Globalization, Gender, and the Family*

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September 27, 2018

This paper shows that globalization shocks have far-reaching implications for the economy's fertility rate and family structure because they influence work-life balance. Employing population register data on marriages, divorces and births together with employer-employee linked data for Denmark, we show that lower labor market opportunities due to Chinese import competition lead to a shift towards family, with more parental leave taking and higher fertility, as well as more marriages and fewer divorces. This pro-family, pro-child shift is driven largely by women, not men. Correspondingly, the negative earnings implications of the trade shock are concentrated on women, thereby increasing gender earnings inequality. We show that the choice of market versus family is a major determinant of worker adjustment costs to labor market shocks. While older workers respond to the shock rather similarly whether female or not, for young workers the fertility response takes away the advantage in shock adjustment that they typically have–if the worker is a woman. We find that the female biological clock, that women have difficulties to conceive beyond their early forties, is central for the gender differential, rather than the composition of jobs and workplaces, and other potential causes.

Keywords: Fertility, Earnings Inequality, Marriage, Divorce, Import Competition, Occupational Choice

JEL Classification: F16; F66; J12; J13; J16

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*First draft: December 2016. The study is sponsored by the Labor Market Dynamics and Growth Center (LMDG) at Aarhus University. Support from Aarhus University and Statistics Denmark are acknowledged with appreciation. We thank Henning Bunzel for his help with the data, Tibor Besedes, Ben Faber, Dan Hamermesh, John McLaren, Bob Pollak, Veronica Rappoport, Steve Redding, Andres Rodriguez-Clare, and Esteban Rossi-Hansberg, as well as audiences at the ASSA 2018, UC Berkeley, The Role of the Firm in the Labor Market Conference (Berlin), SETC Cagliari, the Duke Trade Conference, EEA Geneva, EEA Cologne, ETSG Florence, IfW Kiel, the IZA/Barnard Gender and Family Conference (New York City), Kentucky, Munich, Princeton, RIETI (Tokyo), UIBE (Beijing), and ETH Zurich for useful comments.

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1 Introduction

Central to coping with labor market shocks from trade liberalization are the adjustment costs of workers as they seek to re-establish favorable earnings trajectories in the aftermath of the shock (Artuc, Chaudhuri, and McLaren 2010, Autor, Dorn, Hanson, and Song 2014).[1] This paper extends the analysis of worker adjustment costs beyond worker age, skill, and the conditions of the local market to the market versus family choice.[2] Studying workers who were exposed to rising import competition from China in the 2000s, we show that as the trade shock lowers market employment opportunities the likelihood of shifting to family activities is crucial for a successful labor market adjustment, with worker age and gender playing major roles.

Using population register together with labor market data on workers matched to their firms, our study provides a longitudinal picture of individual-level family *and* labor market responses to rising import competition in Denmark from 1999-2007. Lower labor market opportunities are accompanied by a shift towards family. Exposed workers disproportionately have children and take parental leave, they form new marital unions, as well as they avoid breaking up existing ones. We document the new finding that the pro-family, pro-child shift caused by trade exposure is driven by women, not men. The direct implication is that rising import competition increases the gender earnings gap.

We study the responses of the 1999 cohort of workers to a policy-induced trade liberalization, the removal of Multi-fiber Arrangement quotas on Chinese exports following the country's entry into the World Trade Organization (late 2001). It leads to a 23 percent increase in fertility and a similar uptake in parental leave for unmarried Danish women, subsequent marriage rates are up by about a quarter, at the same time when married women divorce substantially less because of the

[1] Autor, Dorn, and Hanson (2016) present a broader survey.

[2] See Becker's groundbreaking *Theory of Marriage* (1973). Synonymous to family in our paper is the term household. Companionship and children are main motivations for two individuals to live together (Becker 1973).

import competition.[3] These family responses go hand in hand with long-run labor earnings losses for women, almost 85 percent of one year's salary, in contrast to men who do not significantly lose earnings over 1999 - 2007. We also find qualitatively similar findings for Denmark's entire (private-sector) labor force in an extension employing an instrumental-variables approach.[4]

Investigating the reasons for this gender difference with detailed worker, firm, and partner information, the primary reason why women shift more towards family than men is not that womens' original employment was concentrated at relatively exposed firms or in more vulnerable occupations compared to men.[5] There is no evidence that women experience a larger negative shock than men based on the respective earnings losses at the original firm. Rather, men and women follow a different adjustment path to the shock, with women moving relatively strongly towards family. One interpretation of that is that women have relatively high labor market adjustment costs.

Our preferred explanation for this gender difference in adjustment is womens' biological clock. Because women can often not conceive beyond their early forties, they have a higher reservation value than men. Consequently, a negative labor demand shock due to trade exposure will raise a woman's incentive of moving towards family by more than it does for a man. Furthermore, because giving birth is physically and psychologically demanding, the market penalty of fertility in terms of work interruptions tends to be higher for women than for men, which can reduce womens' incentives to invest into the new human capital needed in a new job or sector. Support for this explanation comes from the finding that it is mostly younger women who account for the gender differential; in contrast, the adjustment of women past their fertile age is similar to that of men. Below we also discuss a number of other potential explanations for our findings.

The impact of globalization in advanced countries through rising import competition, especially

[3] Marriage forms a marital union whereas divorce ends the marital union. We thus see increased marriage and lower divorce rates both as signs of a higher level of family activity.

[4] See Section B in the Appendix.

[5] Industry heterogeneity is an unlikely explanation because all workers initially are employed in textiles.

from China, has attracted a lot of attention recently (Autor, Dorn, and Hanson 2013, Autor, Dorn, Hanson, and Song 2014, Bloom, Draca, and van Reenen 2016, Ebenstein, Harrison, McMillan, and Phillips 2014, Hakobyan and McLaren 2016, Keller and Utar 2017, Pierce and Schott 2016a, and Utar 2014, 2018). In addition to labor markets, a smaller but growing literature has studied the impact of Chinese import competition on non-labor market outcomes such as health (Pierce and Schott 2016b) and political elections (Che, Lu, Pierce, Schott and Tao 2016, Autor, Dorn, Hanson, and Majlesi 2017).[6] Consistent with our analysis is Autor, Dorn, and Hanson's (2018) finding that female-specific trade shocks from China increase US marriage rates. Marriage responses in both Denmark and the US are consistent with Becker's (1973) prediction of higher gains to household formation when the earnings differential between the spouses is larger, and that import competition does not lower overall marriage rates in Denmark as it does in the US can be explained by Danish workers receiving more transfer income than their US counterparts.[7] As far as we know, our paper is the first study of gender differences in the response to rising import competition based on individual-level data.

By seeking to better understand adjustment costs to workers' re-establishing promising career paths after a shock, our paper relates to research in family economics as well as the literature on job displacement.[8] To the extent that trade exposure reduces fertility through channels present after job loss–fear of career interruptions (Del Bono, Weber, and Winter-Ebmer 2015), increased uncertainty (Farber 2010), lower health risk (Browning, Dano, and Heinesen 2006), or increased mortality (Sullivan and van Wachter 2009)–, accounting for these factors will increase the pos-

[6] See also Dai, Huang, and Zhang (2018), Dix-Carneiro and Kovak (2017), Topalova (2010), and Utar and Torres-Ruiz (2013) on regional labor market effects of trade liberalization in emerging countries, as well as Anukriti and Kumler (2018)), and Kis-Katos, Pieters, and Sparrow (2018) for analyses of some family outcomes.

[7] In section 5 we show that in Denmark trade exposure does not reduce personal income because of insurance benefits and transfers, in contrast to the US where such payments do not replace earnings losses (Autor, Dorn, Hanson, and Song 2014). Furthermore, to the extent that mens' earnings are higher than womens', the impact of trade exposure to reduce relative male earnings (Autor, Dorn, and Hanson 2018) reduces marriage incentives, whereas in Denmark relative male earnings went up (see section 5) and the higher earnings differential can explain higher marriage rates.

[8] Younger workers may have higher adjustment costs than older workers, e.g., because seniority rules insulate the latter more strongly from career disruptions than the former (Oreopoulos, von Wachter, and Heisz 2012).

itive fertility response reported below.[9] Importantly, income losses are relatively small in our setting, implying that fertility decisions reflect substitution more than income effects (Huttunen and Kellokumpu 2016, going back to Becker 1960, 1965). Recent work on worker adjustment cost differences to trade liberalization does not examine the labor market-family adjustment margin.[10] By highlighting the importance of age through its influence on fertility, our analysis sheds new light on worker adjustment costs more generally, which provides an input in the design of labor market policies to more strongly possible fertility choices of workers.

We also contribute to a fast growing literature on the reasons behind behavioral gender differences in various settings (Bertrand 2010 and Blau and Kahn 2017 survey). While labor-saving household technology (e.g. washing machine) and birth control (Goldin and Katz 2002) are among the factors that have reduced the gender earnings gap in the post-WWII era, our finding that trade liberalization increases the gender earnings gap qualifies the presumption that–perhaps by giving women new opportunities–it would necessarily reduce gender inequality; this complements recent evidence that exporting firms tend to pay men a wage premium relative to women (Boler, Javorcik, and Ullveit-Moe 2018).[11] By employing detailed micro data on firms and workers, our analysis largely eliminates gender composition differences, e.g. that women are relatively more likely to be clerks rather than managers. As in Goldin's (2014) temporal flexibility hypothesis, children are central to our biological clock explanation of gender differences. By finding the strongest evidence for gender differentials among lower-paid, low-educated workers, however, our analysis emphasizes womens' lower intertemporal elasticity of labor supply together with opportunity cost factors more

[9] Globalization shocks do not affect labor markets in the same way as other shocks that may cause job loss, see Keller and Utar (2017).

[10] In particular, Brussevich's (2018) analysis focuses on sectoral cost differences, e.g., women having lower costs of moving into services, and Autor, Dorn, Hanson, and Song (2014) conclude that the modestly higher earnings losses of younger workers are driven by these workers' lower attachment to the labor market. See also Artuc, Chaudhuri, and McLaren (2010), Dix-Carneiro (2014).

[11] Earlier work by Black and Brainard (2004) finds that import competition narrows the residual gender wage gap more rapidly in relatively concentrated industries, lending support to Beckers (1957) model of discrimination according to which increased market competition reduces employer discrimination in the long run. For an overview of the relationship between trade liberalization and gender inequality, see Pieters (2015).

than the demanding characteristics of high-powered jobs that require to be on the job 'all the time'. Methodologically, by exploiting the quasi-experiment of a sudden shift in labor demand due to a policy-induced increase in competition, our analysis seeks to combine the real-world nature of individuals' long-term career choices with the impeccable identification of the experimental approach.

The remainder of the paper is as follows. The following section reviews the recent evolution of imports in Denmark and discusses identification of the impact of rising import competition. We also introduce the most important recent developments regarding family formation and fertility as well as parental leave in Denmark. Section 3 lays out the econometric framework of this paper. Section 4 shows that rising import competition has increased marriage and parental leave, as well as fertility for younger women, at the same time when it reduced divorce rates of Danish workers. Further, we document the key gender differential by demonstrating that all family impacts are largely due to women. Next we establish that increased family activity is the flip side of reduced market work by showing that women experience far higher earnings losses through import competition than men (section 5). Turning to the causes of the gender differential, section 6 introduces our biological clock argument and provides evidence on the central importance of children. We also discuss a number of other explanations, including initial exposure differences and composition effects through occupational sorting. Finally, section 7 provides a number of concluding observations. The Appendix provides complementary results on gender differences in the responses to trade exposure for Denmark's entire private-sector labor force, further descriptive evidence, details on a placebo exercise before China entered the WTO, as well as more details on the trade liberalization in textiles through lifting of quotas on China.

2 Import Shocks and Integrated Data on Individual-Level Market versus Family Behavior

This section provides background on recent trends in import competition and family patterns in Denmark. Also the information that allows us to identify the impact of rising import competition, employer-employee matched data which gives a comprehensive picture of the labor market situation of individual workers in Denmark, and population register data which provides information on all child births, marriages, and divorces. We present also descriptive evidence on the behavior of workers depending on their exposure to rising import competition, as well as gender, which give a useful starting point for the following regression analysis.

2.1 Rising Import Competition for Denmark's Textile Workers

Many advanced countries have experienced a rising level of import competition after China joined the World Trade Organization (WTO) in December 2001. This study employs a concrete policy change that was part of the trade liberalization associated with China's WTO membership, the dismantling of binding quotas on Chinese textile exports that were part of the Multi-Fibre Agreement (MFA).[12]

The MFA was established in 1974 as the cornerstone of a system of quantitative trade restrictions on developing countries' textile and clothing exports with the intention to protect this relatively labor intensive sector in advanced countries. Denmark did not play a direct role in the establishment of the MFA because it was negotiated and managed at the level of the European Union (EU).

During the Uruguay multi-lateral trade liberalization round (1986 to 1994), it was agreed to bring textile trade in line with other world trade for which per the rules of the newly established WTO

[12] A quota is a quantitative limit on how much can be traded.

quotas are generally ruled out. The MFA quotas were agreed to be abolished in four phases starting from the year 1995.

Importantly, neither Denmark nor China were directly involved in negotiating the removal of the textile quotas (as well as which goods would be covered in which of the four phases). This is because negotiations were done at the level of the EU, where Denmark's influence as a relatively small country was limited, while China did not influence the negotiations because at the time, 1995, China was not a member of the World Trade Organization. For the same reason, China did not benefit from the first two trade liberalization phases of 1995 and 1998. Only after China became a member of the WTO in December 2001 it immediately benefited from the first three liberalization phases (1995, 1998, and 2002), as well as the fourth phase of 2005.[13]

As a consequence, the liberalization of Chinese textile and apparel exports as the country entered the WTO can be viewed as a quasi-natural experiment providing exogenous variation in exposure to rising import competition in Denmark's textile and apparel industries. The episode is well known in the literature and has been frequently employed to estimate various impacts of trade (Bloom, Draca, and Van Reenen 2016, Harrigan and Barrows 2009, Khandelwal, Wei, and Schott 2013, and Utar 2014, 2018).[14] Section D of the Appendix provides additional information on this trade liberalization.

What was the impact of China's entry into the WTO on Denmark's textile imports from China? Since the quotas were generally binding and China has a comparative advantage in textile production, the quota removals triggered a surge of Chinese textile exports to Denmark. Figure 1 shows

[13]The large majority of the firms that produced goods subject to 2002 quota removal (Phase I, II, and III) were also producing goods subject to 2005 quota removal (Phase IV); the overlap is 87 percent. Due to this as well as the lack of uncertainty regarding the timing of Phase IV after China's membership of the WTO, our empirical strategy does not separately identify the effect of the 2002 and the 2005 removals.

[14]In particular, Utar (2014) employs the MFA quota liberalization to document firm-level declines in production, employment and intangible capital, followed by significant re-structuring within firms. Utar (2018) shows that increased import competition due to the quota removal causes displacement followed by a shift to service jobs, with workers incurring substantial adjustment costs to the extent that their human capital is specific to manufacturing. Neither of these studies discusses family outcomes and gender differentials associated with rising import competition.

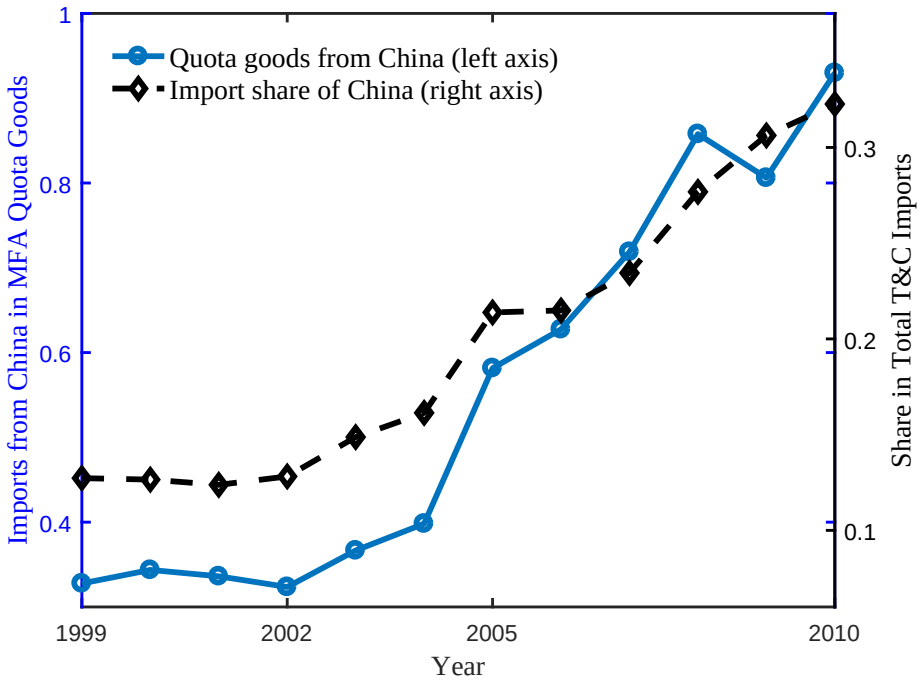

Figure 1: Evolution of Chinese Imports in Response to Quota Removal

Notes: The solid line shows Danish imports from China of MFA quota goods, relative to Danish value added in textile and clothing goods. The dashed line shows China's share in all Danish imports of textiles and clothing goods.

the value of imports coming from China in MFA quota goods over 1999-2010. The import value is measured in multiples of the total value-added in the textile and clothing industry as of the year 1999 (around 1.3 billion Euro).

Our identification strategy employs information on individual firms' product mix and the uncertainty about the timing of China's accession to the WTO through which China benefited the trade liberalization. We identify worker-level exposure to rising import competition using information on the firms' Common Nomenclature (CN) 8-digit product-level domestic production information together with the employer-employee link in the data. First, we match administrative quota categories to 8-digit CN products to identify textile and clothing firms that have domestic production in any of these protected goods that will subsequently be quota free with respect to China. Information on the firms' products comes from the domestic production data base.[15]

A firm is defined to be treated if in 1999 it produced in Denmark a 8-digit product that would be subject to quota removal as China entered the WTO in 2002, and untreated otherwise. Exploiting the employer-employee link in the data, a treated (or, exposed) worker is one who is employed by a textile firm domestically producing one or more products in 1999 for which quotas fell away with China entering the WTO, while a not exposed worker is one who is employed by a textile firm that did not produce such products within Denmark in 1999. Notice that our definition of treatment is based on the year 1999, three years before China's entry into the WTO; in this way we reduce the possible influence of anticipation effects.[16]

[15] Despite its threshold of 10 or more workers, this database (called VARES) covers close to the universe of workers because textiles and clothing firms below the VARES threshold are very rare.

[16] We have also employed an alternative treatment variable, the firm's 1999 revenue share of quota-affected products, which yields similar results.

2.2 Workers and their Firms

Information on the workers and their firms comes from the Integrated Database for Labor Market Research of Statistics Denmark (IDA database). It contains administrative records on virtually all individuals and firms in Denmark..[17] Specifically, we start out with annual information on all persons of age 15 to 70 residing in Denmark with a social security number, information on all establishments with at least one employee in the last week of November of each year, as well as information on all jobs that are active in that same week.

The analysis in the text is based on all full time workers employed by Denmark's textile and apparel industries as of the year 1999. We exclude workers who were not working full-time because their market versus family choices are likely to be different from those of full-time workers. We follow the 1999 cohort of full-time workers employed in the textile and clothing industry wherever they go, both inside and outside of the labor force, until 2007. The main estimation sample consists of all full-time workers that make positive wages and are between 18 and 56 years old in the year 1999. We impose this age constraint because it ensures that our workers would not typically go into retirement during our sample period. To perform a placebo exercise we also follow these workers from 1999 backward to the year 1990.[18]

We examine the workers' annual salary, hours worked, unemployment spells, and job switching using information on the industry code of primary employment, the hourly wage, the worker's highest attained education level and labor market experience, as well as gender, age, immigration status, and occupation at the four-digit level.[19] We also analyze movements into unemployment and outside of the labor force, as well as into early retirement.

[17] For brevity, we use the term firm although our analysis includes workplaces that usually are not referred to as firms. These are not that common in the textile industry, however, see our analysis of Denmark's economy-wide labor force in the Appendix, Section B.

[18] See Section 3 and Appendix, Section A.

[19] The Danish version of the International Standard Classification of Occupation (D-ISCO) at the four-digit level has about 400 different job types. See https://www.dst.dk/en/Statistik/dokumentation/nomenklaturer/disco-88.

The employer-employee link allows us to control for a number of firm-level variables that may be important for the workers' labor market and family choices. They include firm size (measured by employment), firm quality (proxied by the average firm wage), as well as the past separation rate of the firm. Being able to control for the specific situation of each worker in terms of industry, firm, and job is important for assessing the the importance of selection for our results. Furthermore, to the extent that a worker is not single, partner characteristics, including earnings, income, and whether the partner is exposed to rising import competition, are bound to matter. The analysis below will employ extensive information on how partner characteristics shape worker choices.[20]

Our main sample, all full-time textile workers in the year 1999, is close to 10,000 in number. Of these, close to half are exposed to rising import competition, see Table 1, on top. The table shows in Panel A a number of key characteristics as of 1999. Comparing treated with untreated workers in terms of their 1999 characteristics sheds light on the extent of their similarity before the onset of rising import competition.

Worker adjustment costs are generally increasing with age, not least because older workers tend to have a harder time to learn the skills needed in new jobs than younger workers. The average age of both treated and untreated workers is about 39.2 years, and both tend to have between 14 and 15 years of labor market experience. Immigrants are somewhat less likely to work at firms subject to rising import competition, whereas average earnings are quite similar. In terms of family status, around 60 percent of treated workers are married, compared to about 58 percent for the untreated group.[21] Even though treated workers are somewhat more likely to be married compared to untreated workers, the average number of children of untreated workers is a bit higher. All in all, Table 1 indicates that the differences between treated and untreated workers are quite small.

[20] A number of interesting questions would call for aggregating individual-level information to the household level; for example, using regional exposure variation Dai, Huang, and Zhang (2018) show that rising import competition in China has increased the share of households in which only the man is employed. We do not perform a household-level analysis here because workers without partner are central to some of our analysis.

[21] The share of single workers is about 28 percent for both treated and untreated workers.

The same can be said about the propensity that treated and untreated workers have a newborn and take parental leave in the year 1999; the former is somewhat higher for untreated workers while parental leave taking is slightly higher among treated workers. Quantitatively, about every 20th worker has a newborn or takes parental leave in the year 1999.

We distinguish three levels of formal education of our workers: at most high school, vocational training, and college education or more.[22] Education levels matter for worker adjustment to the negative labor demand shock of trade exposure because college education provides general skills that can facilitate switching from one job (or industry) to another. In our sample, the share of workers with vocational training is virtually the same for the sets of treated and untreated workers (36 percent, see Table 1). Every ninth of the untreated workers has college education, while in the treated set of workers college education is slightly more prevalent.

Workers have a range of different jobs ranging from relatively low-paid laborers to highly-paid professionals and managers. A quantitatively important group are machine operators, typically making mid-level wages, who account for more than one third in both the set of treated and untreated workers. On the other hand, between 5 to 6 percent of all textile workers are managers. Generally, we do not see marked differences by occupation between the sets of treated and untreated workers.

Overall, Table 1 suggests that there are no strong differences between the sets of treated and untreated workers at the beginning of our analysis.

[22] Vocational training combines on the job training at firms with formal education at schools; it takes typically about 3 years. For an analysis of vocational training in the context of rising import competition, see Keller and Utar (2017).

Table 1: Comparing Workers by Exposure to Import Competition

	Treated	**Untreated**		
	N = 4,743	N = 5,255		
Variables	**Average**	**Average**	**Diff.**	**t-stat**
Age	39.206	39.228	-0.022	-0.111
Immigrant	0.053	0.076	-0.023	-4.607
Labor Market Experience	14.912	14.491	0.421	3.694
Log Annual Earnings	12.165	12.154	0.011	0.843
Married	0.604	0.576	0.028	2.802
No of Children	1.448	1.480	-0.032	-1.387
Birth Event	0.040	0.045	-0.004	-1.099
Parental Leave Take	0.053	0.050	0.003	0.687
College Educated	0.130	0.107	0.023	3.580
Vocational Educated	0.361	0.360	0.001	0.127
Machine Operator	0.353	0.359	-0.007	-0.685
Manager	0.059	0.052	0.008	1.680

Notes: Shown are averages of the 1999 characteristics of workers exposed (treated) and not exposed (untreated) to rising import competition from China. Treated workers are those whose firm manufactured in Denmark a product protected by a quota that would be removed with China's entry into the WTO; correspondingly, Untreated workers. Immigrant is an indicator for a worker who has first or second generation immigrant status. Labor market experience measured in years. Married, Birth Event, Parental Leave Take, College, Vocational, Machine Operator, and Manager are indicator variables. Log earnings is measured in 2000 Danish Kroner; the mean is about 29,000 US Dollar.

We now turn to describing the sample by trade exposure and by gender (see Table 2). Furthermore, for certain parts of our analysis it is natural to analyze subsets of workers. To understand whether rising import competition affects divorce behavior we focus on workers who–as of the year 1999–are married, and in addition our analysis of child birth focuses naturally on workers who are in their

fertile age.[23] In Table 2 we distinguish two different samples, the workers that were unmarried and those that were married in 1999. Note that the unmarried include workers who are co-habitating with another person.

[23] We take 36 years as the fertile age limit for women, and 45 years for men. Results are found to be similar for other plausible thresholds.

Table 2: Worker Characteristics By Gender and Family Status

	Treated Mean	Untreated Mean	Diff	t-stat
Panel A. Women	N = 3,067	N = 2,521		
Age	39.29	39.22	0.07	0.26
Hourly Wage	134.88	134.23	0.65	0.55
Married	0.62	0.61	0.01	0.60
Number of Children	1.51	1.55	-0.04	-1.32
Panel B. Married Women	N = 1,889	N = 1,533		
Age	42.18	41.90	0.28	0.91
Hourly Wage	136.02	135.11	0.91	0.59
Number of Children	1.88	1.92	-0.05	-1.39
Partner's Log Income	12.51	12.47	0.04	2.15
Panel C. Unmarried Women	N = 1,178	N = 988		
Age	34.66	35.06	-0.40	-0.91
Hourly Wage	133.05	132.87	0.19	0.11
Co-habiting	0.52	0.47	0.05	2.45
Number of Children	0.91	0.96	-0.05	-1.05
Partner's Log Income	12.41	12.39	0.01	0.45
Panel D. Men	N = 1,672	N = 2,730		
Age	39.08	39.24	-0.16	-0.53
Hourly Wage	189.53	181.64	7.89	2.66
Married	0.58	0.55	0.04	2.34
Number of Children	1.34	1.42	-0.08	-2.05
Panel E. Married Men	N = 974	N = 1,492		
Age	43.01	43.16	-0.15	-0.44
Hourly Wage	206.98	193.55	13.44	3.04
Number of Children	1.92	2.01	-0.09	-2.07
Partner's Log Income	12.14	12.15	-0.01	-0.44
Panel F. Unmarried Men	N = 698	N = 1,238		
Age	33.60	34.52	-0.53	-2.07
Hourly Wage	165.17	167.28	-2.11	-0.60
Co-habiting	0.39	0.41	-0.02	-0.88
Number of Children	0.54	0.71	-0.17	-3.67
Partner's Log Income	12.06	12.12	-0.06	-2.00

Notes: Table shows averages of 1999 worker characteristics. See the text for definition of treated and untreated workers. Partner characteristics in the case of unmarried workers are for co-habitant.

Table 2 indicates that the family status of being married typically means that workers are also older than unmarried workers. The average difference is about seven years for women and nine years for men, both for exposed and not exposed workers. Furthermore, married individuals do not account for the same fraction of all workers in the sample for men and women, which is because male and female sample workers tend to be married to individuals not employed in the textile and apparel industries.[24] Table 2 also provides some information on partner characteristics by reporting partner income. It is higher for married women than for married men, which is a reflection of the gender earnings gap between men and women. At the same time, the differences in partner income between treated and untreated workers are at most moderate as Table 2 indicates.

2.3 Indicators of Family Activity: Marriage, Divorce, Birth, and Parental Leave Information

The age at first marriage has increased for both men and women in Denmark since the 1960s, as it did in many other countries. In 1968 the average age at first marriage was 24.7 and 22.4 for men and women, respectively, while in the year 2008 these ages were 34.4 and 32. Education goals and an increased life expectancy have contributed to this. The long-term trend of delayed marriage slowed down recently, and the age at first marriage in 2014 was quite similar to 2008 for both men and women.

While marriage has come later for Danes, divorce rates have fallen in Denmark from the mid-1980s to the mid-2000s. In 1986, the chance that a marriage would last for five years was about 86%, rising to above 89% by 1998 and above 91% by the year 2007. A number of factors seem to have contributed to the lower divorce rates, and as we will show below one of them is the response

[24] In our sample of close to 6,000 married workers, only about 12 percent of workers are married to another textile worker as of the year 1999.

to rising import competition.[25] Marriage and divorce information for all Danish residents comes from Denmark's Central Population Register; they can be matched to the worker data with a unique person identifier.

An important aspect of family life in Denmark is co-habitation, which for many (though not all) couples is the stage of life before marrying. The share of persons living in a co-habitating relationship in Denmark has increased since the middle of the 20th century, as it did in many other high-income countries. During our sample period, the share of non-married cohabiting couples in all household types was stable at around 12-13%. Co-habitation information comes from the IDA data base.

One goal of household formation is often to raise children. In the time since 1990 the total fertility rate in Denmark has been broadly stable.[26] At the same time, there have been some fluctuations, for example during the period 2002 to 2008 when Denmark's total fertility rate increased by almost 10%. Looking at the contribution of women at different ages to total fertility, as women' age at first birth has risen the contribution of women aged 25 years–traditionally accounting for the largest share– to fertility has fallen while the contribution of women aged 30 and 35 years has correspondingly increased. Overlaying this trend are more short-term changes. For example, while the contribution to fertility by 25 year-aged women fell by 16% from 1996-2001 this decline was considerably slowed during the next five years (a decline of 4% between 2002-2007). While this may be due to a number of factors, lower opportunities in the labor market may have increased the incentives of relatively young women to have babies, as we will discuss below. Child birth information is derived from Statistics Denmark's Fertility Database. It provides parental information with personal IDs on every child born in Denmark.

[25] In the years after 2011, outside of our sample period, divorce rates in Denmark increased again.

[26] The total fertility rate is defined as the number of children that would be born alive per 1,000 women during the reproductive period of their lives (ages 15 through 49), if all 1,000 women lived to be 50 years old, and if at each age they experienced the given year's age-specific fertility rate. The rate for Denmark is estimated around 1,730 in the year 2017, compared to 1,870 for the United States; CIA World Fact Book, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2127rank.html.

Another indicator of reduced market work for the explicit purpose of child care is parental leave, which compared to having a child is a less drastic form of moving towards family. By international standards, parental childcare leave is generous in Denmark, though there have been some fluctuations in the parental leave provisions over time. Specifically, during the 1990s there was a step-by-step decrease of parental leave support, which was reversed in the early 2000s. From the year 2002 on, there is a maximum of 112 weeks of job-protected parental leave per child. Of this, the mother can take up to 64 weeks–18 weeks of maternity leave plus 46 weeks of parental leave–, while the father can take a maximum of 48 weeks, composed of 2 weeks of paternity leave and 46 weeks of parental leave.[27] The information on childcare leave comes from Statistics Denmark's Parental Leave database (*Barsellsspells*).

In addition to these worker and firm characteristics, there are other factors that may influence the workers' labor market versus family choices. In our cohort analysis we think of these primarily as characteristics as of the initial year of the sample, 1999.[28] Among unmarried workers those co-habitating with another person may well act different from single workers, not least because a co-habitating partner may either provide support or increase the worker's difficulties resulting from trade exposure depending on whether the partner him- or herself is exposed to rising import competition. Generally, partner characteristics may play an important role in determining labor market versus family choices, in part because they affect household income levels. Furthermore, children that live with a worker may matter as well because in addition to income needs the presence of children may affect the worker's human capital investment strategies and risk-taking behavior. For workers that have a partner as of the year 1999 (co-habitant or married), we employ information on the partner's exposure, earnings, education, age, and a range of other characteristics.

[27] See OECD Family Database, OECD Family Database

[28] Both years 2000 and 2001 are chronologically before the onset of rising import competition, however, we will focus on 1999 to limit the possible influence of anticipation effects. In contrast, characteristics in year 2002 or later may themselves be outcomes of worker adjustment and hence are endogenous.

2.4 Descriptive Evidence

In the previous section we have described the sample in terms of 1999 characteristics. Over the sample period of 1999 to 2007, our textile workers have quite different trajectories that depend on trade exposure, on idiosyncratic worker characteristics, and possible other factors, including gender. Some evidence on the latter is seen in Figure 2 which shows the distribution of workers by major sector in the final year of the sample, 2007. Recall that because all workers are 1999 textile and apparel workers, they are by construction in the manufacturing sector at the beginning of the sample. Figure 2 shows that 50 percent of workers not exposed to rising import competition are still in manufacturing by 2007, while 29 percent have moved to the services sector. Our sample confirms the general trend of a shift of employment away from manufacturing towards services.[29]

At the same time, Figure 2 shows that of the set of exposed workers, 44 percent are employed in the service sector by 2007, while only 36 percent have still a manufacturing jobs. This difference suggests that rising import competition has sped up structural change for exposed workers. If manufacturing firms exposed to new import competition have shut down, displacing their workers, or they have scaled down their production, the rate at which exposed workers seek to find jobs in services will be relatively high. In line with this, note that the disproportional shift of exposed workers into services is virtually the same size as their lower tendency of staying in manufacturing (15, versus 14 percentage points, respectively). The figure also shows the share of workers outside of the labor force as well as unemployed. Exposed workers are somewhat more likely to be out of the labor force than not exposed workers, but overall Figure 2 suggests that the most important influence of trade exposure appears to be on the shift from manufacturing to services.[30]

The following analysis provides evidence on key outcomes year-by-year in an event-study format. We begin with marriage patterns. Figure 3 on top compares marriage rates of exposed and not

[29] Other factors that may explain this shift towards services are the relocation of manufacturing jobs to other countries and relatively high rates of labor-saving technological change in manufacturing.

[30] This is confirmed in Utar (2018).

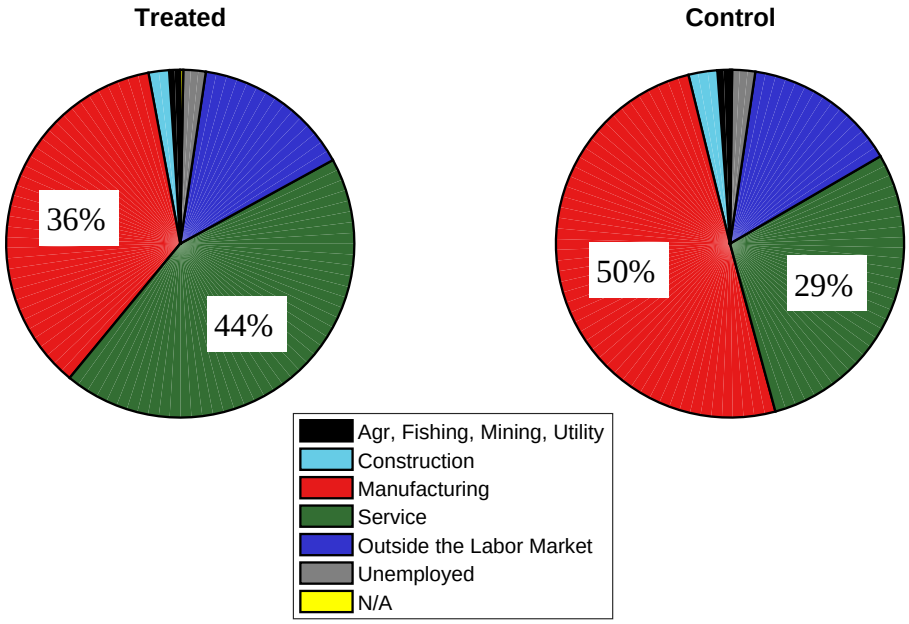

Figure 2: Sectoral Distribution of Workers in 2007

exposed unmarried workers.[31] Recall that the first full year in which China was member of the WTO was 2002; this is indicated by the vertical line in Figure 3. Marriage rates were around five percent before 2002, and overall there is a downward trend until 2006 when marriage rates are around 3.5 percent. The reason for lower marriage rates over time is that in some cases individuals marry and then stay with their partners, so we cannot observe them marrying again. Importantly, yearly marriage rates for exposed and not exposed workers were quite close to each other before the onset of new import competition in year 2002. Once the shock hit, however, marriage rates of exposed workers rose relative to those of not exposed workers. In the year 2004, specifically, the marriage rate of exposed workers is around 5 percent, compared to not exposed workers of about 4 percent. By the year 2006 marriage rates for the two sets of workers have more or less converged again. This graph is consistent with a positive impact of trade exposure on marriage. Furthermore, the evolution over time suggests that this effect may have been strongest in the immediate aftermath

[31] Here we drop the year 1999 from the analysis; by construction, the marriage rate in 1999 for all these women was zero.

of China's entry into the WTO, which is plausible.

We now turn to marriage patterns of treated and untreated workers by gender, see Figure 3, bottom. There, a striking difference emerges between men and women. Exposed women marry more than not exposed women during the treatment period, in contrast to men where exposure tends to reduce marriage rates. The overall increase in marriage rates during the treatment period shown in the top of Figure 3 is due to the behavior of women. Lower marriage rates of exposed men may be in part due to the lower marriageability of men, as has been noted for the US (Autor, Dorn, and Hanson 2018). Figure 3 presents some initial evidence that trade exposure may increase the extent of family activities, with possibly stark differences between the behavior of men and women.

Given the pro-marriage response of women, we turn to the fertility behavior of women next. Figure 4 shows annual birth rates for two samples of women in our sample, those who are unmarried as of 1999, versus those women who are married in 1999. In addition to the difference in family status, unmarried women are on average about seven years younger than married women (35 versus 42 years, see Table 2). Thus, the analysis distinguishes also older from younger women, where it is plausible that the older women is relatively less influenced by fertility considerations because conception is more difficult.

Consistent with that, the birth rates of older women are relatively low (the two bottom lines in Figure 4), and interestingly, the birth rates of exposed and not exposed married women are virtually identical. In contrast, for the younger women, trade exposure is associated with higher birth rates in the treatment period, and especially between 2002 and 2004. This provides some initial evidence that trade exposure leads to a positive fertility response of–especially younger–women.

We show additional event-study plots in the Appendix, section E. They show evidence consistent with exposure not only raising marriage and birth rates but parental leave uptake as well, and exposure is associated with lower divorce rates (Figures A-3 to A-6). Consistent with the results

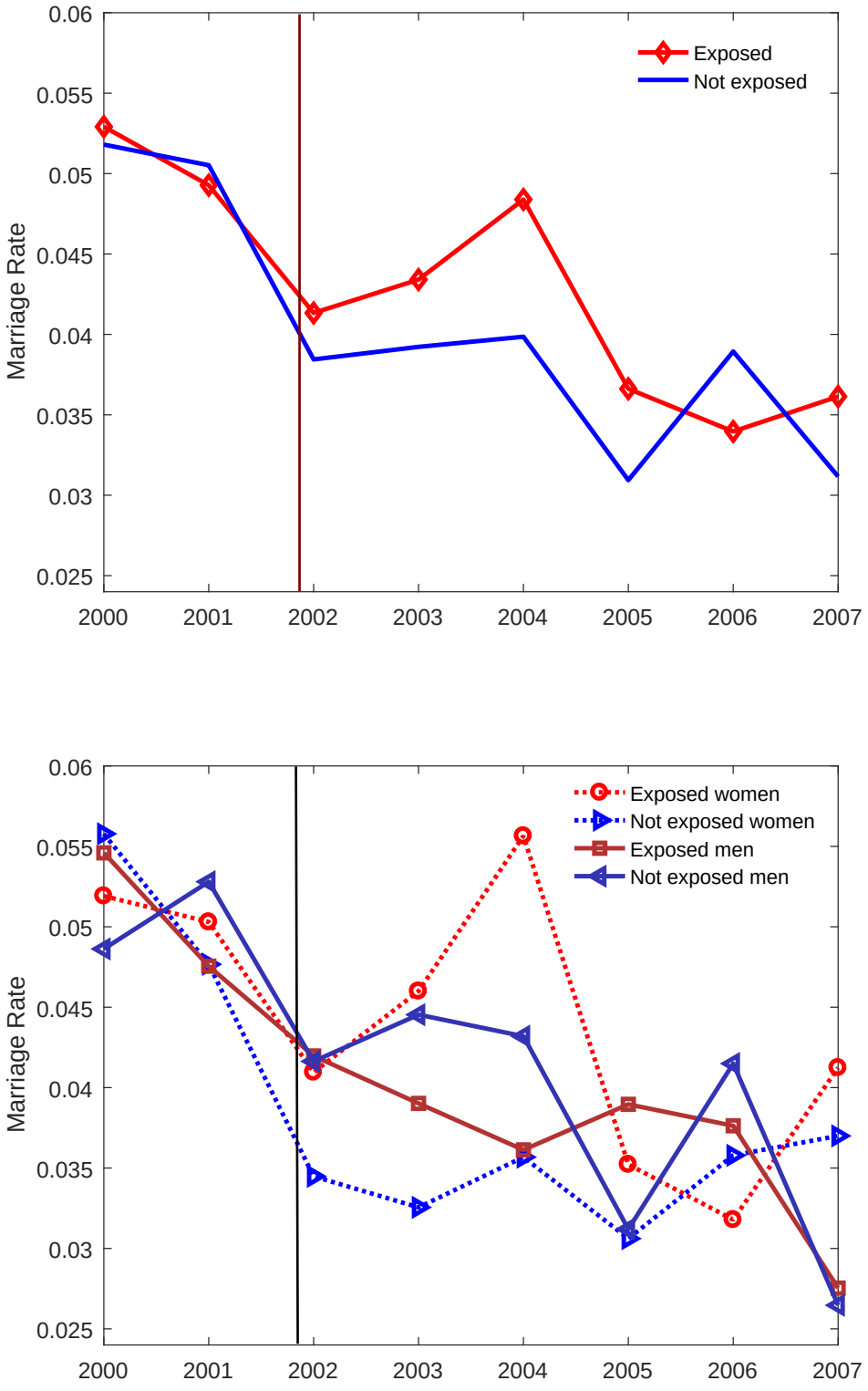

Figure 3: Marriage in the Face of Chinese Import Competition

Notes: Figure shows yearly rates of marriage for all as of 1999 unmarried workers by exposure (top) and by exposure and gender (bottom).

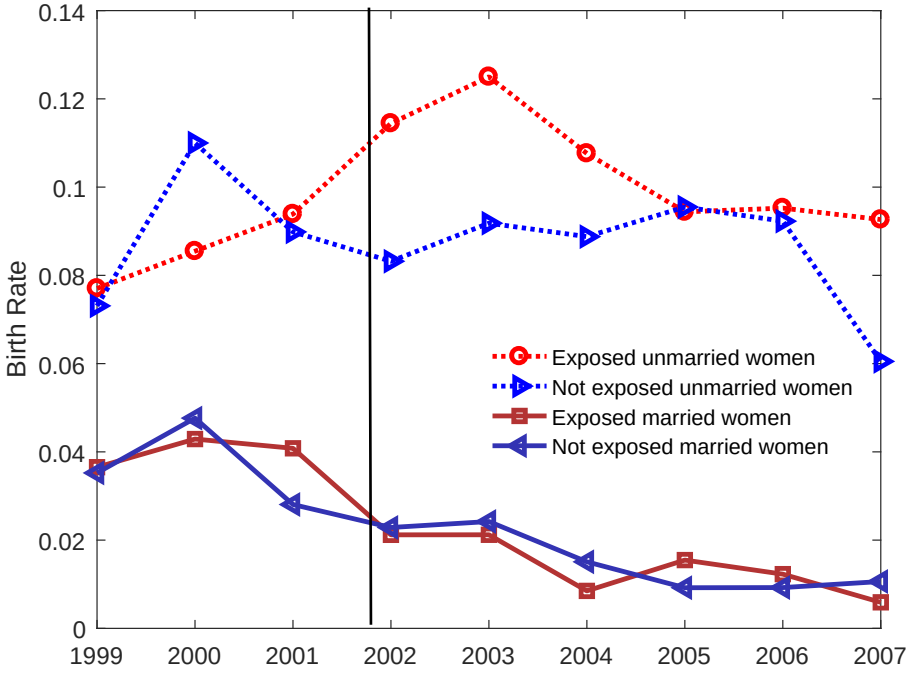

Figure 4: Birth Rates of Married and Unmarried Women

Notes: Figure shows birth rates for 1999 unmarried and married female workers, by trade exposure.

from the figures above, womens' response to rising import competition is generally stronger than that of men. Furthermore, we present event-study evidence that exposure affects the workers' labor market outcomes. Results indicate that treated workers leave the manufacturing sector substantially faster than not treated workers, and conversely, treated workers transition to the services sector more rapidly than untreated workers (see Figures A-7, A-8). Worker transitions between sectors are consistent with the idea that trade exposure leads to higher sectoral mobility for men compared to women.[32]

We also show results for specific occupations, such as the important group of machine operators (D-ISCO 82), to filter our occupational composition effects when comparing men and women. In particular, trade exposure hits female machine operators harder and faster in terms of unemployment than male machine operators (Figure A-9). The unemployment rates for women doubles between 2001 and 2002, whereas it is flat for men, and for women it triples between 2001 and 2003, compared to a doubling for men. Overall, the descriptive evidence is consistent with the hypothesis that the larger family impacts of exposure for women are mirrored in larger labor market effects, compared to men.[33]

We following section turns to our estimation approach.

3 Estimation Approach

To estimate the impact of rising import competition our approach compares family and labor market outcomes for exposed and non-exposed workers. Changes in family status and the number of

[32] By 2007, the difference between exposed and not exposed male workers is 15-16 percentage points both in terms of likelihood to be still in manufacturing and to have moved to the services sector; analogously, this difference for women is only 11-12 percentage points.

[33] Also in 2007 birth rates of exposed women are relatively high, however more data past year 2007 would be needed to unambiguously confirm that. Our sample period ends in 2007 because in year 2008 the Danish labor market was affected by another shock, the Great Recession.

children are relatively rare, discrete events, and it is natural to employ probit regressions. Exploiting the drastic change with China entering the WTO in the year 2002, we employ a difference-in-difference framework, where the family outcome X_{is} of worker i in period s is specified as follows:

$$X_{is} = f(\beta_1 Exposure_{i,99} * Post_s + \beta_2 Post_s + \beta_3 Exposure_{i,99} + \beta' W_{i,99} + \varepsilon_{is}), \;\; s = 0, 1 \;, \qquad (1)$$

where s identifies the pre- and post-liberalization periods (years 1999-2001 and 2002-2007, respectively), $Exposure_{i,99}$ is an indicator for exposure to rising import competition, $Post_s$ is an indicator variable for the years 2002-2007, and the vector $W_{i,99}$ are 1999 characteristics of worker i, such as age, education, the size of the worker's firm, and partner characteristics, as well as a constant. $Post_s$ captures the influence of aggregate trends affecting all workers. Recall that to limit the influence of anticipation effects, the year 1999 is used to determine workers' subsequent exposure to the quota removal. Of key interest is β_1 which reveals whether exposed workers show different outcomes compared to observationally similar non-exposed workers, relative to pre-shock years. By averaging the observations before and after the year 2002, our approach addresses the serial correlation and other concerns highlighted in Bertrand, Duflo, and Mullainathan (2004). We also allow for correlation within a group of workers employed by the same firm in 1999 and cluster standard errors by worker's 1999 firm. For ease of exposition, we denote the difference-in-difference term $Exposure_{i,99} * Post_s$ by $ImpComp_{is}$, mnemonic for rising import competition.

We can exploit the longitudinal structure of the data further by employing least squares estimation with worker fixed effects:

$$X_{is} = \alpha_0 + \alpha_1 ImpComp_{is} + \alpha_2 Post_s + \delta_i + \varphi_{is}, \qquad (2)$$

where δ_i is a fixed effect for each worker i. This implies that the coefficient α_1 is estimated only

from within-worker changes over time. Including worker fixed effects has the advantage that it eliminates the influence of any observed or unobserved heterogeneity across workers. Below we will show both probit and least-squares fixed-effects results.

In addition we will examine the evidence for gender differences in the response to rising import competition by including a Female interaction term. In the least squares case, the specification becomes

$$\begin{aligned} X_{is} = \alpha_0 + \alpha_1 ImpComp_{is} + \alpha_2 ImpComp_{is} * Female_i + \\ \alpha_3 Post_s + \alpha_4 Post_s * Female_i + \delta_i + \nu_{is}, \end{aligned} \tag{3}$$

where $Female_i$ is equal to one if worker i is a woman. In this specification, α_2 measures the differential effect of rising import competition on women.

Identification The coefficient α_1 in equation (2) is the well-known linear difference-in-difference estimator, which gives the treatment effect under the standard identification assumption that in the absence of treatment the workers would have followed parallel trends.[34] As we have shown in section 2 the sample is fairly balanced in the sense that the differences between treated and untreated workers are limited. Additionally, there is no evidence that the product mix of firms determining each worker's treatment status is endogenous. An important potential remaining threat to identification is differential pre-existing trends. For example, if removal of quotas for other developing countries in 1995 and 1998 (quota removal Phase I and II, respectively) had led to increased competition and cause a differential trend between treated and untreated workers in the industry, identification would fail. Furthermore, the second half of the 1990s is also a period of European Union enlargement accompanied by increased trade integration with Eastern European

[34] While given the nonlinearity of the probit specification the coefficient β_1 is generally not the treatment effect even with identical pre-trends, it can be shown that it is closely related.

countries.

In order to examine the importance of pre-trends we conduct a falsification exercise for the period 1990-1999, during which rising import competition due to China's entry into the WTO was absent (placebo test). To do so we employ data on family and labor outcomes for our workers back to the year 1990. Then, without changing the definition of treatment (a worker's firm produces a MFA quota product as of 1999), we run specifications analogous to equation (2) for the period 1990-1999, with the subperiod 1990-94 assumed to be the pre- and 1995-99 the post-shock period.

The results show that during the placebo period 1990-1999 there is no significant relationship between import competition and marriage, fertility, or divorce. For example, the point estimate for women in the marriage regression is positive but not precisely estimated (0.012, with a s.e. of 0.013; N = 10,954).[35] There is no significant impact from import competition on labor market outcomes during this period either (this confirms results in Utar 2018). Furthermore, there is no significant difference in how men and women behaved in relation to import competition during the 1990s. Specifically, the point estimate in the marriage regression for men is similar to that for women given above (for men, it is 0.013 with a s.e. of 0.014, N = 8,550).[36] In sum, there is no evidence that the MFA removal phases I and II, the enlargement of the European Union with the Eastern European Countries, or any other factor has generated major differential pre-trends that would make it difficult to estimate causal effects during 1999-2007 with this identification strategy.

4 Family Responses to Import Competition: Gender Matters

This section shows that in the face of rising import competition workers increase their family activities, especially women. This increase in family activities should be seen as a substitution for

[35] The full set of these placebo results are shown in the Appendix (Tables A.1 and A.2).

[36] See Section A of the Appendix for full results.

employment in the labor market, as we show in the following section 5. We begin our analysis of family activities by examining the decisions of men and women to have new children.

4.1 Import competition and fertility

In this section we turn to the relationship between rising import competition and fertility decision of men and women. Our outcome variable is one if a female worker has become mother to a newborn child, or correspondingly, if a male worker has become father to a newborn child during a particular period, and zero otherwise. The sample is the set of fertile age women and men, defined as below 37 (46) years for women (men) as of the year 1999. Table 3 shows the results.

Table 3: Import Competition and Newborn Children

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	All	All	All	Men	Women	All	Men	Women
		Co-habitating or Single				Single		
ImpComp	0.009	0.063^{a}	0.034	0.034	0.089^{b}	-0.018	-0.018	0.132^{a}
	(0.022)	(0.024)	(0.029)	(0.029)	(0.039)	(0.030)	(0.030)	(0.042)
ImpComp x Female	0.033		0.055			0.150^{a}		
	(0.031)		(0.048)			(0.053)		
Worker FE	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	10,915	5,956	5,956	3,264	2,692	3,305	2,014	1,291

Notes: Dependent variable is one if worker i has a newborn child during period s, and zero otherwise. The sample in column (1) is textile workers of fertile age (below 37 for women, below 46 for men as of 1999). The sample in columns (2) to (5) is workers not married as of 1999, in columns (6) to (8) workers neither married nor co-habitating as of 1999. Robust standard errors clustered at the level of workers' 1999 firm are in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

Our analysis shows that rising import competition does not lead to lower fertility. On the contrary, the estimates for men and women are both positive though insignificantly different from zero, see column (1). Thus, even though the trade shock has the expected effect of reducing labor earnings of exposed workers–as will be confirmed below–we do not find that it leads to fewer newborn children even though babies typically require significant additional expenditures. We will return to this point below.

There is some evidence that exposed women tend to respond more strongly in terms of fertility than exposed men because the point estimate for women in column (1) is more than four times that for men (0.042 versus 0.009, respectively).

Fertility decisions are often a matter of a person's life cycle. Depending on the particular stage a worker is in, he or she might want to have a new child, or not. An important aspect of this is whether a worker has found a partner. More generally, we are interested in the role of family status in the relationship between import competition and fertility. In the first step, we focus now on those workers who were not married as of year 1999. They can be co-habitating with someone, or they can be single. As shown in Table 2 these workers are typically younger, which confirms that they are typically at an earlier stage in their lives. Column (2) shows that increased import competition increases birth rates for these workers. To understand how large the impact of trade exposure on fertility is, note that the average of the dependent variable in column (2) is 0.28, which means that about one in four workers in the sample have one or more newborn children during the years 1999 to 2007. The coefficient of 0.063 in column (2) means that trade exposure raises the probability of birth by about 23 percent (= 0.063/0.28). Thus, the trade-induced increase in fertility is substantial.

The following three columns show that the impact of trade exposure on fertility is driven mostly by women. First, we see that while the interaction specification in column (3) is qualitatively similar to before, quantitatively the tendency to have more children is stronger for unmarried than for married workers. Separate regressions for male and female workers in columns (4) and (5) show

unmarried women respond by having new births. One in three of unmarried women have one or more new children during the sample period, so that the marginal fertility impact of trade exposure is about 28 percent (= 0.089/0.33). The coefficient for men is also positive but only about one third in size and not significant.

The finding that the fertility response for unmarried workers is stronger than for married workers is interesting because it suggests that the consequences of rising import competition are long-term in nature. It is not primarily the workers who are in a marital union that decide to have (or add) a child when hit by rising import competition; rather, it is the typically earlier-stage unmarried workers who do so. The latter are typically relatively young, implying that their fertility choice will affect a relatively large part of their life and many years of possible participation in the labor market.

We can go further with this analysis by separating workers who live with a partner (co-habitating) from those workers who have no partner (single).[37] The set of results on the right side of Table 3 is for single workers (columns (6) to (8)). From the number of observations at the bottom of Table 3, we see that one in three workers who can have children (fertile-age workers) is single, and singles account for more than half of all unmarried fertile-age workers.

We see that it is particularly single women who respond to trade exposure by having children.[38] The Female interaction coefficient for singles is about three times the size as for all unmarried workers (column (6) versus column (3)). The result is confirmed by performing separate specifications for men and women (columns (7) and (8)). Specifically, the coefficient in column (8) means that exposure accounts for almost 60 percent of all new childbirth (= 0.132 relative to the mean of 0.22).

[37] The definitions of co-habitation and single are as of the initial year, 1999.

[38] The analysis here does not distinguish between one or more children, though in the majority of cases it is only one. Also of interest is whether this is the first or an additional child; we study the role of existing children in the responses in section 6 below.

Overall, these results mean not only that import competition has a sizable impact on fertility but it also indicates that the earnings impact of rising import competition is likely to manifest itself over a long period because single workers are relatively young and almost by definition at an early stage of their lives.

While Table 3 shows least squares estimation results, similar findings are obtained when we employ probit models that control for an extensive set of 1999 worker, firm, and partner characteristics, see Table A-8.

4.2 Trade exposure and parental leave

This section examines the impact of higher competition through Chinese imports on parental leave uptake. While some of the leave parents take may be associated with newborn children, our analysis encompasses also parental leave for existing children. The latter may be thought of as a more incremental move towards family activities, compared to the more drastic step of having another (or the first) child that was analyzed in the previous section. As noted in section 2, both men and women have the option to take up to 46 weeks of parental leave.[39] Table 4 shows the results.

[39] In addition, women can take 18 more weeks of maternity leave around giving birth, in contrast to fathers who can take up to 2 weeks of paternity leave.

Table 4: **Parental Leave and Import Competition**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	All	All	All	Men	Women	All	Men	Women
		Co-habitating or Single				Single		
ImpComp	0.024	0.065^{a}	0.037	0.037	0.078^{b}	-0.021	-0.021	0.123^{a}
	(0.019)	(0.023)	(0.026)	(0.026)	(0.039)	(0.026)	0.026)	(0.042)
ImpComp x Female	0.020		0.041			0.144^{a}		
	(0.029)		(0.046)			(0.049)		
Worker FE	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	10,915	5,956	5,956	3,264	2,692	3,305	2,014	1,291

Notes: Dependent variable is one if worker i takes parental leave during period s, and zero otherwise. Estimation by least squares. The sample in column (1) is textile workers of fertile age (below 37 for women, below 46 for men as of 1999). The sample in columns (2) to (5) is workers not married as of 1999, in columns (6) to (8) workers neither married nor co-habitating as of 1999. Robust standard errors clustered at the level of workers' 1999 firm are in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

The outline of our parental leave analysis follows that of new births in the previous section, and it is interesting to see that the results are similar as well. This suggests that the parental leave effect of import competition is mainly driven by newborn children. First, notice that rising import competition does not lower parental leave taking; if anything it increases it, although the coefficients in column (1) are not precisely estimated. Furthermore, exposed women tend to take up more parental leave than exposed men based on point estimates, although the difference is now somewhat smaller than for fertility (compare columns (1) in Tables 4 and 3, respectively). This suggests that gender differences are stronger for the family decision that typically requires a greater time commitment (new birth).

When we focus on unmarried workers, the parental leave behavior of workers is similar to the workers' fertility behavior (columns (2) to (5)). First, exposed workers tend to take up more parental leave than workers not subject to rising import competition (column (2)). Quantitatively, the coefficient of 0.065 means that the marginal impact of trade exposure is about 26 percent of all parental leave taking of these workers (= 0.065/0.25). This is a moderately higher effect than for new childbirths (23 percent). Furthermore, we see that women are contributing to the trade-induced increase in parental leave more than men (columns (3) to (5)). The coefficient for women of 0.078 means that trade exposure accounts for about 22 percent of all parental leave taking of unmarried women (= 0.078 relative to a dependent variable mean of 0.35 in column (5)).

As in the case of childbirth, this pattern is further strengthened when we concentrate on single workers (columns (6) to (8)). Exposed single women increase their parental leave uptake while exposed single men do not. The magnitude of the gender differential is comparable to that of child birth, and the marginal impact of trade exposure is about 54 percent of all parental leave taking for single women (= 0.123 relative to a mean of 0.23). This confirms the large impact of import exposure that we have seen for child birth in Table 3.

Supplementary results using probit models broadly confirm these parental leave results (see Table A-9). Furthermore, employing an instrumental-variables approach exploiting industry differences in trade exposure, we show fertility and parental leave responses for the sample of all private-sector 1999 workers in Denmark in Section B of the Appendix (close to 1.2 million workers). The analysis confirms that fertility responses to rising import competition are non-negative, with point estimates for female workers much higher than for male workers. Furthermore, rising import competition significantly increases maternity leave taking by exposed women.

Summarizing, exposure to rising import competition increases not only fertility but also parental leave taking of our workers. Women, not men, account for most of this increase in family activities. In particular, it is younger women at a relatively early stage of their lives that shift in the face

of lower labor market opportunities towards child-related activities. Given that the incidence is concentrated on relatively young workers who would not be expected to retire from the labor market for many years, the earnings implications of rising import competition could be drawn out over a relatively long period of time.

4.3 Marriage Responses to Rising Import Competition

Table 5 shows evidence on the workers' marriage behavior in the face of rising import competition. We begin with probit results for all workers who are not married as of the year 1999.[40] In addition to import competition we include the following 1999 worker, firm, and partner characteristics: worker age, number of children, and indicators for immigrant status, being single and living with child, as well as three different levels of education; firm variables are the average wage and separation rate; and partner variables are exposure to rising import competition and education indicators (results not shown to conserve space).

[40]The marriage decision is directly relevant only for unmarried workers. Workers who in 1999 are married would have to divorce before marrying again; divorce is analyzed in section 4.4 below.

Table 5: Marriage Decisions and Import Competition

	(1)	(2)	(3)	(4)	(5)
Sample	All	Men	Women	Fertile Age	Fertile Age Single
Specification	Probit	LS	LS	Probit	Probit
ImpComp	-0.020	-0.008	0.045^{c}	-0.058	-0.066
	(0.094)	(0.026)	(0.026)	(0.099)	(0.163)
ImpComp x Female	0.153^{c}			0.176^{c}	0.253^{c}
	(0.092)			(0.103)	(0.148)
Worker, Firm, Partner Chars	Y	-	-	Y	Y
Worker FE	-	Y	Y	-	-
Time FE	Y	Y	Y	Y	Y
Observations	8,163	3,877	4,340	5,912	3,283

Notes: Dependent variable is one if worker *i* married during period *s*, and zero otherwise. Sample is unmarried textile workers. Estimation method in columns (1), (4), and (5) is probit, in columns (2) and (3) least squares (LS). Probit specifications include Age, Number of Children, and indicator variables for being first or second generation Immigrant, Education, and Single living with Child (all as of year 1999); the Separation Rate and Average Wage at worker *i*'s initial workplace, as well as indicators for Exposed Partner and Partner's Education. Partner characteristics are not applicable in column 5. Robust standard errors clustered at the level of workers' initial firm are in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

The results indicate that neither men nor women marry less due to rising import competition (column 1). The point estimate for men is imprecisely estimated at close to zero, whereas for women the Female interaction coefficient indicates that trade exposure increases female marriage rates. These results are confirmed with least-squares specifications for men and women separately (columns (2) and (3), respectively).

What accounts for this increase in marriage? Exploiting variation across U.S. regions, Autor, Dorn,

and Hanson (2018) find that rising import competition has lowered marriage rates. At the same time, their result that female-specific Chinese trade shocks increase marriage rates is consistent with our analysis. In the U.S. lower worker income appears to be a major reason for reduced marriage rates because lower income reduces the marriageability of men. In contrast, institutional characteristics including more transfer payments explain why rising import competition does *not* lower personal incomes inclusive of transfers in Denmark, as we show below.

How large is the impact of rising import competition on marriage? A back-of-the-envelope calculation compares the marginal effect of import competition with the average marriage probability in the sample. The latter is 0.16, while the marginal effect of the Female interaction coefficient in the probit estimation (column 1) is about 0.04, and 0.045 according to the least-squares estimation (column 3). Accordingly, rising import competition accounts for a sizable portion, upwards of one quarter (= 0.04/0.16), of the overall marriage probability in the sample.

Changes in family status such as marriage often occur as individuals go through stages of their lives. We are therefore interested in the role of age for the workers' marriage responses. In column (4) we present results for the relatively young set of workers in their fertile age (women below 37, men below 46 as of the year 1999). The Female interaction coefficient is positive and with 0.176 somewhat higher than before (coefficient in column 1 is 0.153). We conclude that the increase in marriage caused by rising import competition is disproportionately resulting from choices by younger, not older women. This finding is in line with the fertility and parental leave results. To some degree marriage and child-related activities come in a bundle for these relatively young women.

Another important question is the role of cohabitation, often seen as an intermediate stage between being single and being married. Column 5 of Table 5 shows results for single (not cohabitating) workers of fertile age. We see that rising import competition particularly induces young single women to marry. This shows that trade exposure induces the relatively drastic change from single

to married family status, and not only the comparatively incremental step from co-habitation to marriage. Furthermore, based on point estimates in columns (4) and (5) it is particularly young singles where the difference in the trade exposure-induced marriage behavior of women and men is largest.

4.4 The Impact of Import Competition on Marriage Break-up

The final step in our analysis of family responses to trade exposure is to examine divorce behavior. Our divorce analysis focuses on the workers that were married in the first year of our sample period (1999). Recall that being married typically means that the workers are at a later stage in their lives, as reflected in their average age of about 42 years, in contrast to unmarried workers who are on average about 34 years (see Table 2). Given this age difference one would not necessarily expect that the motives of being in a marital union are the same. Table 6 shows the results.

Table 6: **Exposure to Import Competition Reduces Divorce Rates**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	All	All	All	Men	Women	Men	Women
						Fertile Age Workers	
Specification	LS	Probit	LS	LS	LS	LS	LS
ImpComp	-0.025[a]	-0.102	-0.011	-0.011	-0.039[a]	-0.019	-0.085[a]
	(0.009)	(0.112)	(0.013)	(0.013)	(0.011)	(0.019)	(0.025)
ImpComp x Female		-0.188[c]	-0.027[c]				
		(0.097)	(0.016)				
Worker, Firm, Partner Characs	-	Y	-	-	-	-	-
Worker FE	Y	-	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y
Observations	11,780	11,703	11,780	4,934	6,846	2,774	2,184

Notes: Dependent variable is one if worker *i* has a divorce during period *s*, and zero otherwise. Sample is textile workers who are married as of 1999. Estimation method in column (2) is probit, in columns (1) and (3)-(6) it is least squares (LS). The list of variables included in the probit specification is given in the Notes to Table 5. Robust standard errors clustered at the level of workers' initial firm are in parentheses. [c], [b] and [a] indicate significance at the 10 %, 5% and 1% levels respectively.

We find that rising import competition reduces divorce rates. Employing least squares with worker fixed effects yields a coefficient of -0.025 in the sample with both men and women (column (1)). On average, the divorce rate for these workers is 0.049, and the impact of trade exposure is about 50 percent of that. There are a number of reasons why trade exposure might lead to lower divorce rates. One of them is insurance. When employment opportunities vanish due to rising import competition, an existing marital union may provide income security that not exposed workers do not need to the same extent. While this is certainly possible, Danish workers have access to a relatively extensive system of insurance and government transfers, and spousal income support may be less needed than in other countries.

The next set of results clarifies that the reduction of divorce probability is mainly driven by women (columns (2) to (5)). According to the probit estimation the point estimate for men is about -0.1 (not significant) and about -0.3 (significant) for women (column (2)). The analogous least squares specification yields point estimates of -0.01 and -0.04 for men and women, respectively (column (3)).

A greater divorce response for women than men is also borne out in separate analyses for male and female workers (columns (4) and (5)). The marginal impact of trade exposure on divorce for women evaluated at the mean is about 83 percent (the average divorce rate for the sample underlying column (5) is 4.7 percent; -0.039/0.047 = -0.83).

Analyzing marriage decisions we have found that relatively young individuals at an early stage of their lives react more strongly to trade exposure than older workers. We have also seen that particularly young women respond strongly to rising import competition in terms of fertility and parental leave. Here, workers were married at the beginning of the sample (the year 1999), and as one would expect they are typically older than the workers studied above.

Even though married workers tend to be older, is it still possible that fertility plays a role in their divorce decisions? The standard deviation of the age of married women is about 9 years, implying that some married women are young enough so that their divorce behavior may still be affected by their goals in terms of children. In the final set of results of Table 6 we therefore focus on divorce decisions of workers in their fertile age (columns (6) and (7)).

We see that while mens' divorce response to rising import competition is not much affected by age, women in their fertile years respond roughly twice as much to trade exposure as the average married women (columns (5) and (7), respectively). This indicates that the tendency of exposed workers to remain in their marriages is related to fertility, and as we have seen, also the divorce impact of trade exposure is concentrated on women. Quantitatively, the impact of trade exposure

for fertile women implied by the estimate of -0.085 is large, given that the average divorce rate in this sample is 0.08.

Summarizing, workers exposed to rising import competition increase their family activities in several dimensions. The previous two sections have shown that 1999 textile and apparel workers marry more and divorce less in response to trade exposure. Extending these results, Section B in the Appendix shows that trade exposure leads as well to higher marriage and lower divorce rates for the entire private-sector labor force in Denmark. As in the case of textile workers, women are central to this pro-family, pro-child shift in response to globalization.

5 Labor Markets and Import Competition: Breaking it down by Gender

We have seen that in response to rising import competition women more strongly than men increase their family activities in number of dimensions. At the same time we know that rising import competition has led to substantially lower earnings for Danish workers (Utar 2018). This section extends this analysis by showing that labor market consequences of rising import competition are far from gender neutral, and how this interacts with family responses to rising import competition. We employ equation (2) with worker-level labor market outcomes as dependent variables. The outcomes are cumulative labor earnings, earnings per year of employment, cumulative hours worked, hours worked per year of employment, cumulative spells of unemployment, and cumulative personal income. All earnings, hours, and income variables are normalized by the worker's own 1999 annual earnings, hours, and income respectively. The impact on cumulative variables that is captured by α_1 will measure the long-run impact of the import competition. Results are shown in Table 7. Panel A on the top shows results for the pooled sample of men and

women analogous to equation (2), while Panel B reports gender specific results using a Female interaction variable analogous to equation (3).

Table 7: **Labor Markets Hit by a Trade Shock: The Role of Gender**

	(1) Labor Earnings	(2) Earnings per year of Employment	(3) Hours Worked	(4) Hours per year of Employment	(5) Unemp-loyment	(6) Personal Income
Panel A. No Gender Distinction						
ImpComp	-0.487**	-0.076**	-0.379**	-0.063***	1.040***	0.078
	(0.217)	(0.034)	(0.151)	(0.022)	(0.329)	(0.080)
Panel B. Analysis by Gender						
ImpComp	-0.082	0.002	-0.217	-0.021	0.806*	0.104
	(0.290)	(0.042)	(0.204)	(0.027)	(0.411)	(0.140)
ImpComp x Female	-0.754**	-0.161***	-0.275	-0.085**	-0.019	-0.032
	(0.352)	(0.056)	(0.216)	(0.033)	(0.407)	(0.149)
Worker FE	Y	Y	Y	Y	Y	Y
Period FE	Y	Y	Y	Y	Y	Y
Observations	19,650	19,212	19,426	18,943	19,650	19,644

Notes: Dependent variable is given on top of column for the period 1999 to 2007. The sample is all 1999 textile workers. Estimation method is by least squares. The units in all earnings and hours results are multiples of worker *i*'s 1999 earnings and hours, respectively. The units in the personal income results, column (7), are multiples of worker *i*'s personal income in 1999. Personal Income includes unemployment insurance and government transfers. Unemployment is defined as the percentage of annual time in unemployment. Robust standard errors clustered at the level of workers' initial firm are in parentheses. ***, ** and * indicate significance at the 10 %, 5% and 1% levels respectively.

In Panel A of Table 7 we show evidence familiar from other studies that rising import competition from China has significantly lowered labor market opportunities of affected workers. In particular,

the coefficient of -0.487 iin the earnings equation (column (1)) means that on average, exposed workers lose almost half of their annual earnings relative to non-exposed workers, or about 8 percent of their 1999 earnings per year of treatment during 2002-2007. The reduction in earnings is largely driven by decline hours worked rather than decline in hourly wages (compare column (1) with (3)). Trade causes a significant increase in unemployment (column 5). Denmark is a country with relatively generous social benefits in addition to unemployment insurance benefits for involuntarily displaced workers. As a result, there is no long-run negative impact of the rising competition on workers' personal income (column 6). This will be important for the impact of import competition on family choices.

After documenting the overall labor market effects, we now turn to any gender difference in trade adjustment. Panel B of Table 7 shows that the outcomes vary strikingly by gender. In particular, the earnings point estimate for men is close to zero and not significant at standard levels. In contrast, the Female interaction is significantly negative, with women losing due to import competition on average about 84 percent of the 1999 earnings–almost 14 percent per year of treatment during 2002-2007. The evolution of women's earnings losses over time is essentially linear, with every year of treatment leading to the same incremental earnings loss, see Figure A-1 in the Appendix.

Why is the long-run earnings impact of rising import competition concentrated on women? First, in order to understand the proximate causes, we break cumulative earnings down into several components (see columns (2) to (5)). The dependent variable in column (2) is cumulative earnings per year of employment. The result shows the same qualitative result–only women lose earnings, not men–, but the gender differential increases.[41] This means that women are doing relatively better staying employed than remaining in relatively well paid jobs.

The gender differential for the impact of trade exposure on hours worked is shown in column

[41] The Female interaction coefficient is more than twice the all-sample coefficient in column (2), while in column (1) it is less than twice the size.

(3). Interestingly, the hours coefficient in Panel A is smaller (in absolute magnitude) than the earnings coefficient in column (1). This is consistent with workers work more hours that are relatively poorly paid. In Panel B, as before women tend to have more reduced hours than men but the Female interaction coefficient here is not significant. The results in column (4) refine this analysis by showing that trade exposed women have significantly lower hours worked per year of employment than men. The implication of these findings confirms what the comparison of columns (1) and (2) showed: trade exposed women have tended to work at relatively low-paid jobs. Importantly, these results are obtained with worker fixed effects so that differences in the composition of mens' and womens' 1999 jobs play no role.

In addition to employment disruptions or work in lower-pay, lower-pressure jobs, earnings changes can be due to moving outside of the labor force, early retirement, or unemployment. It turns out that movements outside of the labor force and into early retirement are not important adjustment dimensions (not reported). In contrast, we see that rising import competition has caused significant unemployment for exposed workers (see Panel A of column (5)). At the same time, unemployment is unlikely to explain the gender differential in earnings because there is little evidence that exposure has caused more unemployment for women than for men (see Panel B of column (5)). The following analysis will concentrate on labor earnings, a relatively comprehensive measure of workers' labor market performance.

Finally, column (6) of Panel B shows the gender differential in the impact of trade exposure on the workers' personal income. We see that in contrast to labor earnings, there is virtually no difference between the income impact of trade exposure for women and for men. Furthermore, the evolution of personal income over time is similar for men and women as well, see Figure A-2 in the Appendix.

An important implication of these income findings is that the response to rising import competition can be seen largely as a substitution effect–income changes that might lead to labor supply

responses, either in the labor market or at home, are largely absent in our setting.

6 Explaining the gender differences

6.1 Earnings differentials and human capital

A first step towards explaining the gender differential is to see which types of workers have suffered the largest labor earnings losses. A simple human capital model predicts that younger workers tend to lose less than older workers because they adjust better. Specifically, younger workers have a greater incentive to move into better paying jobs in the presence of any fixed costs of moving (such as training) as they have more years to re-coup the fixed costs. Moreover, younger workers have accumulated less sector- and firm-specific knowledge and are therefore more likely to transition to other jobs than older workers that have accumulated more specific human capital. Recent evidence that younger workers perform better in terms of labor market adjustment is presented in Artuc, Chaudhuri, and McLaren (2010), Dix-Carneiro (2014) and Utar (2018). The following Table 8 presents evidence on this. We begin with Panel A at the top, which shows results on earnings from any job the worker held during 1999 to 2007, starting out with the 1999 job in textiles.

Table 8: **The Earnings Differential by Age and Stage of Life**

Sample	(1) All	(2) Married	(3) Not Married	(4) Fertile Age	(5) Not Fertile Age
Panel A. Earnings from all Jobs					
ImpComp	-0.082	-0.462	0.496	0.257	-0.881***
	(0.290)	(0.329)	(0.393)	(0.347)	(0.283)
ImpComp x Female	-0.754**	-0.249	-1.501**	-1.036*	-0.021
	(0.352)	(0.380)	(0.662)	(0.575)	(0.343)
Panel B. Earnings in the 1999 Textile Job					
ImpComp	-0.913***	-1.165***	-0.605**	-0.823***	-1.111***
	(0.286)	(0.324)	(0.288)	(0.289)	(0.342)
ImpComp x Female	0.0882	0.318	-0.193	0.130	0.188
	(0.221)	(0.267)	(0.255)	(0.246)	(0.290)
Worker FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	19,650	11,588	8,062	10,716	8,934

Notes: Dependent variable in Panel A is worker *i*'s cumulative earnings 1999 to 2007 from any job, expressed relative to the worker's 1999 earnings. Dependent variable in Panel B is worker *i*'s cumulative earnings 1999 to 2007 at the original 1999 textile job, expressed relative to the worker's 1999 earnings. Estimation is by least squares. Robust standard errors clustered at the level of workers' initial firm are in parentheses. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

We begin with results shown in Panel A of Table 8. In column (1) we repeat the earlier result on the earnings effect of rising import competition. Recall that the *ImpComp* coefficient, which gives the exposure impact for men, is close to zero and not significant at standard levels. Trade-exposed women, however, see their earnings fall on average by around 84 percent of their 1999 earnings (-0.836 = -0.082 + (-0.754)). The remaining specifications in Panel A of Table 8 are analogous

results for subsets of the sample.

We begin by distinguishing married from not married workers (columns (2) and (3)). Typically, unmarried workers, who can be either single or co-habitating, are both at an earlier stage of life and younger than married workers. The results show that earnings losses for married workers are not too different from those of the average in the whole sample (which is about -0.5, see Table 7, Panel A, column 1), and there is no significant gender difference in the earnings effect of rising import competition. For unmarried workers, the results are quite different (column (3)). Trade-exposed unmarried women lose over the period of 1999 to 2007 on average their entire 1999 earnings (point estimate of -1.501 + 0.496 = -1.005), which is very different from unmarried exposed men who actually tend to increase their earnings relative to non-exposed men (not significant). Relatively young unmarried men are performing as one would expect based on simple human capital considerations, but the same is not the case for women.[42]

Perhaps this is because the married versus unmarried distinction combines an element of stage-of-life with the age of the worker. Thus the next set of results focuses on age by distinguishing workers in their fertile age from those who are not (columns (4) and (5)). Recall that in our analysis, fertile age women are those below 37 years of age in 1999, while fertile age men are those below 46 in 1999. With a coefficient of about -0.9, column (5) shows that relatively old workers experience earnings losses that are larger than the average of about -0.5 for all workers. This is in line with human capital theory. Furthermore, the insignificant interaction coefficient shows that older women experience virtually the same long-run earnings losses as older men. Therefore, the behavior specifically of relatively old female workers is in line with human capital theory as well.

[42]Consistent with the more strongly negative effect of exposure on womens' earnings, Hakobyan and McLaren (2018) estimate that wage growth of exposed women in the US was more reduced by the NAFTA liberalizations than that of exposed men; at the same time, they find this gender gap to be stronger for married than for single workers, not the reverse (see Panel A, columns (2) and (3)). Hakobyan and McLaren (2018) explain their finding by selective non-participation whereby higher-paid married female workers drop out of the labor force. In contrast, in our setting the impact of trade exposure on movements out of the labor force has no strong gender bias.

However, while younger men perform relatively well younger women experience substantial trade-induced earnings losses, on average about 78 percent of their 1999 earnings (column (4)). This means that as a first-order approximation age does not matter for the earnings performance of women after the negative shock of trade exposure. Another way of thinking about this is that the earnings trajectory of relatively young women is more similar to that of older workers than to that of relatively young men. Consider the dynamics of earnings as they evolve over the period 1999 to 2007. Figure 5 is based on regressions analogous to those in columns (4) and (5) where the length of the treatment period is varied from only the year 2002 to the years 2002-2007. The figure shows the point estimates by gender and by age. The key observation is that while young men perform well enough so that by 2007 there is no cumulative earnings loss compared to young not exposed men, the earnings performance of exposed young women is more negative and follows that of older exposed workers.

The fact that the earnings trajectories of exposed younger and older women is so similar does not mean that the factors behind the choices are the same. As we have seen in section 4, younger women are key to the move towards family in response to rising import competition. In contrast, older women presumably are constrained by the human capital costs of switching jobs discussed above. The main result of this section is that the labor market-family choice eliminates the advantage of young women (but not men) in the presence of a negative labor market shock.

Instead of earnings from all jobs, Panel B of Table 8 focuses on earnings a the worker's original 1999 textile firm. Some workers will respond to the shock by moving to a different job, which may be in a different industry or occupation. If there were a gender differential in the earnings at the original 1999 firm this could indicate that the immediate impact of trade exposure was stronger for either men or women. Exposure may trigger lower earnings in the original 1999 job for at least two reasons: first, the job disappears, leading to worker displacement, and second, the worker moves

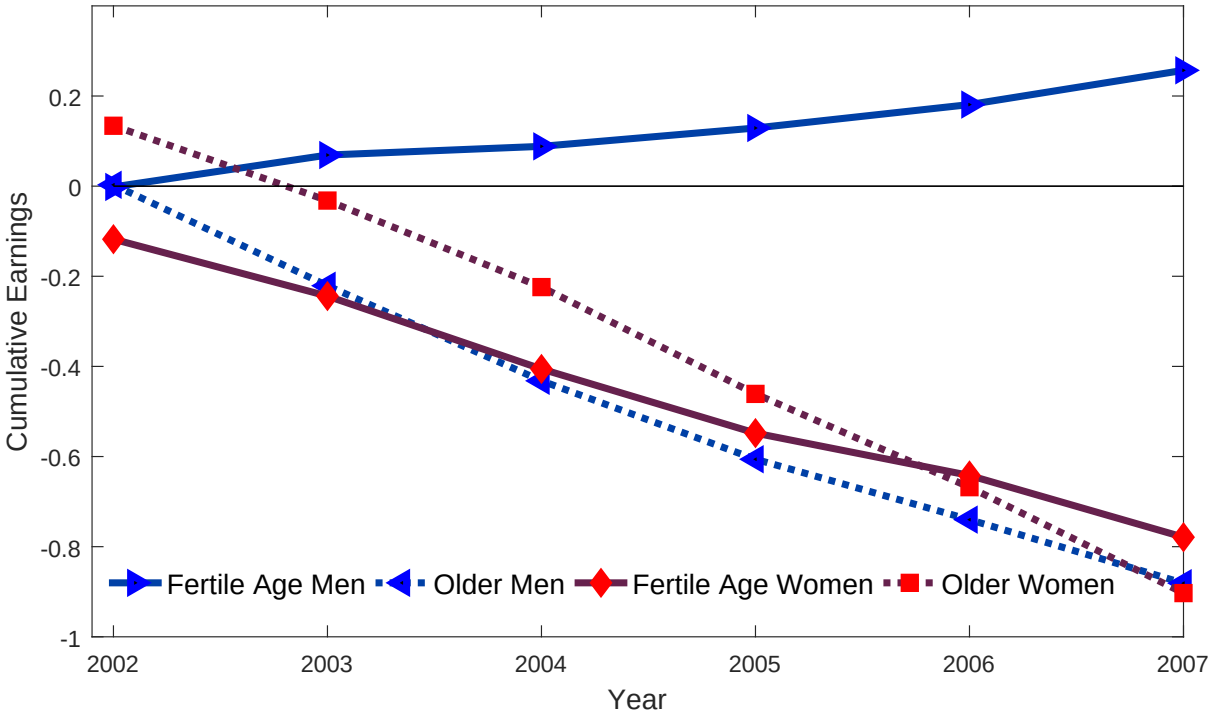

Figure 5: **The 'Missing' Earnings of Young Women**

Notes Shown are *ImpComp* treatment point estimates from least squares regressions with four different samples (fertile-age men, fertile-age women, not fertile-age men, not fertile-age women) and six different endpoints of the treatment period (1999-2002, 1999-2003, to 1999-2007). All regressions include worker and period fixed effects.

to another job.[43] We see in Panel B of Table 8 that in terms of initial-job earnings, men lose on average about 90 percent of their 1999 earnings due to exposure (column (1)). Importantly, there is no major difference between mens' and womens' initial-job earnings losses, as evidenced by the insignificant Female interaction coefficient. This shows that the gender earnings differential has less to do with the immediate impact of trade exposure than with the subsequent labor market (and family) adjustment of the workers.

Furthermore, we see from the remaining results in Panel B that womens' initial-job earnings losses are not significantly higher than those of men in any of the subsamples. In particular, the initial-job earnings losses of fertile-age women are not larger than those of men (column (4)). Thus, it is unlikely that young women move more strongly towards family than young men because the former experience a more severe shock on impact. Rather, this is evidence that the gender earnings gap is the consequence of different adjustment paths for men and women.

6.2 Biological Clock and the Role of Children

The age pattern we have documented in the shift of women to family activities points to a biological clock argument. At its core is the fact that women, in contrast to men, generally have difficulties conceiving beyond their early forties. For this reason, a woman's reservation value to stay in the labor market is relatively high, and a given negative labor market shock will provide relatively strong incentives for women to take up family activities, versus committing to a new job (with investment in training). This holds as long as the woman is young enough so that fertility and caring for young children is still an issue. This would explain the gender difference in family responses to rising import competition, at the same time when the shift to family explains that young womens' labor earnings fall behind those of men.

[43] Reasons for worker mobility might include reduced earnings or hours, or fear of that in the future.

The pattern of family and labor market outcomes relative to age is consistent with this explanation (see Tables 3 to 8). Further evidence for the role of the biological constraint can be provided by examining the type of labor market positions that induce exposed workers to make a pro-family decision. It strengthens the evidence because the analysis is based on an individual-level link between labor market position and family responses. Table 9 shows the results.

Each entry in this table reports the coefficient (and robust standard error) of our rising import competition variable, *ImpComp*, based on a least-squares regression with worker and period fixed effects. Results for Birth, Parental Leave, Marriage, and Divorce are shown by the four broad columns, separately for men and for women.

The first row of Table 9 shows the overall family response, irrespective of the worker's labor market position; this repeats results from the earlier Tables 3 to 6 for convenience.[44] The following two rows distinguish family responses while being employed in the original 1999 textile job from family responses after the worker has left the 1999 textile job. Finally, the lower rows distinguish two specific labor market positions after departing from the original textile job, namely (1) Outside of the labor force and (2) Unemployed. Our interest lies in which of these labor market positions, if any, is closely related to the worker's take-up of family activities.[45]

We begin with the family outcomes while the workers still work at their initial firm. The results show that trade exposure rarely generates a pro-family response at the original employer, neither for men nor for women (row 2). The coefficients tend to be small and insignificant.[46] In sharp contrast, rising import competition often triggers pro-family choices once a worker is not employed anymore at their initial firm, especially for women. The results show that exposed women are induced to

[44]The birth and parental leave results are columns (9) and (10) of Tables 3 and 4, respectively, while marriage and divorce results are columns (5) and (6) of Tables 5 and 6, respectively.

[45]Recall that the labor market position of an individual is recorded every year in late November, while the definitions of the family outcomes cover the whole calendar year. It is thus in principle possible, for example, that in a given year an unemployed worker has taken parental leave from his job.

[46]The exception to this is the female divorce response, however, the corresponding divorce point estimate for men is similar in magnitude so it does not help to explain the gender differential.

take pro-family action in terms of all four outcomes (row 3). Taken together, this establishes that *change* of labor market position is correlated with exposure inducing family responses.

However, this does not necessarily constitute evidence in support of Becker's (1973) hypothesis that labor market and family activities are jointly determined. Perhaps trade exposure matters because by moving to a new job the worker makes a new set of acquaintances, and the uptick of family activities is the consequence of that? The final rows of Table 9 show that there seems to be more to it than meeting new people. Rather, we see that women make often pro-family decisions out of relatively weak positions in the labor market. For example, a relatively large share of trade-induced new births occurs when the women is outside of the labor force (coefficient of 0.043, column (2)). The same cannot be said for men (coefficient of -0.001, column (1)). Similarly, exposure-induced parental leave uptake for women who are unemployed or out of the labor force is important, whereas this is not the case for men (rows 4 and 5, columns (3) and (4)). Women who are outside of the labor market are also marrying due to rising import competition, in contrast to men (columns (5), (6), row 4).

Table 9: **Family Responses to Trade Exposure across Labor Market Positions**

	Birth		Parental Leave		Marriage		Divorce	
	(1) Men	(2) Women	(3) Men	(4) Women	(5) Men	(6) Women	(7) Men	(8) Women
Any Labor Market Position	0.034	0.089	0.037	0.078	-0.008	0.045	-0.011	-0.039
	(0.029)	(0.039)	(0.026)	(0.039)	(0.026)	(0.026)	(0.013)	(0.011)
At the Initial Job	-0.002	0.013	0.015	0.0120	-0.030	-0.001	-0.010	-0.014**
	(0.024)	(0.027)	(0.020)	(0.030)	(0.020)	(0.018)	(0.010)	(0.006)
After Leaving Initial Job	0.036	0.098***	0.0160	0.114***	0.022	0.046**	-0.001	-0.025***
	(0.023)	(0.032)	(0.021)	(0.035)	(0.019)	(0.020)	(0.011)	(0.009)
Of which:								
Out of Labor Force	-0.001	0.043***	-0.003	0.038**	-0.0004	0.013*	0.004	-0.003
	(0.005)	(0.016)	(0.003)	(0.017)	(0.003)	(0.007)	(0.003)	(0.003)
Unemployed	-0.010*	0.003	-0.006	0.027*	-0.005	-0.002	-0.003	-0.004
	(0.006)	(0.006)	(0.004)	(0.014)	(0.004)	(0.005)	(0.004)	(0.003)

Notes: Each cell gives a least squares coefficient and standard error estimate of *ImpComp* obtained from the estimation of equation 1, including worker and period fixed effects and a constant. The sample of workers in columns (1) to (6) is unmarried workers, in columns (7) and (8) married workers. Robust standard errors clustered at the level of workers' initial firm are in parentheses. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

Overall, this analysis indicates that women tend to move towards family from a relatively weak labor market position.

Next, we use information on the individual worker transitions to examine the timing of the move towards family. If the move towards family precedes a weak labor market position, labor market consequences of rising import competition are less likely the cause for the worker's pro-family choice than if the latter is simultaneous or subsequent to the weakening of the worker's labor market position. We focus on women in the following analysis because women are central to the move towards family, as shown above. Results are shown in Table 10.

Table 10: The Timing of Unemployment and Child-related Activities

	Births			Parental Leave		
	(1) All	(2) Before Unemployment	(3) During or After Unemployment	(4) All	(5) Before Unemployment	(6) During or After Unemployment
Import Comp	0.089**	0.050	0.052**	0.078**	0.028	0.059**
	(0.039)	(0.032)	(0.023)	(0.039)	(0.032)	(0.024)
Worker FE	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y
N	2,692	2,692	2,692	2,692	2,692	2,692

Notes: Dependent variable given at top of column. Estimation by least squares. Robust standard errors clustered at the level of workers' initial firm are in parentheses. *, ** and *** indicate significance at the 10 %, 5% and 1% levels respectively.

The panel on the left documents the impact of trade on fertility, while the panel on the right presents results on parental leave. The results in column (1) repeat earlier results for convenience (Table 2, column 5). The dependent variable for worker i is equal to one in period s if the worker had a new child in this period, and zero otherwise.[47] The results show that unmarried female 1999 textile workers respond to trade exposure by having more children, and as noted above the impact is quantitatively sizable.

The two following columns modify the definition of the dependent variable to investigate the timing of birth versus unemployment. In column (2) the dependent variable is equal to one if the worker has a new child and the worker has not (yet) had a period of unemployment, while the dependent variable is equal to one in column (3) if the worker has a newborn at the same time or following unemployment. While the point estimates in columns (2) and (3) are similarly large,

[47] Or more than one new child.

only for birth-with-or-after unemployment is the impact of trade precisely estimated so that the coefficient is significant at standard levels.

The results on parental leave follow a similar structure. Notice that the coefficient capturing the family response to rising import competition is roughly twice as large when the family action is taken at least simultaneously with unemployment than before the unemployment spell.

These results from individual worker transitions strengthen the evidence that women take pro-family decisions because of the relatively weak labor market position they find themselves in. This is confirmed by our analysis of the entire private-sector labor force of Denmark, where we show that exposure causes maternity leave after but not before a period of unemployment (see Section B of the Appendix).

6.3 Other Explanations

6.3.1 Temporal Flexibility

Central to the temporal flexibility argument of Goldin (2014) is that women during their prime child-rearing years are more inclined to choose jobs that pay lower earnings than men because women more than men want to be able to have and raise children, which requires to avoid working very long and specific hours (for example, night shifts on call on weekends, or 100 hours a week). This argument is closely related to our biological clock argument because biological conditions dictate that women cannot relatively early in their professional life develop high-profile careers and then have children because past their early forties conception becomes difficult.

If indeed children are at the core of the behavioral difference, sorting by gender into different occupations does not have to be a key element of the story, and we know that in the US, for example, sorting *between* major occupational groups is not as important as within-occupation effects

(Goldin 2014). In the following we provide evidence on the importance of between occupational sorting for gender differentials in our setting. Results are shown in Table 11.

Table 11 compares results from two sets of probit regressions, without and with four-digit occupational fixed effects. If sorting between occupations is important for the evidence on gender differences in this paper, the inclusion of relatively detailed occupational fixed effects should lead to substantially different results. In contrast, our results are quite similar, as seen from comparing the estimates with and without occupational fixed effects in Table 11 shows. The largest difference in point estimates is obtained for marriage responses, with 0.15 without and 0.18 with occupational fixed effects for the Female interaction variable. This difference is not large, and moreover, note that a focus on within-occupation differences by adding the fixed effects does not decrease but instead it increases the estimated gender differential. Clearly, between-occupation sorting is not central to the differential marriage response to import competition of men and women. For the other three outcomes shown in Table 11 the point estimate differences with and without occupational fixed effects are quite small to begin with. [48] This provides new evidence that within-occupation factors are central to the gender differences, as emphasized by the biological clock and temporal flexibility arguments.[49]

A somewhat different perspective emerges when we consider gender differentials for different parts of the skill distribution of workers. To the extent that temporal flexibility considerations are most important for the careers of highly skilled workers, for example, the need of young lawyers to be constantly on call for important clients, one would expect that gender differentials are increasing with skill. To examine this in our context, we have estimated the impact of trade exposure on earnings for workers with three different levels of education, see Appendix Table A-10. Based on comparing the Female interaction point estimates, we find that the gender earnings differential is

[48] If we employ three-digit occupational fixed effects, as in Goldin (2014), results are very similar.

[49] That the gender differentials persist even with the inclusion of detailed occupational fixed effects is not very surprising in the light of the fact that results are similar to those obtained with probits using least squares estimation with worker fixed effects, because worker fixed effects are more general than occupational fixed effects.

Table 11: Gender Differential in Family Response to Exposure: Within or Between Occupations?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Marriage		Birth		Parental Leave		Divorce	
ImpComp	-0.020	-0.029	-0.012	-0.040	-0.104	-0.128	-0.102	-0.121
	(0.0945)	(0.0957)	(0.136)	(0.145)	(0.142)	(0.151)	(0.112)	(0.117)
ImpComp x Female	0.153^{c}	0.184^{c}	0.321^{b}	0.330^{b}	0.320^{b}	0.316^{b}	-0.188^{c}	-0.196^{c}
	(0.0922)	(0.0946)	(0.140)	(0.149)	(0.139)	(0.149)	(0.0970)	(0.104)
Observations	8,163	8,008	3,283	3,103	3,283	3,045	11,703	10,941
All controls	Y	Y	Y	Y	Y	Y	Y	Y
Period fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Four-digit Occupation FEs	-	Y	-	Y	-	Y	-	Y

Notes: Dependent variables are equal to one if worker in period s has married (columns 1-2), or has mothered/fathered a newborn baby (columns (3-4), or has taken a parental leave (columns (5-6), or has divorced (columns 7-8), zero otherwise. Sample: all unmarried workers as of 1999 (columns 1-2), all fertile age single workers as of 1999 (columns 3-6), all married workers as of 1999 (columns 7-8). Estimation by probit with period fixed effects (equation 1). All specifications include individual, partner, firm characteristics. Columns 2, 4, 6, 8 include in addition four-digit occupation fixed effects. Robust standard errors clustered at the 1999 firm level in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

falling with education. In fact, only for workers with the lowest level of education, at most high school (as of 1999), is there a significant (but then a substantial) gender earnings differential.

We have also examined differences in the skill distribution by comparing different occupations. Recall that among 35 percent of all textile and apparel workers are machine operators and assemblers, which tends to pay mid-level wages. Furthermore, close to ten percent of our workers are laborers in elementary occupations, where they receive low wages, at the same time when about 20 percent of the textile workers are relatively highly paid as managers or in professional and technicians' occupations. Table 12 shows evidence on the strength of the gender earnings differential across one-digit occupation groups.

Table 12: **Earnings Gender Differential by Occupation**

	(1) Managers	(2) Professionals and Technical Occupations	(3) Clerks	(4) Craft	(5) Operators	(6) Laborers
ImpComp	-0.694	0.232	2.831^{c}	-0.825^{c}	0.281	0.426
	(0.538)	(0.854)	(1.152)	(0.473)	(0.622)	(0.881)
ImpComp x Female	0.337	0.819	-2.976^{b}	0.265	-1.478^{b}	-1.751
	(0.990)	(0.985)	(1.166)	(0.824)	(0.677)	(1.862)
N	1,064	2,870	2,464	1,690	8,592	1,590

Notes: Dependent variable is cumulative earnings 1999-2007 over 1999 earnings. Sample is given at top of the column (as of 1999). Estimation by least squares with worker and period fixed effects. Robust standard errors clustered at the 1999 firm level in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

The results for different occupations in Table 12 should be interpreted with some caution to take account for the different sample sizes, and not all interaction coefficients are significant. As it

stands, however, occupations in which women tend to suffer relatively high losses compared to men are at the low end and in the middle of the pay distribution; the largest point estimates for the Female interaction coefficient are obtained for clerks, operators, and laborers. In contrast, the gender earnings differential for the high-paying manager and professionals occupations is positive, though not precisely estimated.

In sum, our analysis shows within-occupation effects rather than between-occupation sorting is key for our finding of gender differentials in labor market and family responses to import competition. Furthermore, we find the strongest evidence for gender earnings differentials for lower-skilled workers. This suggests that opportunity cost considerations matter in addition to the central importance of children for the gender earnings differential, especially for lower skilled worker groups.

6.3.2 Preferences for Children

Our biological clock argument concerns the difference between men and women about how age affects their probability of future conception. All else given, women will move more strongly towards family than men for this reason. In addition, there may be gender differences in how strongly the decisions of men and women are affected by the presence of children, which may be seen as a measure of preferences for children. The deep causes of preferences may be various–including gender identity and discrimination–and to unpack them goes beyond the scope of this paper. There is direct evidence, however, that the presence of children affects family choices caused by trade exposure differently, focusing on the divorce decision, see Table A-1.

The first two columns repeat our earlier finding that there is a gender differential in divorce responses between men and women (from Table 5). The second two columns show that exposed women who have a baby (as of 1999) are more likely to remain in the marital union than women who do not, whereas the presence of a baby has not significant impact on the divorce behavior of

men (columns (3) and (4)).

Table 13: **Divorce Responses and Babies**

	(1) Women	(2) Men	(3) Women	(4) Men
ImpComp	-0.039^{b}	-0.011	-0.031^{b}	-0.012
	(0.011)	(0.013)	(0.011)	(0.013)
ImpComp x *Baby*			-0.070^{c}	0.010
			(0.035)	(0.043)
N	6,846	4,934	6,120	5,660

Notes: Dependent variable is given on top of column. Estimation by least squares with worker and period fixed effects. Specifications underlying columns 3 and 4 include an interaction variable exposure times the presence of a child aged less than 3 years old in the year 1999 (*Baby*). Robust standard errors clustered at the 1999 firm level in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

We conclude that preference for children matters for gender behavior not only because it affects future conception but also the ability of workers to care for existing (young) children.

7 Concluding Remarks

Using population register data on all marriages, divorces and births together with employer-employee matched data from Denmark, we have shown that rising import competition due to the removal of textile quotas on China had a significant impact on gender inequality through its effect on the family-market work balance. Generally, single workers exposed to import competition more frequently marry, have children, and take parental leave, while married workers do not divorce their spouses as often as similar non-exposed workers. Strikingly, even though the negative earnings impact at the initial job is comparable for men and women, the pro-family, pro-child adjustment is gender biased in the sense that it is primarily driven by women, and correspondingly, the negative long-run earnings impact of import competition on women is much higher than for men. We show that these results carry broadly over to the Danish economy at large.

We have also documented that the gender bias in the family-market work adjustment persists controlling for job, worker, and partner characteristics. Instead, there is strong evidence for what we call the biological clock argument of gender earnings differences. It is especially young, early-stage-of-life women who cannot postpone as well as men conception (and caring for a young child) who are the driving force behind the gender differential. The shift towards family activities fully eliminates for women the adjustment cost advantage that young workers typically have over older workers.

This paper has provided evidence that globalization can have a strong impact on earnings inequality because women and men do not substitute family work for market work in the same way even when they face the same labor market shock. According to our results the family margin is significant even in advanced countries with a substantial amount of family-oriented support systems, such as relatively generous parental leave and availability of childcare. There is clearly a need for future work on the importance of the market-family margin in adjusting to structural change.

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8 Appendix

A Placebo Results on Potential Pre-Trends

The following analysis checks for possible pre-trends by following our 1999 textile workers back to the year 1990 for a number of placebo exercises. As the pre-shock period we employ the period 1990-94, while the treatment period is assumed to be 1995-99. Table A-1 shows labor market and income results for five outcomes, separately for men (Panel A) and women (Panel B). Table A-2 reports in addition earnings and income results separately for married and unmarried workers, as well as evidence on three different family outcomes (birth, marriage, and divorce).

Beginning with Table A-1, notice that none of the coefficients is significantly different from zero at standard levels, neither for men nor for women. This is what one would expect in the absence of major pre-trends.

Table A-1: **Potential Pre-Trends I: 1990-1999**

	(1) Earnings	(2) Personal Income	(3) Hours Worked	(4) Hourly Wage	(5) Unemployment
Panel A. Men					
$Exposure_{i,99} * Post95_s$	0.009	0.019	-0.009	0.017	-0.085
	(0.033)	(0.028)	(0.014)	(0.020)	(0.107)
N	8,248	8,248	7,964	7,964	8,248
Panel B. Women					
$Exposure_{i,99} * Post95_s$	0.013	-0.012	0.015	-0.002	-0.052
	(0.028)	(0.025)	(0.015)	(0.014)	(0.117)
N	10,374	10,374	9,850	9,850	10,374

Notes: Dependent variables on top of column. All variables are expressed in logs. They are the average annual value of earnings, personal income, hours worked, hourly wage and the unemployment index, respectively. Unemployment index takes the value of one when no unemployment is recorded in a given year, and ranges to 1001 which indicates unemployment for the whole duration of year. E.g., the value 501 indicates a half year of unemployment. Averages are taken across the pre- and post-1995 periods, namely 1990-1994 and 1995-1999. Estimation by least squares. All specifications include worker and time fixed effects. Robust standard errors clustered at the 1999 firm in parentheses.

Turning to the results in Table A-2, we see that also here none of the estimated coefficients is significantly different from zero. Based on these findings we can rule out the possibility of major pre-existing trends for family outcomes and at the subsample level as well.

Table A-2: **Potential Pre-Trends–Subsample Analysis**

	(1) Earnings	(2) Personal Income	(3) Divorce	(4) Marriage	(5) Birth
Panel A. Men					
$Exposure_{i,99} * Post95_s$	0.003	0.009	0.003	0.013	0.006
	(0.024)	(0.019)	(0.007)	(0.014)	(0.018)
N	8,550	8,542	8,550	8,550	8,550
Panel B. Women					
$Exposure_{i,99} * Post95_s$	0.024	-0.007	-0.003	0.012	0.017
	(0.027)	(0.013)	(0.006)	(0.013)	(0.016)
N	10,954	10,946	10,954	10,954	10,954
Panel C. Married Workers as of 1999					
$Exposure_{i,99} * Post95_s$	-0.014	0.020	0.003	0.029	0.005
	(0.032)	(0.025)	(0.007)	(0.023)	(0.027)
$Exposure_{i,99} * Post95_s * Woman_i$	0.042	-0.028	-0.002	-0.017	0.007
	(0.039)	(0.025)	(0.008)	(0.029)	(0.034)
N	11,548	11,548	11,548	11,548	11,548
Panel D. Unmarried Workers as of 1999					
$Exposure_{i,99} * Post95_s$	0.042	0.010	0.006	-0.011	0.014
	(0.032)	(0.021)	(0.013)	(0.009)	(0.020)
$Exposure_{i,99} * Post95_s * Woman_i$	-0.021	-0.012	-0.012	0.022	0.012
	(0.054)	(0.023)	(0.019)	0.014	0.031
N	7,956	7,940	7,956	7,956	7,956

Notes: Dependent variables at the top of the column. Estimation by least squares. All specifications include worker and time fixed effects and a constant. Regressions in Panels C and D also include $Post95_s * Woman_i$ but omitted from the table. Earnings variable is the average earnings over 1990-1994 and 1995-1999 normalized by the worker's own 1999 earnings. Similarly personal income variable is the average personal income across the pre- and post-1995 period normalized by the worker's own personal income as of year 1999. Divorce, Marriage, and Birth variables take 1 if the individual has an event of divorce, marriage, or birth (fathering or mothering a new born child) over the periods, 1990-1994 and 1995-1999, and zero otherwise. Robust standard errors clustered at the (initial) firm in parentheses.

B Results for the Private-Sector Danish Labor Force

This section extends some key results in the text to a larger sample, essentially the private-sector labor force of Denmark in the year 1999.[50] Following Keller and Utar (2016) we estimate the impact of rising import competition by employing six-digit industry (or product line) variation in the change of import penetration in Denmark. Because the change in Danish imports from China across industries might be endogenous it is instrumented by imports in eight other high-income countries (Australia, Finland, Germany, Japan, Netherlands, New Zealand, Switzerland, and the USA). We employ two additional instrumental variables: geography-based transportation costs and a measure of the importance of retail channels. These variables are the log average of the distance from Denmarks import partners using the 1996 imports as weights, and the ratio of the number of retail trading firms over the total number of importing firms in 1996. We estimate the impact of rising import competition by regressing family responses on the change in import penetration from 2000 to 2009 together with an extensive set of worker, firm, product line, and (if applicable) partner variables.[51] Marriage and divorce results are shown in Table A-3.

First, note that the impact of rising import competition is negative neither for men nor women in Denmark (columns (1) and (2)). This shows that the more positive marriage impact in Denmark compared to the US is not driven by our textiles worker sample. Rather, it is likely in part related to the relatively large extent of insurance and transfer payments that exposed workers receive in Denmark. Second, women react more strongly than men in terms of marriage, with a coefficient that is more than twice the size of the coefficient of men.

[50] We drop government employment and some other (small) sectors because Statistics Denmark does not report data allowing us to compute our six digit product line control variables.

[51] In order to account for the zeros in some of our dependent variables, we add one before taking logs when appropriate.

Table A-3: Marriage and Divorce Decisions

	(1) Marriage Men	(2) Marriage Women	(3) Divorce Men	(4) Divorce Women
ImpComp	0.155	0.398^{b}	-0.018	-0.132^{c}
	(0.175)	(0.176)	(0.056)	(0.078)
Worker Variables	Y	Y	Y	Y
Firm Variables	Y	Y	Y	Y
Product Line Variables	Y	Y	Y	Y
Partner Variables	Y	Y	Y	Y
First-stage F-stat	7.79	9.73	9.52	10.80
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	441,827	395,369	500,720	489,537

Notes: Dependent variable is shown at top of column. Estimation by two-stage least squares. Instrumental variables are (1) Chinese imports in eight other high-income countries, (2) trade costs based on distance, and (3) share of retailing in all firms, all at the six-digit industry level. Reported is the robust Sanderson-Windmeijer F-statistic. Robust standard errors clustered at the level of the industry in parentheses. Partner variables in columns (1) and (2) are for co-habitating individuals. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

The gender differential in the divorce response is even larger than for marriage, see columns (3) and (4) of Table A-3. Exposed women divorce significantly less than not exposed women, in contrast to men for whom exposure does hardly change divorce behavior.

Next, we turn to the workers' new births and maternity leave decisions. Table A-4 shows the

results. In the sample of roughly 1.2 million fertile-age workers, the point estimate for the change of import penetration is positive but insignificant.

Table A-4: Import Competition, Fertility and Maternity Leave

	(1) Birth	(2) Birth	(3) Birth	(4) Maternity Leave
	All	Women	Men	
ImpComp	0.036	0.115	0.001	0.185^{b}
	(0.112)	(0.154)	(0.120)	(0.094)
Worker Variables	Y	Y	Y	Y
Firm Variables	Y	Y	Y	Y
Product Line Variables	Y	Y	Y	Y
Partner Variables	Y	Y	Y	Y
First-stage F-stat	10.12	10.54	9.45	10.80
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1,188,616	452,128	736,488	472,649

Notes: Dependent variable is shown at top of column. Sample is fertile age workers, defined as less than 37 (46) years for women (men). Estimation by two-stage least squares. Instrumental variables are (1) Chinese imports in eight other high-income countries, (2) trade costs based on distance, and (3) share of retailing in all firms, all at the six-digit industry level. Reported is the robust Sanderson-Windmeijer F-statistic. Robust standard errors clustered at the level of the industry in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

When we separate men from women, the point estimate for the latter is considerably larger than for the former, though neither is significant at standard levels. These findings parallel our results for the sample of textile workers (see Table 3, column (1)). Finally, Table A-4 shows the impact of trade exposure on maternity leave taking on the right. Maternity leave implies a new birth

(though it is possible to have a newborn without taking maternity leave). We see that rising import competition significantly increases the parental leave take-up of women in form of maternity leave.

Overall, the results show that in the Danish labor force as a whole import competition leads to more family activity, especially for women. Thus the results confirm our findings in the main text.

We have also seen that female textile workers (more than male) shift towards family activities especially out of relatively weak labor market positions, such as in a time during which they are unemployed or outside the labor force (Table 9). For the larger economy-wide sample analogous results are shown in Table A-5 where the outcome variables are defined as marriage and birth while the labor market position of the worker is unemployment.

The results show that exposure causes unemployed women to marry more, in contrast to unemployed men who marry less when exposed to rising import competition (columns (1) and (2), respectively). This may suggest that the marriageability of exposed, unemployed men has declined due to trade exposure. The result for women is more in line with the substitution of family for (lost) labor market activity. Furthermore, we see that trade exposure leads to new births to unemployed women (column (3)). Overall, these results indicate that as we have shown in the text for textile workers, exposed women tend to shift towards family activities in times of economic hardship, as captured by the relatively weak labor market position of being unemployed.

Table A-5: Marriage and Birth Responses out of Unemployment

	(1) Marriage	(2) Marriage	(3) Birth
	Women	Men	Women
ImpComp	0.139[c]	-0.054[b]	0.101[a]
	(0.071)	(0.027)	(0.036)
Worker Variables	Y	Y	Y
Firm Variables	Y	Y	Y
Product Line Variables	Y	Y	Y
Partner Variables	Y	Y	Y
Observations	369,720	439,956	450,752

Notes: Dependent variable is shown at top of column. Sample is fertile age workers, defined as less than 37 (46) years for women (men). Estimation by two-stage least squares. Instrumental variables are (1) Chinese imports in eight other high-income countries, (2) trade costs based on distance, and (3) share of retailing in all firms, all at the six-digit industry level. Robust standard errors clustered at the level of the six-digit industry in parentheses. [c], [b] and [a] indicate significance at the 10 %, 5% and 1% levels respectively.

Table A-6: The Timing of the Maternity Leave Response

	(1) Maternity Leave	(2) Unemployment Followed by Maternity Leave	(3) Maternity Leave Followed by Unemployment
ImpComp	0.185^{b}	0.108^{c}	-0.017
	(0.094)	(0.057)	(0.031)
Worker Variables	Y	Y	Y
Firm Variables	Y	Y	Y
Product Line Variables	Y	Y	Y
Partner Variables	Y	Y	Y
Observations	472,649	472,649	472,649

Notes: Dependent variable is shown at top of column. Sample is fertile age workers, defined as less than 37 (46) years for women (men). Estimation by two-stage least squares. Instrumental variables are (1) Chinese imports in eight other high-income countries, (2) trade costs based on distance, and (3) share of retailing in all firms, all at the six-digit industry level. Robust standard errors clustered at the level of the six-digit industry in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

Table A-6 provides evidence on the timing of parental leave taking caused by trade exposure relative to a period of being unemployed. As shown in columns (2) and (3), there is evidence that trade exposure causes unemployment and then maternity leave, while there is no evidence that trade exposure causes maternity leave and then unemployment. As in the case of the textile worker sample (see Table 10), this indicates that a move towards more family activities *without* having experienced lower labor market opportunities is rare.

Table A-7: Labor Market Consequences of Exposure by Gender

	(1) Earnings Women	(2) Earnings Men	(3) Employment Women	(4) Employment Men	(5) Unemployment Women	(6) Unemployment Men
ImpComp	-28.010^{b}	-9.167	-3.057^{b}	-0.081	191.672^{b}	74.504^{c}
	(16.535)	(14.722)	(1.458)	(0.891)	(71.936)	(36.009)
Worker Variables	Y	Y	Y	Y	Y	Y
Firm Variables	Y	Y	Y	Y	Y	Y
Product Line Variables	Y	Y	Y	Y	Y	Y
Partner Variables	Y	Y	Y	Y	Y	Y
Observations	736,824	918,651	736,824	918,651	736,824	918,651

Notes: Dependent variable is shown at top of column. Estimation by two-stage least squares. Instrumental variables are (1) Chinese imports in eight other high-income countries, (2) trade costs based on distance, and (3) share of retailing in all firms, all at the six-digit industry level. The robust Sanderson-Windmeijer first-stage F-statistic is 10.53 for women and 9.70 for men (p-values below 0.001). Robust standard errors clustered at the level of the six-digit industry in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

Finally, Table A-7 shows that rising import competition has more severe labor market consequences for women than for men. Cumulative earnings of women fall by around three times as much (and significantly) than mens', see columns (1) and (2), respectively. The gender differential in earnings is largely explained by greater employment losses for women (columns (3) and (4)), which replicates our results for textile workers as well (Table 7). One difference to the textile sample is that for the economy-wide sample there is evidence that women are more strongly experiencing unemployment as a consequence of trade exposure than men (columns (5) and (6)).

In sum, our analysis of the impact of trade exposure in the entire Danish private-sector labor force has confirmed many of the main findings on textile workers in the text.

Table A-8: Import Competition and Births - Probit Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	All	All	M	W	All	M	W
		Co-habitating or Single				Single		
ImpComp	0.003	0.159**	0.094	0.092	0.237[b]	-0.008	-0.111	0.458[a]
	(0.074)	(0.074)	(0.085)	(0.102)	(0.113)	(0.136)	(0.167)	(0.173)
Marg. Effect	0.001	0.053	0.031	0.027	0.086	-0.002	-0.020	0.134
ImpComp x Female	0.072		0.071			0.317[b]		
	(0.082)		(0.104)			(0.140)		
Marg. Effect	0.022		0.024			0.080		
Worker, firm, partner vars	Y	Y	Y	Y	Y	Y	Y	Y
Time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Pseudo R-sq	0.083	0.075	0.077	0.086	0.059	0.136	0.136	0.131
Predicted Prob	0.253	0.279	0.279	0.236	0.330	0.173	0.143	0.219
Observations	10,235	5,912	5,912	3,228	2,684	3,283	1,996	1,287

Notes: Dependent variable is one if worker *i* has a newborn child during period *s*, and zero otherwise. Estimation by probit regression. The sample in column (1) is textile workers of fertile age (below 37 for women, below 46 for men as of 1999). "M" is Men, "W" is Women. The sample in columns (2) to (5) is workers not married as of 1999, in columns (6) to (8) workers neither married nor co-habitating as of 1999. Robust standard errors clustered at the level of workers' 1999 firm are in parentheses. [c], [b] and [a] indicate significance at the 10 %, 5% and 1% levels respectively.

Table A-9: Trade Exposure and Parental Leave - Probit Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	All	All	All	Men	Women	All	Men	Women
		Co-habitating or Single				Single		
ImpComp	0.003	0.155[b]	0.021	0.131	0.191[c]	-0.099	-0.189	0.370[b]
	(0.074)	(0.073)	(0.087)	(0.106)	(0.112)	(0.142)	(0.177)	(0.170)
Marg. Effect	0.001	0.048	0.006	0.031	0.071	-0.019	-0.024	0.110
ImpComp x Female	0.081		0.102			0.317[b]		
	(0.084)		(0.104)			(0.139)		
Marg. Effect	0.024		0.032			0.073		
Worker, firm, partner vars	Y	Y	Y	Y	Y	Y	Y	Y
Time FEs	Y	Y	Y	Y	Y	Y	Y	Y
Pseudo R-sq	0.090	0.073	0.085	0.076	0.052	0.138	0.122	0.118
Predicted Prob	0.232	0.249	0.249	0.168	0.347	0.151	0.103	0.226
Observations	10,235	5,912	5,912	3,228	2,684	3,283	1,996	1,287

Notes: Dependent variable is one if worker *i* takes parental leave during period *s*, and zero otherwise. The sample in column (1) is textile workers of fertile age (36 or below for women, 45 or below for men as of 1999). The sample in columns (2) to (4) is workers not married as of 1999, in columns (5) to (7) workers neither married nor co-habitating as of 1999. Robust standard errors clustered at the level of workers' 1999 firm are in parentheses. [c], [b] and [a] indicate significance at the 10 %, 5% and 1% levels respectively.

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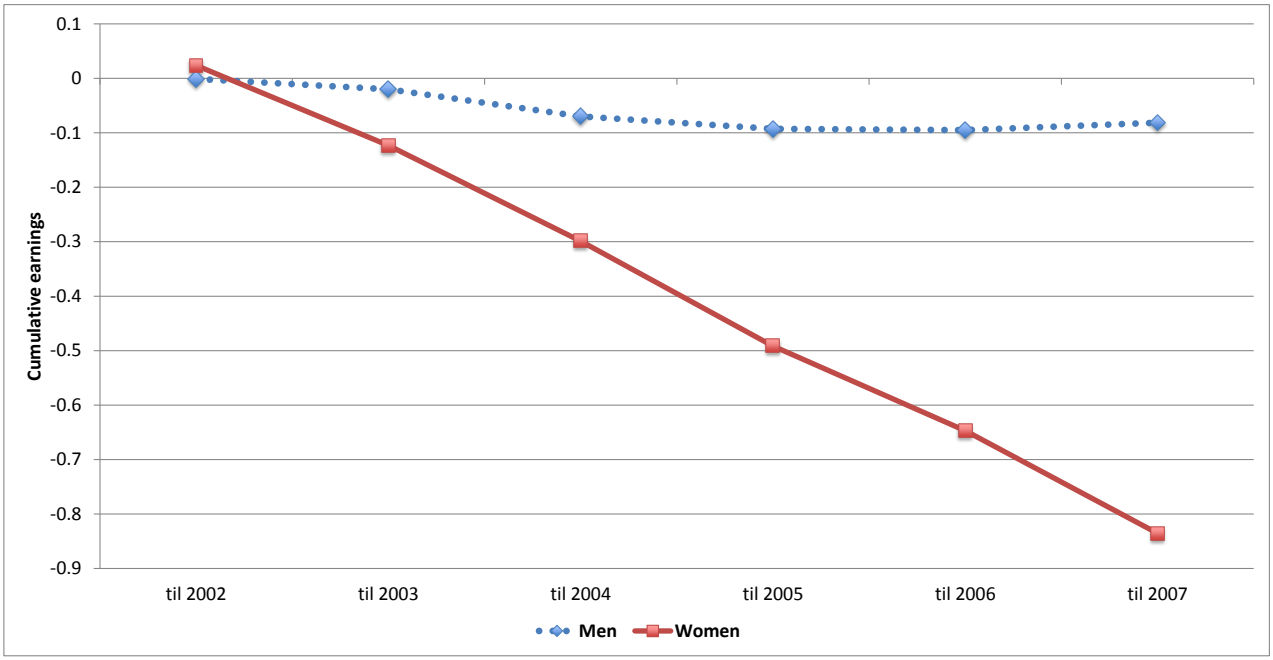

Figure A-1: Earnings dynamics of men and women

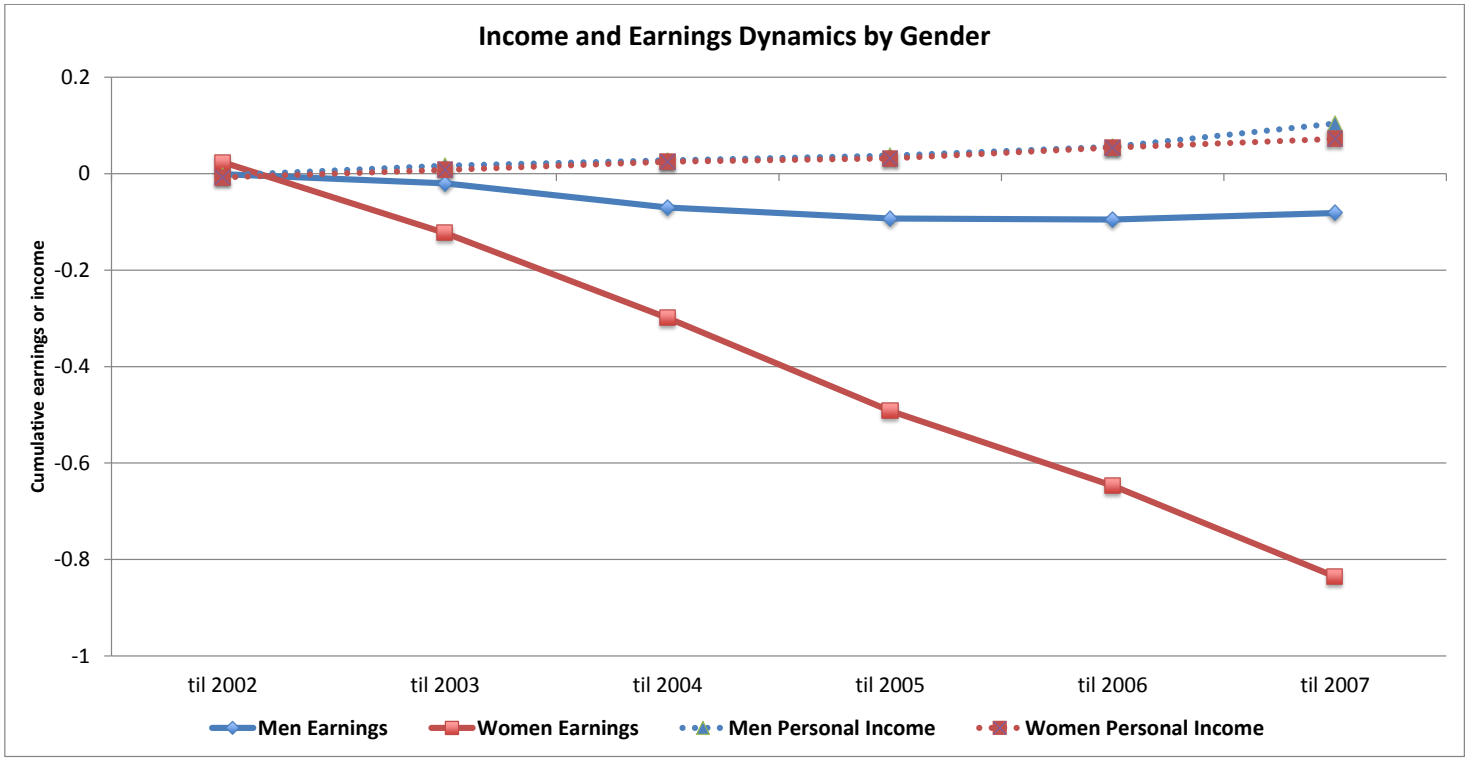

Figure A-2: Evolution of Income and Earnings Effects by Gender

C Alternative Explanations: Gender Differential and Skill

The following table shows cumulative earnings regressions for three groups of workers, those with college education and above, with vocational education, and those with at most high school education. These education levels are as of the first year of the sample period, 1999.

Table A-10: **Gender Earnings Differential by Education**

	(1) College	(2) Vocational School	(3) High School
ImpComp	-0.291	-0.134	-0.0292
	(0.838)	(0.302)	(0.429)
ImpComp x Female	-0.354	-0.554	-0.989^{c}
	(1.119)	(0.558)	(0.521)
Worker FE	Y	Y	Y
Period FEs	Y	Y	Y
Observations	2,312	7,088	9.778

Notes: Dependent variable is labor earnings from all jobs from 1999 to 2007, relative to 1999 earnings. Estimation is by least squares. Robust standard errors clustered at the 1999 firm level in parentheses. ^{c}, ^{b} and ^{a} indicate significance at the 10 %, 5% and 1% levels respectively.

The results indicate that the gender earnings differential is declining in skill as measured by formal education. On average, female workers with at most high school education earn roughly one annual salary less than male workers with the same education over the sample period, or about 17 percent per year of treatment.

D Trade Liberalization in Textiles and Clothing

D.1 The Multi Fibre Arrangement System

When the General Agreement on Tariffs and Trade (GATT) was signed in 1948, world trade in textile and clothing was excluded from the agreement. Trade in textiles and clothing was governed by bilateral agreements. As the number of agreements grew, the Multi-fibre Arrangement (MFA) was introduced in 1974 to govern the world trade in textile and clothing. For the European Union, most (MFA) quotas were negotiated for the bloc of countries as a whole, and since 1993 any member state specific restrictions were removed and the quotas started to be managed at the EU level. In 1995 the Agreement on Textiles and Clothing (ATC) replaced the MFA, and made provision for phasing it out in four steps over a period of 10 years. This was to happen at the beginning of the years 1995, 1998, 2002 and 2005. Based on the volume of imports in 1990, quotas were to be eliminated equivalent to 16% of 1990 imports at the beginning of 1995, 17% at the beginning of 1998, 18% at the beginning of 2002, and the remaining 49% at the beginning of 2005.

Between 1986 and 1994 the EU executed MFA quotas towards 19 countries. These were Argentina, Brazil, China, Czechoslovakia, Hong Kong, Hungary, India, Indonesia, the Republic of Korea, Macao, Malaysia, Pakistan, Peru, Philippines, Poland, Romania, Singapore, Sri Lanka and Thailand.

Under the later ATC system, the selection of MFA products to be integrated into the normal WTO system was left to the decision of the importing country. The EU started its phasing-out process by integrating mainly products or MFA categories with no quotas vis--vis WTO members. The same approach was chosen by the USA. During the first two phases, the EU integrated 34 MFA categories, but only very few existing quotas vis--vis WTO members.

During the same time the EU also liberalized quotas mainly on a bilateral basis for neighboring

countries in Eastern Europe (Europe Agreements) and the Mediterranean. Among the list of 19 countries above, the Czech Republic, Slovakia, Hungary, Poland, and Romania already had established quota free access to the European market before 1999. In 1997 about 70% of the total EU import value of textiles and clothing was imported without any quantitative restrictions, while the other 30% was imported under quota.

Among the 81 categories for which EU quotas existed, only 18 were utilized at an average of more than 70% between 1996 and 1998. The exporting countries with the highest quota utilization were China, India, Pakistan and Indonesia.

In 1998, China's share of textiles and apparel imports of 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%.

D.2 Textile Quotas

The Systeme Integre de Gestion de Licenses (SIGL) database provides categories of textile and clothing products that are subject to trade quotas in the European Union for a particular year. We employ this data to identify firms in Denmark that will be affected by the quota removals on Chinese exports following that country's entry into the WTO. The quota categories are administrative descriptions of quota products that do not follow standard statistical product classifications. The quotas have a varying degree of coverage; for example, the quota category Gloves, mittens and mitts, knitted or crocheted covers nine products at the 8-digit Common Nomenclature (CN) level, while the category Woven fabrics of synthetic filament yarn obtained from strip or the like of polyethylene or polypropylene, less than 3 m wide corresponds to a single 8-digit CN product. Quota categories include both textile and clothing products. A given category does not necessarily

cover a technologically or materially homogeneous group of products, nor does it have to be comprehensive. For example, ramie bedspreads are covered by the quota restriction for China while cotton bedspreads are not, and Brasseries of all types of textile material is covered, in contrast to Corselettes of all types of textile materials. The source of the correspondence between quota categories and eight-digit products is Utar (2014), and it is available from the author.

D.3 The Timing of the Trade Shock

It is important to clarifywhether we utilize the end of the MFA or Chinas entry into the WTO as the onset of rising import competition. The two occurrences, Chinas entry into the WTO and the end of the MFA are related to each other. The empirical strategy exploits the expiration of the MFA quotas for China due to its WTO membership. The abolishment of the MFA quotas were scheduled in 1995 and therefore there was no uncertainty associated with its timing. However, China was not able to benefit from these quota removals as it was not a member of the WTO. The uncertainty that matters for the difference-in-difference estimation strategy comes from uncertainty regarding China's the accession to the WTO, as well as its timing.

D.4 Importance of China's entry into the WTO

It is useful to compare the importance of China's entry into the WTO with the implications of the earlier liberalizations for other countries' exports to Denmark. For example, how did Danish workers fare under the phase II relaxation that occurred in the year 1998?

The European Union kept a relatively open trade policy in the textile and clothing sector throughout the 1990s except for some 'sensitive MFA quota categories' which were mostly the subject of the 2005 (Phase IV) quota abolishment. For example, developing countries subject to the MFA quotas, such as India, Indonesia, Pakistan, Thailand, did not experience any quota removal as part of Phase

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

The EU has no textile quotas for the least developed countries. For example, Bangladesh was benefitting from the General System of Preferences (GSP), and no textile quotas were imposed on Bangladesh throughout the sample period.

Argentina, Brazil, Macao and Pakistan had 1 category, Hong Kong 4 and South Korea 6 categories removed in Phase I and II. The highest utilization rate among these quotas removed under the Phase I or II was 49.6 % for category 100 from Korea. This category was not subject to quota for any other country. Giving the overall share imports from these countries and the differences of quota categories imposed across these countries, it is difficult to disentangle the impact of Phase I and II removal from the general liberalization in the textiles and clothing industry.

D.5 Firm-level versus Worker-level analysis

This paper examines the impact of rising import competition at the worker-level based on exposure based on the worker's firm's product mix. It is therefore natural to examine responses at the firm-level as well. Firm-level responses have been documented by Utar (2014) employing a similar empirical strategy. The paper finds a strong decline in employment, sales and intangible assets of these firms. The decline in sales are driven in part by product droppings.

One particular issue is whether the 2002 experience might have prompted some Danish producers of 2005 (Phase IV) quota goods to abandon them earlier than 2005. However, the treatment def-

inition covers either 2002 or 2005 goods (as well as those from the 1995 and 1998 phases), and therefore this does not create a problem for the analysis.

E Additional Descriptive Evidence

This section extends our discussion of the descriptive evidence in section 2 by showing additional event-study style graphs. We begin with parental leave taking. Figures A-3 and A-4 show annual rates of parental leave for male and female workers, by exposure to rising import competition. While the mens' rates are quite close to each other, for women the parental leave rates of the exposed group of workers are higher than those of the not exposed group in every year after China entered the WTO.

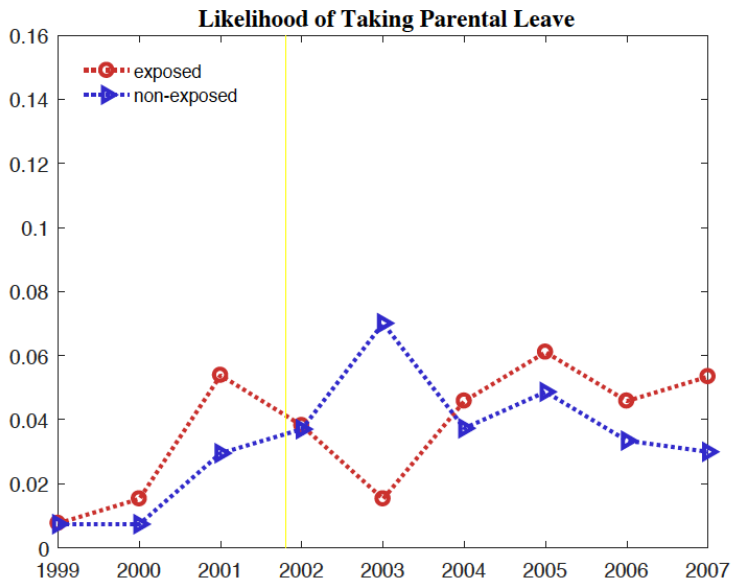

Figure A-3: Parental Leave Taking by Male Workers

Notes: Figure shows annual parental leave rates of male textile workers from 1999 to 2007. China entered the WTO in December 2001.

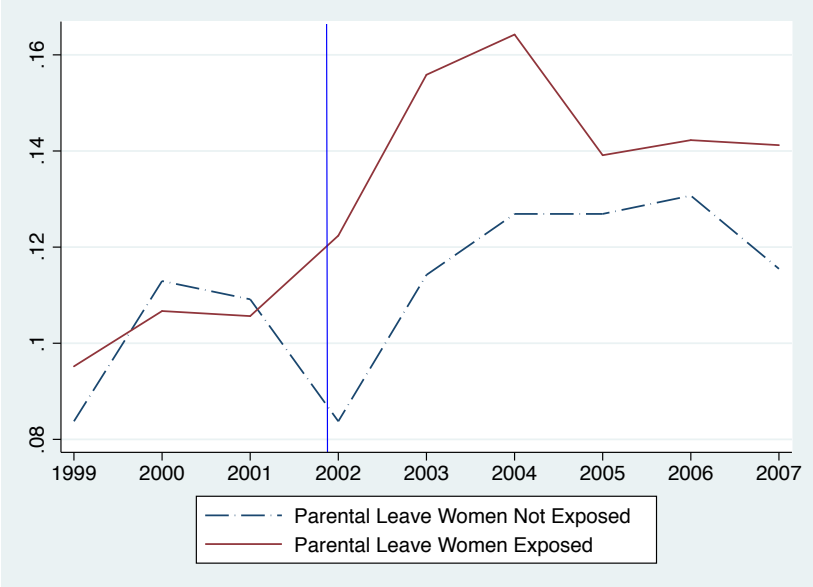

Figure A-4: Parental Leave Taking by Female Workers

Notes: Figure shows annual parental leave rates of female textile workers from 1999 to 2007.

Divorce rates are shown in Figures A-5 (Men) and A-6 (Women). For men, divorce rates fluctuate from year to year typically for both groups of workers (treated and untreated). In contrast, the divorce rate of exposed women is lower than that of not exposed women during the treatment period, and rather stable at around 1 percent.

Figure A-5: Divorce Rates of Male Workers

Notes: Figure shows annual divorce rates of male textile workers from 1999 to 2007.

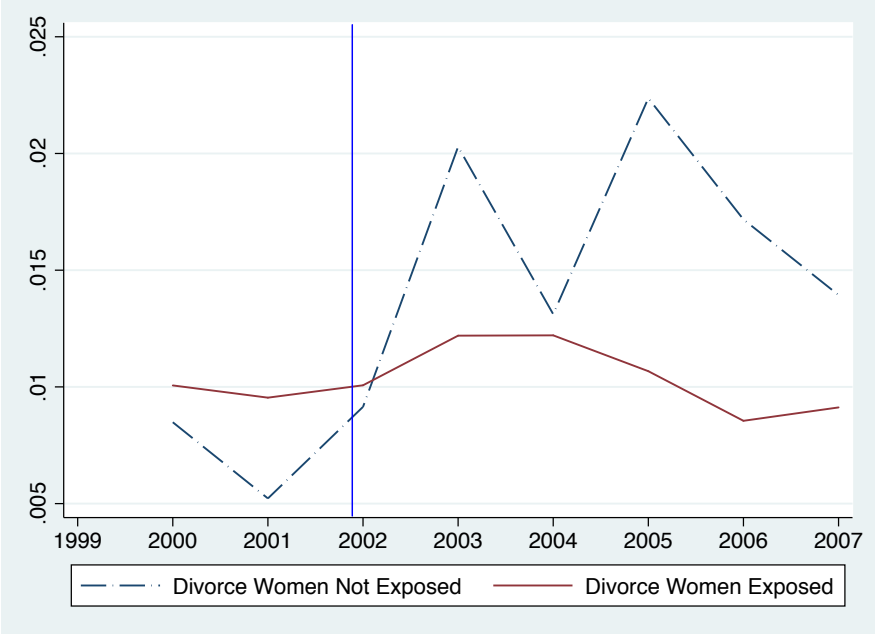

Figure A-6: Divorce Rates of Female Workers

Notes: Figure shows annual divorce rates of female textile workers from 1999 to 2007.

Figure A-7 gives evidence of worker transitions out of the manufacturing sector. Recall that in 1999 all workers are in manufacturing because we analyze the 1999 cohort of textile workers. With transitions into other sectors of the economy, as well as into unemployment and exits from the labor force, the probability of being in manufacturing will fall over time. Figure A-7 provides evidence of a treatment effect starting in 2002. Perhaps even by the year 2001 there might be a small difference between exposed and not exposed workers. To address these types of anticipation effects, we define expose three years before China entered the WTO, as of the year 1999. Notice that the difference between exposed and not exposed men by 2007 is larger than between exposed

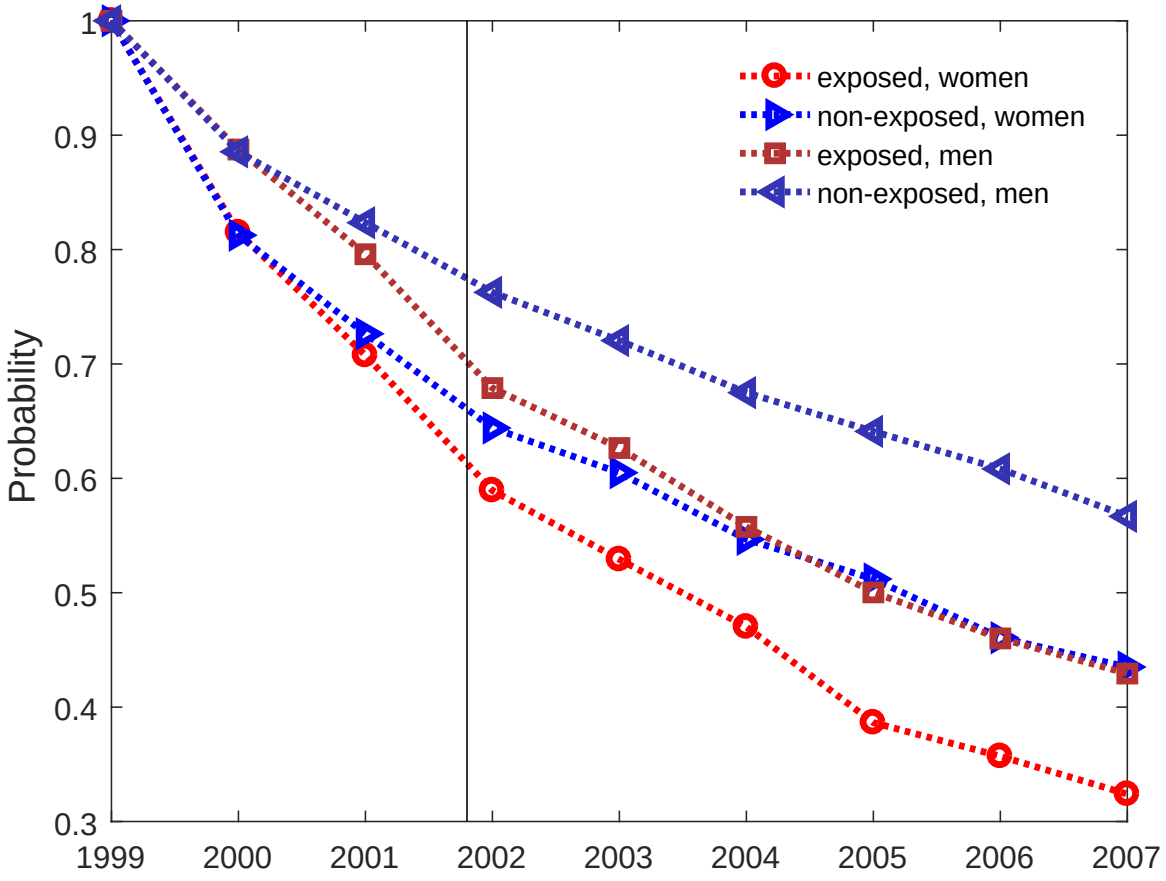

Figure A-7: Likelihood of Staying in the Manufacturing Sector

Notes: Likelihood of having a manufacturing job across the sample workers depending on gender and import competition. See text for definition of exposure.

Figure A-8 shows that former textile workers move into the services sector, and the evidence supports the hypothesis that this is more strongly the case for exposed workers. Generally, women move more rapidly into services than men, but notice that the difference between exposed and not exposed men by the year 2007 is larger than the difference between exposed and not exposed women.

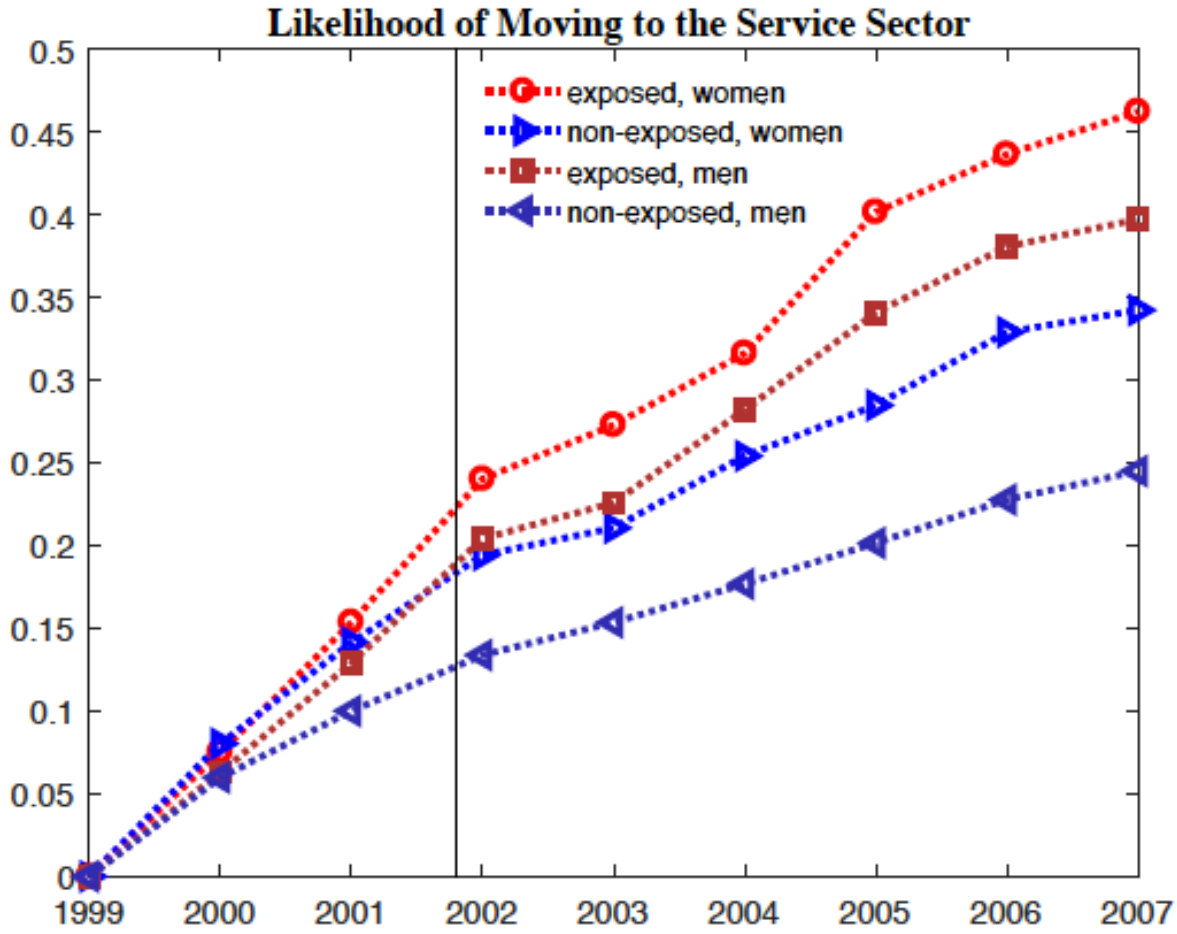

Figure A-8: Sectoral Shift to Service Employment

Notes: Figure shows worker transitions from being a 1999 textile (manufacturing) worker into the services sector, with the probabilities given on the vertical axis.

Machine operators and assemblers are an important occupation in textiles, accounting for more than one third of the labor force in 1999. Figure A-9 shows that exposed female machine operators become more rapidly and more strongly unemployed than exposed male machine operators.

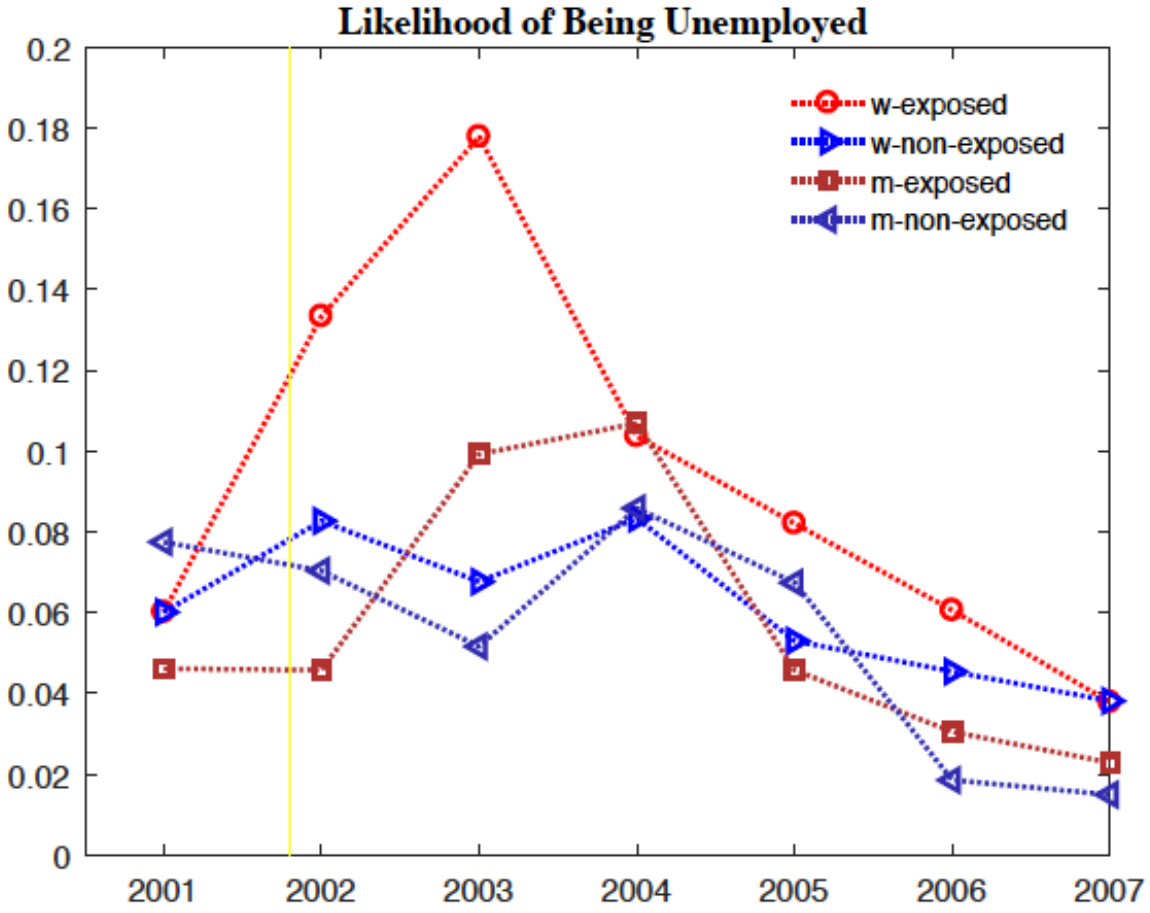

Figure A-9: Unemployment Rates of Textile Machine Operators

Notes: Figure shows unemployment rates of 1999 textile machine operators from 2001 to 2007. China entered the WTO in December 2001.