(0.030)	(0.018)	(0.017)	(0.026)	(0.011)	(0.015)	(0.009)
F	145.038	8.450	1.243	69.629	2.694	14.243	19.417
N	1605	1605	1631	1631	1631	1631	1634
Number of Firms	1095	1095	1121	1121	1121	1121	1135

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 that are classified as doing basic skill required jobs plus 1. The dependent variable in column (b) 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. The dependent variable in column (c) is the logarithm of the number of employees with at least some college level education plus 1. The dependent variable in column d is the logarithm of the number of employees with at most high school diploma plus 1. The dependent variable in column (e) is the logarithm of the number of employees with textile and clothing related technical design education plus 1. The dependent variable in column (e) 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 (f) is the logarithm of the average hourly wage within firms. The logarithm transformation is applied after taking the mean values of original variables across 1995-2001 and 2002-2007 periods (subject to their availability). All specifications include firm fixed effects. Data Source: Statistics Denmark.

Table A-7: Pre-Post Analysis with Aggregate Data III

Sample	T&C Manufacturers pre(1996-2001) and post(2002-2004) periods			
	(a)	(b)	(c)	(d)
Variable	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
Panel A				
$MFAQ2Prod99_i * Dum02_t$	0.490***	0.215**	0.320***	0.401***
	(0.083)	(0.066)	(0.067)	(0.075)
$Dum02_t$	0.242***	0.061	0.095**	0.163***
	(0.037)	(0.034)	(0.034)	(0.038)
F	85.038	81.757	81.725	59.155
Panel B				
$MFAQ2ProdShare99_i * Dum02_t$	0.931**	0.582**	0.823**	0.826**
	(0.335)	(0.196)	(0.255)	(0.288)
$Dum02_t$	0.322***	0.090**	0.140***	0.228***
	(0.037)	(0.032)	(0.031)	(0.036)
F	89.021	83.145	81.983	56.273
Panel C				
$MFAQ2RevShare99_i * Dum02_t$	0.458	0.299	0.460*	0.485*
	(0.243)	(0.172)	(0.180)	(0.196)
$Dum02_t$	0.339***	0.100**	0.152***	0.239***
	(0.037)	(0.031)	(0.031)	(0.036)
F	85.412	78.707	78.012	54.507
Panel D				
$MFAQProd99_i * Dum02_t$	0.335***	0.182**	0.265***	0.337***
	(0.069)	(0.058)	(0.058)	(0.066)
	0.216***	0.032	0.055	0.109**
	(0.039)	(0.039)	(0.036)	(0.041)
F	83.564	82.135	80.667	61.306
N	1019	1020	1020	1020
Number of Firms	699	716	716	716

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, and is not observed to be 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. All regressions include size quintiles, where the size is measured as the number of products. All regressions include firm fixed effects. Data set Data Source: Statistics Denmark.

Table A-8: 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 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 Statistics Denmark. The main data sets are an international trade data-set (Udtræk Udenrigshandel), a domestic sales/production data-set (Udtræk Varestatistik), a firm accounting data-set (Udtræk Regnskabsdata) and a person-level labor market data-set (Udtræk Persondata / IDA). Detailed information on content, coverage and variable definitions of these data-sets can be found at http://www.dst.dk/da/Statistik/dokum
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 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.[31]. 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.[32]

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 Statistics Denmark and also by the LMDG. For 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 Statistics Denmark 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 − beginning of year 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 year 2000 Danish kroner. Physical capital assets include plant, machinery,

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

[32] 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.

technical installations, land, buildings, and other equipment such as computers, and office furniture. Table B-1 and B-2 present summary statistics for firm-level variables from the 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 year 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 year 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 a Danish version of 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 does not include data for the year 1995. 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' values 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 work such as cleaning services, delivery services, guard work, and transport work. The last grouping, pstill2 value 37, contains occupations that are unclassified 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 with the first two digits at 25 or below. The group of people with at least some college schooling refers to a hffsp value with 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 six digits 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/production data between 1995 and 2005 are merged to construct product portfolios of firms. The first eight digits of the product categories in the domestic sales data are the same as the combined nomenclature (CN) 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 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 correspondence of the quota categories. The annex is available at the SIGL. The resulting CN correspondence 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. The matchings 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	4218	6	16.955	30.185	1995-2005
Number of 6-digit Products	4218	6	15.240	26.082	1995-2005
Number of New Products	3467	2	6.491	12.972	1996-2005
Number of New Non-MFAQ Products	3467	2	5.041	10.620	1996-2005
Number of New Non-T&C Products	3467	0	2.560	7.967	1996-2005
Number of Dropped Products	3609	2	5.365	11.593	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	41.68	15.88	10.13	6.78	4.85	20.67

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	84.33	10.61	2.31	1.08	0.22	1.44
6-10	24.59	46.97	17.80	6.06	1.47	3.12
11-15	4.78	25.48	41.40	14.01	6.37	7.96
16-20	5.58	5.12	20.93	37.67	14.88	15.81
21-25	3.75	3.75	8.13	18.13	30.63	35.63
25+	1.00	1.84	1.51	2.68	7.36	85.62

Source: Statistics Denmark.