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Household responses to trade shocks

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Household Responses to Trade Shocks[*][†]

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Abstract

We study the impact of Chinese import competition in the 2000s on workers and their households in England and Wales. We document both the direct employment changes of individuals affected by trade exposure, as well as the employment response of individuals whose partner is exposed to trade. We find substantial differences by gender. Men respond to import competition by increasing labour force participation at older ages, and by moving into self-employment. This is true both in response to their own trade exposure, and as an 'added worker effect' when their partner is exposed to the shock. By contrast, we find no such response for women, who do not increase labour supply following shocks affecting their partners. Gender differences in employment responses reflect differing opportunities in the self-employed sector: male workers exposed to import competition largely enter self-employed jobs in historically male-dominated occupations, as do men reacting to shocks affecting their partners.

JEL Classification: D10, F14, F16, F61, J12
Keywords: Import Competition, Families, Labour Supply, Added-Worker Effects, Gender

1 Introduction

A sizable body of empirical research has shown that trade shocks can have lasting effects on both individual workers and local labour markets. The impact of trade shocks on households, as opposed to individuals, has however received less attention. The responses of households are important for several reasons. The partners of those directly affected can increase labour supply or extend their working lives to compensate for adverse economic impacts. Shocks can also affect household formation or dissolution. Finally, household members can respond to shocks in different ways according to the margins that are available to them, which in turn may differ by gender.

In this paper, we use longitudinal, linked census data from England and Wales to study the responses of both workers *and* their partners to rising import competition with China in the 2000s, a salient case of a large trade shock (Autor et al., 2016). We document three key facts. First, employment responses to the trade shocks differ substantially across men and women with similar degrees of exposure. In particular, men are more likely to transition into self-employment and to extend their working lives at older ages. Second, we show that being employed in an exposed industry reduces the probability of divorce among younger women, while having no effect on the marriage or divorce rates of younger men. Third, we document added worker effects, with again asymmetric responses by gender. Men are more likely to increase labour supply in response to shocks affecting their female partners, while we do not find evidence for the converse. The latter is true irrespective of whether young children are present in the household.

We consider several reasons why responses by gender should differ both in response to their own and partners' exposure to rising import competition. We find no evidence that differences in men's and women's initial hours and broad occupation explain the gender differences in our main findings, or effects on fertility that might affect women's labour market responses differently to men's. Our results do however point to men having greater access to opportunities in the self-employed sector, allowing them greater flexibility to increase their labour supply. Male-dominated occupations such as taxi drivers and plumbers account for almost two-thirds of the transitions of men initially employed in exposed industries, indicating that it is these jobs that provide men with an 'employment buffer'. Similarly, the increase in self-employment among men whose partners were exposed to rising import competition is almost entirely accounted for by historically male-dominated jobs.

We use data from the Office for National Statistics (ONS) Longitudinal Study (LS). The LS is uniquely suited for our purpose as it contains detailed information for all residents in the household on demographic characteristics and labour market activity. This includes information on workers' hours, industry and occupation as well as their employment and self-employment status, and for those not participating in the labour market, the reason for their inactivity (e.g. studying, sick, retired). The UK is an interesting case

for investigating the adjustment processes to trade shocks, given that it experienced the largest percentage decline in manufacturing employment among OECD countries during the 2000s, at the same time as a large increase in its trade deficit with China (Dorn & Levell, 2024). Our empirical analysis compares households with similar characteristics, but whose members differ in exposure to import competition based on narrowly defined industries: those working in industries where China's comparative advantage is strongest are the most exposed. We measure how outcomes changed from 2001 to 2011, subsequent to China's entry into the World Trade Organisation (WTO) in December 2001. Following Autor et al. (2014), we instrument for the exposure to import competition in each industry using the growth in Chinese exports to other developed economies. This strategy isolates the variation in Chinese imports to the UK due to changes in supply and trade-related conditions abroad, rather than domestic demand.

Our work contributes to several strands of the literature. The first is the literature on the labour market effects of trade shocks. A large body of research has studied the consequences of increased Chinese import competition at the local labour market, firm, and individual level (Autor et al., 2013; Utar, 2014; Balsvik et al., 2015; Bloom et al., 2016; Foliano & Riley, 2017; Dauth et al., 2021; Citino & Linarello, 2021; De Lyon & Pessoa, 2021). Several other studies have examined the effects of trade shocks based on other episodes, including the large import tariff reductions in emerging economies such as India and Brazil (Topalova, 2010; Dix-Carneiro & Kovak, 2017, 2019; Gaddis & Pieters, 2017). We contribute to this literature by studying the labour market responses of partners in the same household as exposed workers.

In doing so, our paper also relates to the more general empirical literature on added worker effects, which studies spousal labour supply responses to economic shocks affecting their partners. Prior work in this area has found mixed results and tended to focus on employment responses of women (e.g. Lundberg, 1985; Stephens, 2002; Attanasio et al., 2005; Goux et al., 2014; Blundell et al., 2016; Halla et al., 2020). We contribute to this literature by studying family labour supply responses in the context of a trade shock, which is likely to be informative about other large-scale structural changes. We also highlight the importance of gender differences in added worker effects, and in particular the responses of men to shocks affecting their female partners. In the same vein, our findings relate to recent papers investigating gender differences in responses to labour market shocks from mass-layoff events (Salvanes et al., 2024; Illing et al., 2024).

This paper also adds to the empirical research agenda on the impacts of trade shocks on non-labour outcomes such as family formation and dissolution. Recent papers study how trade shocks affect marriage and divorce rates, as well as fertility in the US (Autor et al., 2019), Denmark (Keller & Utar, 2022), and Germany (Giuntella et al., 2022). Colantone et al. (2019) study the impacts of import competition on workers' mental distress in the UK, finding large negative effects.

A final contribution we make is to the understanding of how labour market shocks affect transitions into self-employment and the importance of gender in determining these transitions. We show that self-employment acted as an 'employment buffer' for male workers in particular. This took the form of an increase in both solo self-employment and self-employment with employees. While providing an alternative source of employment for displaced workers, solo self-employment is often associated with economic insecurity (Boeri et al., 2020; Giupponi & Xu, 2020). This form of self-employment is more likely to play a role analogous to the informal sector in developing countries, which similarly acts as a buffer against the effects of trade shocks (Dix-Carneiro et al., 2024).[1] However, perhaps more positively, we also find that some workers moving into self-employment also start businesses that hire their own workers. These findings show the importance of using data sources which, unlike traditional employer-employee administrative datasets, cover the self-employed and those outside of the labour force.

The remainder of this paper proceeds as follows. In Section 2, we describe our data. Section 3 sets out our empirical research design. We present the main results in Section 4: 4.1 shows how direct exposure to import competition impacts the outcomes of workers, while 4.2 studies the responses of partners. Section 5 discusses several explanations for the observed gender differences in the responses. Section 6 concludes.

2 Data and Sample Description

2.1 The ONS Longitudinal Study Data

The main dataset we draw on is the Office for National Statistics (ONS) Longitudinal Study (LS, Office for National Statistics, 2019), a unique dataset that links census records for a one per cent sample of the population of England and Wales (people born on one of four selected dates in a calendar year). It covers people usually resident in England and Wales from the 1971, 1981, 1991, 2001, and 2011 censuses.[2] Data on over one million individuals has been collected over the 40 years of the study, and each census wave contains over 500,000 study members. The data contains core socio-demographic variables including the age, sex, marital status and locations of sampled individuals, as well as data on their employment, occupation, industry, and type of employment (e.g. whether they are employees or self-employed, whether they work part-time or full-time, etc). The LS also includes data on co-residents of study members. Although the census asks for detailed information about the nature of individuals' work, it does not include information about

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[1]Symmetrically, a positive trade shock in Vietnam (in the form of tariff reductions on its exports) induced workers to move from informal microenterprises to the formal sector (McCaig & Pavcnik, 2018).

[2]A 'usual resident' of the UK is anyone who, on census day, was in the UK and had stayed or intended to stay in the UK for 12 months or more, or had a permanent UK address and was outside the UK and intended to be outside the UK for less than 12 months.

earnings or income. Life events data, including birth to sample mothers, which we use to study fertility effects, are linked to LS members from administrative sources.

The LS has several advantages for our purposes. First, it is a panel, allowing us to track individuals across censuses held every 10 years. Most of our analysis concerns the impact of import competition on outcomes between the years 2001 and 2011. We also use data from 1981 and 1991 for placebo and robustness exercises. Second, the LS includes not only individuals who are employed but also those who are self-employed or out of the labour force. Those out of the labour force also report the reason they are not working (e.g. because they are studying, retired, sick or at home). Administrative data sources often do not include this information.[3] Third, it includes the survey responses of co-residents of study members. This is essential for our study, as it allows us to study family labour supply responses to shocks affecting an LS member. It also allows us to examine the correlation between exposure to trade shocks across spouses. Fourth, in contrast to many household-level surveys, participation in the census is a legal requirement and the ONS goes to considerable lengths to maximise its coverage (Office for National Statistics, 2015a). Both the 2001 and 2011 censuses have an estimated response rate of 94%. The LS also has low rates of attrition relative to other longitudinal datasets. 88% of LS members in the 2001 census were successfully matched to records in the 2011 census, after excluding those who were known to have died or emigrated (Lynch et al., 2015).

2.2   Other Data Sources

To construct measures of industries' exposure to import competition, we use data on trade flows from the United Nations Commodity Trade Statistics Database (UN Comtrade), which contains detailed statistics on trade in individual commodities. We obtain imports and exports for each of the three-digit industries in our analysis by mapping these individual commodity codes into the Classification of Product by Activity (CPA) codes, which are identical in their first four digits to the 1992 UK Standard Industrial Classification (SIC92) codes.[4] We deflate trade values into 2010 pound equivalents.[5]

As we describe in more detail below, we measure industries' import exposure as imports relative to total domestic sales. We use the Business Structure Database (BSD, Office

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[3]For instance, the UK Annual Survey of Hours and Earnings (ASHE) used in De Lyon & Pessoa (2021) covers employees and thus cannot distinguish movements into self-employment from job loss, and unemployment from non-participation, and the administrative data used to study trade shocks in Germany (Dauth et al., 2021) do not cover the self-employed.

[4]Mappings from Harmonised System (HS) products codes to CPA industry codes are taken from the Eurostat Reference and Management of Nomenclatures (RAMON) Index of Correspondence Tables, available here: https://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL.

[5]The data show a rapid and sustained increase in reported UK imports from China between 1999 and 2000. This most likely reflects a change in the treatment of imports from Hong Kong which originated in China that year (Baranga, 2018). For this reason, we include imports from Hong Kong in our measures of Chinese imports for the UK, but not in our measures of Chinese imports to other countries (which we use as an instrument for UK imports), as they are unaffected by this issue.

for National Statistics, 2021) to obtain information on the total amount of sales by industry. The BSD is administrative data covering plant-level information on employment, sales, geography, and main industry for almost all business organisations in the UK since 1997 (only very small businesses are not included in the register).[6] We sum sales across individual plants in the BSD to obtain total sales at the industry level.

2.3 Sample Description

We follow workers from 2001, the year China acceded to the WTO, and measure how outcomes change between 2001 and 2011. We focus on employees born between 1942 and 1983 and who were therefore aged between 18 and 59 in 2001. We discard individuals for which industry, occupation, or location is missing. The age criteria mean that by 2011, some individuals in our sample were above the state pension age, which during the period 2001-2011 was 65 for men and 60 for women. This allows us to study the extent to which individuals adjust the length of their working lives in response to a shock. To study heterogeneity in responses to import shocks, we split our sample into different subgroups by gender, age and couple status.

Table 1 shows descriptives for our sample at baseline in 2001. Our sample includes 81,304 male employees, with approx. 21.5% working in manufacturing in 2001, and 82,810 female employees, 9% of whom were working in manufacturing. Columns (1) and (4), for men and women, respectively, include employees in all industries; columns (2) and (5) only include those employed in manufacturing industries, and columns (3) and (6) only include those employed in the top twenty industries most exposed to Chinese import competition (which are all in manufacturing, see Table A.1 for the list of included industries). Because our regressions will control for one-digit industry fixed effects, our empirical analysis effectively compares changes in outcomes for workers in more and less exposed manufacturing industries. The table shows that workers in the most exposed manufacturing industries are broadly similar to other manufacturing workers in terms of their baseline characteristics, although there are some differences, as we now discuss.

Panel A presents demographic characteristics on age and whether born abroad. The average age of workers is similar across different sectors. Workers in highly exposed industries were slightly more likely to be foreign-born than other manufacturing workers.

Panel B shows information on individuals' marital status and family situation. Men working in manufacturing industries were four percentage points more likely to have a partner and to be married than those working in non-manufacturing industries. However, both men and women in the most exposed manufacturing industries were similar to other manufacturing workers in terms of their partnering and whether they had children.

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[6]The BSD is derived from the Inter-Departmental Business Register (IDBR), which is a live register of plant data collected by HM Revenue and Customs via VAT and Pay As You Earn (PAYE) records.

Table 1: Summary Statistics: Worker Characteristics in 2001.

	MEN			WOMEN		
	(1)	(2)	(3)	(4)	(5)	(6)
	All Industries	Manuf. Industries	High Exposed Industries	All Industries	Manuf. Industries	High Exposed Industries
Observations	81,304	19,488	4,464	82,810	7,660	2,444
(with partners)	(56,127)	(14,261)	(3,189)	(56,701)	(5,367)	(1,757)
Panel A. Demographic Characteristics						
Age	38.49	39.58	38.97	38.60	38.56	39.31
Foreign-born	0.083	0.068	0.093	0.079	0.090	0.116
Panel B. Marriage and Family Characteristics						
Single	0.344	0.295	0.311	0.298	0.310	0.284
Married	0.584	0.627	0.612	0.584	0.575	0.608
Widowed	0.004	0.005	0.003	0.014	0.012	0.014
Divorced	0.068	0.073	0.074	0.104	0.102	0.094
Has Partner	0.691	0.733	0.716	0.686	0.702	0.720
Has Children	0.427	0.440	0.434	0.433	0.357	0.373
Has Young Children	0.158	0.158	0.171	0.127	0.116	0.108
Panel C. Labour Market Characteristics						
Part-time	0.061	0.019	0.028	0.409	0.212	0.199
Hours worked	42.22	42.39	42.02	31.55	35.55	35.84
Low-skill	0.241	0.144	0.145	0.605	0.406	0.341
Blue-collar	0.303	0.499	0.498	0.054	0.315	0.462
White-collar	0.456	0.357	0.357	0.341	0.278	0.196
Panel D. Partner Characteristics						
Partner age	39.70	40.18	39.45	43.18	42.86	43.52
Partner hours worked	21.54	20.81	20.66	38.94	38.83	38.25
Partner manufacturing	0.072	0.129	0.141	0.211	0.389	0.408
Partner active	0.787	0.791	0.771	0.930	0.930	0.926
Partner employed	0.731	0.742	0.717	0.765	0.785	0.784
Partner self-employed	0.039	0.032	0.034	0.147	0.128	0.125
Partner unemployed	0.016	0.017	0.020	0.018	0.018	0.018
Partner inactive home	0.151	0.145	0.166	0.007	0.007	0.009

Notes: The table shows mean values for employees in the 2001 Longitudinal Study. Columns (1) and (4) (for the sample of men and women, respectively) include employees in all industries, columns (2) and (5) includes only those employed in manufacturing industries, and columns (3) and (6) only include those employed in the top 20 three-digit SIC92 industries most exposed to Chinese import competition (see Appendix Table A.1). Source is ONS Longitudinal Study.

Panel C shows that general patterns of employment differ across men and women. 41% of female employees worked part-time, while the fraction of male employees working part-time was just 6%. Within manufacturing, the fractions working part-time were substantially lower, at 21% for women and 2% for men. Men and women were also employed in different occupations, which we group into low-skill, blue-collar, and white-collar occupations.[7] In particular, 30% of men worked in blue-collar occupations compared to just 5% of women. Within highly-exposed industries, a more similar and larger proportion of workers of both sexes were employed in blue-collar occupations: 50% of men and 46% of women. However, men in highly trade-exposed industries were more likely to work in white-collar roles, while women in these industries were more likely to work in low-skill occupations. The proportions of men in different occupations in highly-exposed industries are almost identical to the proportions for manufacturing as a whole. Women in highly-exposed industries are however more likely to be in blue-collar occupations than women in other manufacturing industries.

Panel D summarises partner characteristics for those LS members with partners – this includes both married and cohabiting couples. 21% of men's partners were not active participants in the labour market. Of these, about 71% reported being inactive because they were "looking after the home". Only 13% of men in manufacturing had a partner who was also employed in manufacturing, suggesting significant scope for intra-household insurance. By contrast, only 7% of female workers' partners were inactive and 21% worked in manufacturing (rising to 39% for partners of women who themselves worked in manufacturing). Those in the most exposed industries were very similar in terms of their partner's baseline characteristics to other manufacturing workers.

2.4   The 'China shock'

Our analysis exploits the rapid increase in Chinese exports surrounding China's entry into the WTO in December 2001. This increase has been attributed to several factors including lowered tariffs on imported inputs, the end of international import quotas under the Multi Fibre Arrangement (MFA), a reduction in trade uncertainty, and continued rapid Chinese productivity growth during this period (see, e.g. Pierce & Schott, 2016; Handley & Limao, 2017; Amiti et al., 2020).

Figure 1a shows the timing and scale of the rapid increase in Chinese imports to the UK. Most of this increase occurred in the 2000s. During this time, the share of the UK's total imports coming from China almost doubled, and the real value of imports from China

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[7]Based on UK Standard Occupational Classification SOC2000, we define blue-collar workers as those employed in "skilled trades occupations" and "process, plant and machine operatives". Low-skill workers are those employed in "administrative and secretarial occupations", "caring, leisure and other service occupations", "sales and customer service occupations" and "elementary occupations". Finally, white-collar workers are defined as those working in "managers, directors and senior officials", "professional occupations", and "associate professional and technical occupations".

Figure 1: Import Competition and Manufacturing Decline in the UK (1993-2016)

(a) Import Competition between the UK and China (1993-2016)

(b) Manufacturing Employment: More vs Less Trade-Exposed (1993-2016)
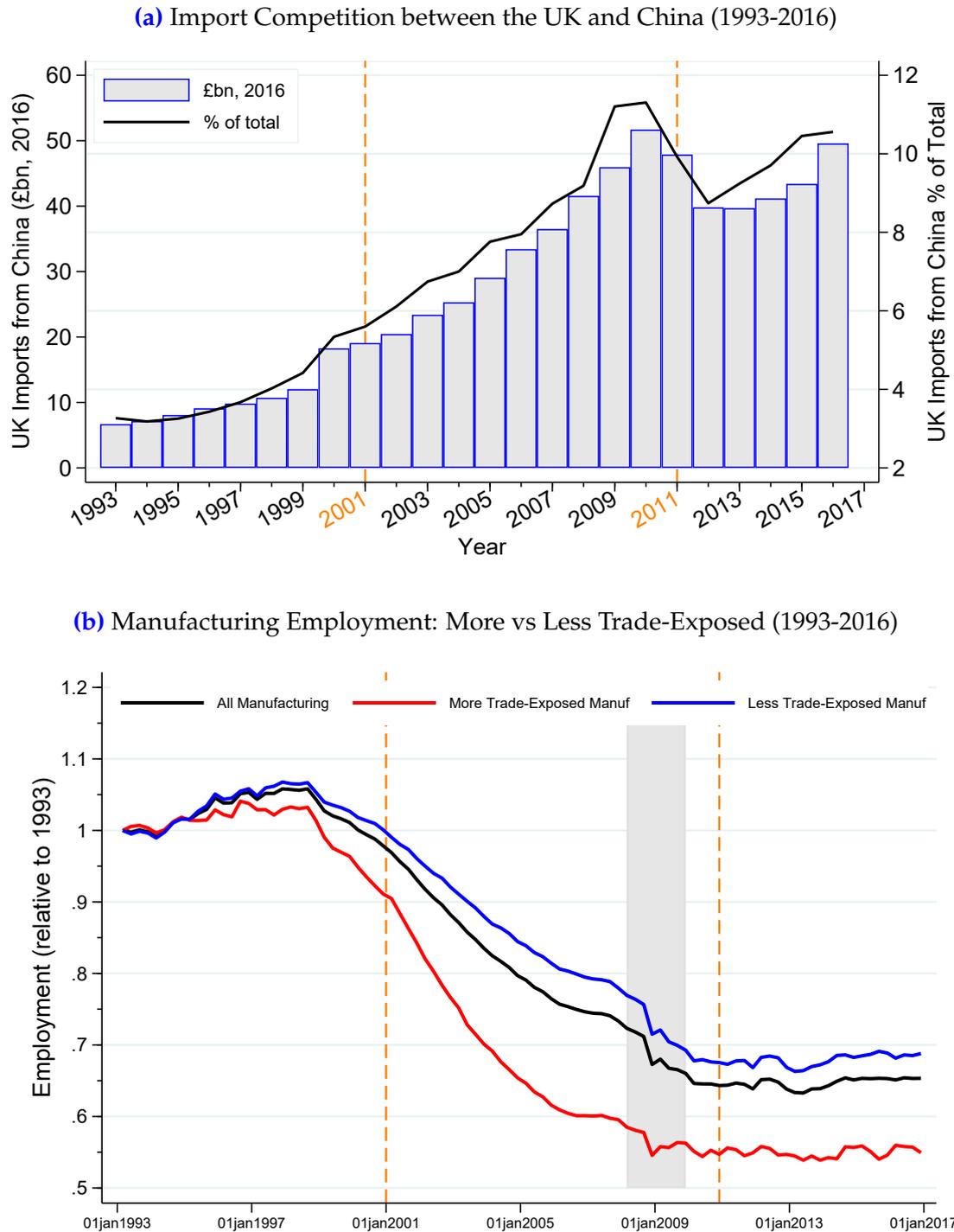
Notes: Panel (a) shows the growth in imports from China between 1993 and 2016. The left y-axis shows the real value of UK imports from China in 2016 billion pound equivalents. The right y-axis shows UK imports from China as a fraction of total imports. Panel (b) shows the decline in manufacturing employment relative to 1993 employment levels, split by all manufacturing industries (black), manufacturing industries most exposed to import exposure (red), and manufacturing industries less exposed (blue). The most trade-exposed manufacturing industries are: Textiles, Wearing Apparel, Leather, Footwear, Office Machinery, Electrical Machinery, Radio & TV equipment, Other Transport Equipment, Furniture, and Games and Toys (see Appendix Table A.1). The source for Panel (a) is the United Nations Comtrade Database. The source for Panel (b) is ONS – UK Total Employee Jobs by Industry, Quarterly Data.

increased from approximately £20 billion in 2001 to around £50 billion in 2011. Imports were concentrated in low-tech manufacturing (e.g. the manufacture of games and toys; luggage and handbags; footwear; leather), consistent with China's comparative advantage in labour-intensive activities during this period (Amiti & Freund, 2010). Table A.1 lists the 20 industries most affected by import competition between 2001-2011.

Figure 1b shows that this increase in imports was accompanied by a decline in manufacturing employment that occurred almost entirely within our period of analysis (2001-2011). This decline was focused on the most trade-exposed industries, whose employment declined by 45 percentage points between 1993 and 2011 compared to 32 percentage points for the least trade-exposed manufacturing industries. Figure 1b also shows that the faster decline in employment among the most trade-exposed industries that occurred during our sample period was not due to the Great Recession of 2008-09 (highlighted in grey), but rather occurred in the period before 2007 when import competition from China was rising steeply. The impact of the recession itself on manufacturing employment was similar across more and less-trade exposed manufacturing industries.

3   Empirical Approach

Our empirical strategy uses cross-industry variation, following Autor et al. (2014). We construct our measure of import exposure by industry as the growth in imports from China during 2001-2011 relative to that industry's total domestic sales (i.e. industry sales plus UK imports minus exports):

$$IE^{UK}_{j,2011-2001} = \frac{\Delta Imports^{China \to UK}_{j,2011-2001}}{Turnover_{j,2001} + Imports_{j,2001} - Exports_{j,2001}} \tag{1}$$

Individuals are then assigned different import exposures according to their industry of employment in 2001, using three-digit UK Standard Industrial Classification (SIC92). We compare own and partners' outcomes for workers with similar characteristics, but who are initially employed in industries with different levels of exposure to import competition. The baseline specification controls for age and sex, as well as fixed effects for initial occupation, local labour market and broad industry sector:

$$\Delta Y_{ij,t_1-t_0} = \alpha + \beta\, IE^{UK}_{j,t_1-t_0} + \delta X_{ij,t_0} + \gamma^{occ} + \gamma^{ind} + \gamma^{ttwa} + \epsilon_{ij,t_1-t_0} \tag{2}$$

where i is for individual, j is for industry, and $t_1 = 2011$ and $t_0 = 2001$. $\Delta Y_{ij,t_1-t_0}$ is the change in outcome Y between 2001-2011 for individual i who was employed in industry j in 2001. This can denote outcomes attributed to workers directly affected by import competition and outcomes related to their partners. The coefficient β captures the effect of increased import competition. The vector X_{ij,t_0} contains baseline controls for individuals'

sex, five-year age groups and their interaction with sex, and foreign-born status. We include two-digit occupation (γ^{occ}) and one-digit industry fixed effects (γ^{ind}) to account for industry and occupation-specific trends (e.g. those related to the automation of routine tasks). We also include local labour market fixed effects (γ^{ttwa}), which are defined as 2001 Travel to Work Areas (TTWAs); geographical units analogous to Commuting Zones (CZ) in the US.[8] We cluster standard errors at the level of three-digit industries, allowing for correlation in error terms among workers who are initially employed in the same narrow industry. To ease interpretation, we scale eq. (1) by the interquartile range of exposure across all manufacturing workers, such that the reported estimates of β can be interpreted as the effect of moving a worker from the 25th to the 75th percentile in the exposure distribution among manufacturing workers. For individuals initially employed in manufacturing, the average increase in import exposure from China between 2001-2011 was 3.82 percentage points, and the interquartile range was 5.80. By gender, the average increase in import exposure was 3.5 ppt for men in manufacturing and 4.65 ppt for women in manufacturing. The increase in import exposure was also similar by gender among workers in highly exposed manufacturing industries (10.26 ppt for men, 11.79 ppt for women (see Appendix Table A.4).

When studying how individuals respond to trade shocks affecting their household partners, we extend the specification in eq. (2) by controlling for partners' characteristics, namely the age (in five-year bins), foreign-born status, one-digit occupation, and one-digit industry fixed effects. A possible concern in this analysis is that partners may both be exposed to the same shocks (for example, if they both work in the same industry), meaning that our results on partners' responses might capture the effects of correlated shocks rather than spillovers within the household. In the Appendix, we investigate the degree to which partners are differently affected by increased import competition. The exposure of partners in the same household tends to be low, with a correlation coefficient of just 0.14 across all workers (0.2 if restricting to manufacturing workers; see Table A.5). We also show in the next section that our main results are robust to restricting the sample to cases where the partners of LS members are not employed in trade-exposed industries.

The growth in import exposure could in part reflect domestic demand or productivity shocks, which we could confound with the role of growing import competition. To address this, we follow the standard approach in the literature and employ an instrumental variable (IV) strategy aimed at isolating the role of factors driving Chinese export growth

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[8]There are 186 TTWAs in England and Wales, generated such that at least 75% of the area's resident workforce work in the area and 75% of the people who work in the area also live in the area. Individuals are assigned to TTWAs using a time-consistent definition of TTWAs across censuses from Montresor (2019). The results remain consistent when using (broader) 11 regional fixed effects instead of TTWA controls.

that is specific to China. We thus instrument for import exposure in eq. (1) with

$$\widetilde{IE}_{j,2011-2001} = \frac{\Delta Imports^{China \rightarrow Other}_{j,2011-2001}}{Turnover_{j,1997} + Imports_{j,1997} - Exports_{j,1997}} \tag{3}$$

where the numerator is the change in imports from China from 2001 to 2011 to other non-UK high-income countries.[9] Equation (3) uses sales, import and export levels from 1997, the earliest year in which we observe sales, to avoid the potential endogeneity of using 2001 imports and sales that may have already been influenced by Chinese import growth. In the Appendix, we show the first-stage regression, regressing the value in eq. (1) on the value in eq. (3). The results in Table A.2 and A.3 show that import growth for different industries in these other countries is highly predictive of UK import growth from China.[10] The identifying assumption is that common patterns in Chinese trade across developed countries are predominantly driven by supply and trade-related factors rather than correlated demand or technology shocks. In support of this assumption, Autor et al. (2014) obtain very similar results when measuring the change in import exposure using residuals from a gravity model of trade flows, suggesting that correlated import demand shocks across high-income countries play little role.[11]

We run several checks to confirm that our results do indeed reflect the effects of increased import competition rather than other factors. We adjust the specification to include more or fewer controls for industry and occupation characteristics and to see how our results are affected if we remove occupation effects altogether. The effect of these changes on our results is small. In addition, to verify our results do not reflect industry-specific trends that predate the rise of import competition from China, we repeat our main regression specifications for the decades 1981-1991 and 1991-2001, using workers' *future* (2001-2011) exposure to growing Chinese import competition. We find no evidence that workers employed in 1981 (1991) in industries that would later be exposed to Chinese import competition saw greater exits from manufacturing or a higher unemployment rate in 1991 (2001); see Appendix B for these results.

We also check whether the growth in immigration to the UK in the 2000s, particularly from Eastern Europe, could confound our results by examining the extent to which trade-exposed industries saw greater growth in the share of foreign-born workers. This appears not to be the case. We find that the correlation between import exposure and the growth in the share of foreign workers is essentially zero, both for all industries ($\rho = -0.018$) as

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[9]Australia, Canada, Denmark, France, Germany, Italy, Japan, Spain, Switzerland, and the US. As we show in the Appendix, our results are robust to using different sets of countries to construct the instrument.

[10]We report the first-stage *F*-statistic in each table in the following sections. For the first stages in our labour supply regressions, for example, we obtain *F*-statistics of about 30 for males and 35 for females.

[11]The gravity approach neutralises demand conditions in importing countries by using the change in China's exports relative to its exports within destination markets, helping to isolate supply and trade cost-driven changes in China's export performance, see further Autor et al. (2014).

well as for only manufacturing industries ($\rho = -0.040$). We discuss further robustness checks alongside our results in the next section.

4 Responses to Import Competition

4.1 Own Responses to Import Competition

Employment Outcomes

We start by studying how direct exposure to import competition impacts the employment outcomes of workers. Table 2 shows regression results for different labour market outcomes: employment in manufacturing, unemployment, employment in any industry (manufacturing or non-manufacturing), self-employment and being active in the labour force (columns (1)-(5), respectively).[12] By construction, the coefficients in columns (2)-(4) sum to those in column (5). The regressions are estimated by two-stage least squares (2SLS), using the variable described in eq. (3) as an instrument for the change in import exposure given in eq. (1). All regressions include the full set of controls discussed in Section 3. The table reports the mean of the dependent variable for each outcome to benchmark the magnitudes of the effects relative to general trends, as well as the relevant first-stage F-statistic.

Panel A shows the results for all (male and female) workers in our sample. Import exposure significantly decreases the probability of being employed in manufacturing and increases the probability of unemployment (columns (1)-(2)). In particular, increasing import exposure from the 25th percentile to the 75th percentile among manufacturing workers reduces the probability that a worker is employed in manufacturing in 2011 by 7.5 percentage points and increases the probability they are unemployed by 0.46 ppt (to provide a sense of scale for the latter effect, the unemployment rate in 2011 was 7.4%, (Office for National Statistics, 2013)). While the effect on manufacturing employment is considerable, we do not detect a statistically significant effect on the overall probability of employment (column (3)). This implies that workers initially employed in industries exposed to import competition mostly transferred to work in non-manufacturing sectors. We study their occupation transitions in more detail below.

Panels B and C show how the effects of import exposure differ by gender. Men and women in exposed industries respond quite differently. The negative impact of import exposure on manufacturing employment is greater for men than women; with a one unit change in import exposure associated with a 7.4 ppt decline in male manufacturing employment, compared to a 5.9 percentage point decline in female manufacturing employment. For men, there is also a significant increase in unemployment, alongside an increase

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[12]The change in employment in non-manufacturing can be inferred using columns (1), (3), and (4).

in economic activity (column (5)), while for women the point estimates in columns (2) and (5), although not statistically significant, suggest that import exposure leads to economic inactivity rather than unemployment.

Table 2: Import Exposure and Labour Market Responses by Gender

	(1) Δ manuf	(2) Δ unempl	(3) Δ empl	(4) Δ self-empl	(5) Δ active
Panel A. All					
Import Exposure	-7.474***	0.455**	-0.658	0.309	0.106
	(2.251)	(0.232)	(0.564)	(0.290)	(0.366)
Mean Dep. Var.	-7.58	2.62	-28.03	7.50	-17.91
First-Stage *F*-stat	[32.23]	[32.23]	[32.23]	[32.23]	[32.23]
Observations	164,114	164,114	164,114	164,114	164,114
Panel B. Men					
Import Exposure	-7.376***	0.733***	-0.976	0.898**	0.654**
	(2.199)	(0.258)	(0.640)	(0.377)	(0.330)
Mean Dep. Var.	-10.13	3.20	-27.65	10.23	-14.21
First-Stage *F*-stat	[29.13]	[29.13]	[29.13]	[29.13]	[29.13]
Observations	81,304	81,304	81,304	81,304	81,304
Panel C. Women					
Import Exposure	-5.868**	0.101	-0.150	-0.610	-0.659
	(2.322)	(0.305)	(0.693)	(0.394)	(0.509)
Mean Dep. Var.	-5.08	2.05	-28.41	4.82	-21.54
First-Stage *F*-stat	[35.65]	[35.65]	[35.65]	[35.65]	[35.65]
Observations	82,810	82,810	82,810	82,810	82,810

Notes: Table shows the effect of import exposure on individual labour market outcomes. Dependent variables in columns (1)-(5) are: being employed in manufacturing, being unemployed, employed, self-employed and active in the labour market (unemployed or in-work). The regressions in all columns are estimated using two-stage least squares (2SLS), with the variable described in eq. (3) as an instrument for the change in import exposure given in eq. (1). Controls are the worker's gender, five-year age groups interacted with gender, and a dummy for whether the worker was foreign-born. We also include two-digit occupation, one-digit industry, and local labour market (defined as 2001 Travel to Work Areas) fixed effects. See Section 3 for more details. Standard errors are clustered at the (SIC92) three-digit industry level. The mean dependent variable and first-stage *F*-statistics are reported below the estimates. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

An advantage of our data is that we can follow transitions into self-employment, unlike other administrative datasets that follow employees only. This turns out to be important. As the mean dependent variables in Table 2 show, there was a general increase in self-employment over this period, particularly among men. The share of our sample who are self-employed increased by 10.2 percentage points among men and 4.8 ppt among women. While a one-unit increase in import exposure decreases the likelihood that men are employees in 2011 by 1 ppt, it increases the likelihood they are self-employed by 0.9 ppt (columns (3)-(4)). These results indicate that for men, transitions to self-employment are an additional means of insurance against job loss caused by import competition. By contrast, we do not find evidence of such a buffer effect for women, who are no more likely to move into self-employment if exposed to the trade shock.

Self-employment includes both solo self-employment (i.e. own account workers without employees) and self-employment with employees (those who run businesses and hire workers). This distinction and the transitions across these self-employment outcomes matter for the interpretation of the effects. Those starting their own businesses and hiring their own employees are likely to be moving to a better position than those moving into solo-self-employment, which is often associated with economic insecurity (Giupponi & Xu, 2020). Appendix Table A.6 decomposes the impact of import exposure on self-employment by its type. It shows there is an increase in both types of self-employment. Around 60% of the self-employment effect for men is accounted for by an increase in solo self-employment, with the remainder accounted for by an increase in those who are self-employed with employees. Appendix Table A.6 also shows that this effect on self-employment with employees is mainly driven by younger men. In contrast, the increase in solo self-employment is mainly driven by older men.

Heterogeneity in effects by age

Table 3 reports the results split by both age and gender. We classify those aged 18-44 in 2001 as 'younger', and those aged 45-59 as 'older'.[13] The impact of import exposure on manufacturing employment is stronger for younger workers than for older workers, among both men and women: A one-unit change in the import exposure measure decreases the probability a worker is employed in manufacturing by almost 8.9 ppt for younger men (6.4 ppt for younger women) relative to 5 ppt for older men (4.8 ppt for older women).

The table also reveals interesting differences in the labour market responses of men by age (panels A and B). Younger male workers exposed to import competition are less likely to be in work by 2011, ultimately leading to a decrease in economic activity (given that movements into self-employment and unemployment did not offset decreases in employment). The opposite is true for older male workers, who are *more* likely to be in work and economically active if initially employed in an exposed industry. To understand what lies behind these results, Appendix Table A.7 decomposes the effects of import exposure on economic inactivity according to different possible reasons: retirement, studying, looking after the home, sickness, and 'other' reasons. The key reason for higher rates of economic activity among older male workers is the reduced probability of retirement. A one-unit increase in import exposure decreases the likelihood of retirement in 2011 by 3.5 percent-

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[13]Appendix Figure A.1 shows results for a more detailed split into three age groups: those aged 18-30, 31-44, and 45-59 in 2001. While noisier, the estimates for the youngest group 18-30 follow the same patterns as those in the middle-age group 31-44. We therefore focus on the two broader age categories for the remainder of this paper.

Table 3: Import Exposure and Labour Market Responses by Gender and Age

	(1) Δ manuf	(2) Δ unempl	(3) Δ empl	(4) Δ self-empl	(5) Δ active
Panel A. Younger Men					
Import Exposure	-8.868***	0.788**	-1.894***	0.755*	-0.351*
	(2.549)	(0.325)	(0.652)	(0.418)	(0.200)
Mean Dep. Var.	-7.58	3.40	-18.74	11.67	-3.67
First-Stage *F*-stat	[26.27]	[26.27]	[26.27]	[26.27]	[26.27]
Observations	54,839	54,839	54,839	54,839	54,839
Panel B. Older Men					
Import Exposure	-5.085**	0.671**	0.654	1.038*	2.362***
	(2.045)	(0.311)	(0.962)	(0.591)	(0.868)
Mean Dep. Var.	-15.41	2.79	-46.11	7.26	-36.05
First-Stage *F*-stat	[34.78]	[34.78]	[34.78]	[34.78]	[34.78]
Observations	26,465	26,465	26,465	26,465	26,465
Panel C. Younger Women					
Import Exposure	-6.364***	0.390	-0.367	-0.661	-0.638*
	(2.283)	(0.436)	(0.556)	(0.469)	(0.382)
Mean Dep. Var.	-4.65	2.44	-17.75	5.69	-9.63
First-Stage *F*-stat	[32.11]	[32.11]	[32.11]	[32.11]	[32.11]
Observations	55,304	55,304	55,304	55,304	55,304
Panel D. Older Women					
Import Exposure	-4.816*	-0.431**	0.440	-0.545	-0.535
	(2.743)	(0.204)	(1.299)	(0.454)	(1.087)
Mean Dep. Var.	-5.96	1.28	-49.84	3.07	-45.48
First-Stage *F*-stat	[40.47]	[40.47]	[40.47]	[40.47]	[40.47]
Observations	27,506	27,506	27,506	27,506	27,506

Notes: Table shows the effect of import exposure on individual labour market outcomes. See notes of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the three-digit industry level are reported in parentheses. The mean dependent variable and first-stage *F*-statistics are reported below the estimates. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

age points.[14] This could be partially driven by the increase in self-employment, as older self-employed workers are more likely to remain in paid work than permanent employees (Crawford et al. (2021); Banks (2016)). Another reason to delay retirement might be to compensate for reduced earnings as they move to less well-paid occupations (as we

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[14]A possible concern here is that different retirement behaviour could in part reflect industry-specific trends regardless of the shock, e.g. workers in textiles retiring later than workers in car manufacturing. To check this, we construct measures of mean retirement age by three-digit industry and gender during the period 1995-1998 from the Labour Force Survey (LFS) and add them as additional controls. Our results on retirement are very similar whether or not we include these controls.

discuss and show below in Table 4). Life-cycle models including Stock & Wise (1990), Scheiber (1992) and Merkurieva (2019) have also explored the use of delayed retirement to compensate for lower retirement savings due to job loss, but this phenomenon remains underexplored in the context of responses to import competition. We do not find any effect on retirement for women.

To sum up the results so far, many of the workers who leave manufacturing in response to higher import exposure find re-employment in non-manufacturing industries. In addition, we find that men, but not women, respond to import shocks by increasing labour force participation at older ages, and by moving into self-employment.

Summary of robustness results for employment effects

The Appendix presents a range of robustness checks for these results. We summarise them in Table C.1 and C.2. First, we show that our results are robust to using different country combinations when constructing our instruments for import exposure in eq. (3). Second, we include a richer set of industry- and occupation-specific controls. Industry-specific controls we add are the intensity of R&D stock over capital, ICT stock intensity over capital, computer stock intensity over capital, and the intensity of net capital stock over industry output (measured in the year 1997 and at the two-digit SIC92 industry level). Occupation-specific controls we include are the Routine Task Intensity (RTI, Autor et al. (2003)) and the offshorability index.[15] These additional controls do not affect our main results. We also show that our results do not change if we exclude occupation fixed effects entirely. Third, we repeat our main results replacing the TTWA fixed effects with fixed effects for 11 broad regions. The goal of this exercise is to show that our results are not sensitive to the definition of local labour markets that we use. We obtain similar results. Fourth, we assess the sensitivity of our results to another major contemporary trade shock, namely the accession to the European Union of several Eastern European countries in 2004.[16] Accounting for import competition with Eastern Europe does not alter our main findings. Finally, we study whether our results are affected if we control for workers' exposure to rising export demand from China. Controlling for UK exports to China also leaves our main results unchanged.[17]

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[15]These measures are initially constructed at the four-digit US-SOC2010 occupational classification level from the US O*NET database. Official crosswalks are then used to map these measures into the corresponding four-digit UK-SOC2000 occupation categories.

[16]The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia.

[17]Autor et al. (2013) also find that incorporating changes in US exports to China did not affect their estimates. By contrast, Dauth et al. (2014) find that, in Germany, exports to the 'East' (China and Eastern Europe) helped to offset the negative employment effects. All of this is consistent with the fact that both the US and the UK saw large growth in their imports from China but only limited growth in their exports to China, while Germany saw large increases in both its imports from and exports to China and so a much smaller deterioration in its bilateral trade balance (Dorn & Levell (2024)).

Occupation transitions

A natural question is how import exposure affects the occupations they are employed in. Table 4 shows a movement of workers initially employed in import-competing industries to different, and on average worse-paid, occupations. The table presents results on how import competition affects the change in workers' employment in low-skill, blue-collar, and white-collar occupations. Trade-exposed workers are more likely to shift out of blue-collar occupations and move into low-skill occupations. These results are consistent with findings that workers exposed to the China shock, conditional on employment, experienced lower earnings growth, as shown in the US (Autor et al., 2014), Denmark (Utar, 2018) and the UK (De Lyon & Pessoa, 2021), as well as occupation movements documented in Keller & Utar (2023).

Table 4: Import Exposure and Labour Reallocation

	(1) Δ low-skill	(2) Δ blue-collar	(3) Δ white-collar
	Panel A. All		
Import Exposure	1.426***	-2.065***	0.639
	(0.443)	(0.622)	(0.778)
First-stage *F*-stat	[31.00]	[31.00]	[31.00]
Observations	130,421	130,421	130,421
	Panel B. Men		
Import Exposure	1.159**	-2.695***	1.536*
	(0.469)	(0.803)	(0.933)
First-stage *F*-stat	[27.94]	[27.94]	[27.94]
Observations	67,146	67,146	67,146
	Panel C. Women		
Import Exposure	1.066*	0.513	-1.579*
	(0.587)	(0.528)	(0.808)
First-stage *F*-stat	[34.20]	[34.20]	[34.20]
Observations	63,275	63,275	63,275

Notes: Table shows the effects of import exposure on flows into different occupational groups conditional on remaining in employment. We define as blue-collar workers those employed in "skilled trades occupations" and "process, plant and machine operatives". Low-skill workers are those employed in "administrative and secretarial occupations", "caring, leisure and other service occupations", "sales and customer service occupations" and "elementary occupations". Finally, white-collar workers are defined as those working in "managers, directors and senior officials", "professional occupations", and "associate professional and technical occupations". This follows from the UK Standard Occupational Classification SOC2000. See note of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Looking at heterogeneity by gender, Panel B shows that male workers affected by the trade shocks lose employment in blue-collar occupations and pick up jobs in low-skilled and white-collar occupations. Women in exposed industries see a net shift out of white-collar occupations and into low-skilled occupations (Panel C). In the Appendix, we extend the analysis to consider a more detailed occupational split, showing results for 1-digit occupations (Figure A.2). Male workers are more likely to lose employment in skilled trades occupations (e.g. TV, radio and audio engineers; musical instrument makers) and more likely to find jobs in elementary occupations (e.g. labourers in building and woodworking trades) as well as white-collar jobs. Women, by contrast, are more likely to lose employment in professional occupations (e.g. design and development engineers) and elementary occupations, and go into sales and customer service occupations (e.g. retail assistants) or administrative, secretarial jobs.

Partnering and Divorce

We next turn to consider the impacts of import exposure on partnering and divorce.

Table 5 shows how import exposure affected marital status, with the results split once again by gender and age. Column (1) shows the effects of import exposure on the probability that those who were unmarried in 2001 were married in 2011. We do not find evidence for the effects on the marriage rates of women who were initially unmarried, or on the marriage rates of younger men. Among older men, singles in exposed industries are by contrast significantly less likely to get married.

The results in column (2) show that exposure to import competition leads to a reduction in the likelihood that married women under 45 get divorced.[18] In particular, a one-unit increase in exposure to import competition decreases the likelihood of divorce by 2.2 percentage points. In additional results (not shown in Table 5), we have found that this response is greater in the presence of children in the household, where the estimated coefficient increases to 2.67 (standard error 0.81). There is, by contrast, no effect of import exposure on the divorce rates of married men.

In column (3), we show results for the impact of import exposure on new partnering, that is, on the probability of finding and cohabiting with a different person in 2011 (relative to 2001). We use characteristics of partners such as age and education to assess whether partners of LS members observed in 2001 and 2011 are likely to be the same individual or not (recall that, in our data, only LS members are followed over time, not their extended family or co-residents). Consistent with the lower divorce rates we found for younger women, we find that exposure to import competition means that married younger women are less likely to find and cohabit with a new partner. We do not find effects on re-partnering behaviour for men in couples.

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[18]Note that in England and Wales overall in 2001, the median age of women at divorce is 37.7 years. The corresponding figure for males is 40.0 years (Office for National Statistics, 2015b).

Table 5: Import Exposure and Family Status by Gender and Age

	(1) Δ married (if unmarried)	(2) Δ divorced (if married)	(3) Δ new partner (if couple)
Panel A. Younger Women			
Import Exposure	-0.187	-2.180***	-1.255***
	(1.263)	(0.721)	(0.477)
Observations	27,870	27,434	30,066
Panel B. Older Women			
Import Exposure	1.895	-0.041	-0.040
	(1.538)	(0.483)	(0.339)
Observations	6,586	20,920	19,131
Panel C. Younger Men			
Import Exposure	0.379	-0.185	0.589
	(1.232)	(0.680)	(0.522)
Observations	28,814	26,025	30,135
Panel D. Older Men			
Import Exposure	-3.940***	0.832	-0.227
	(1.252)	(0.772)	(0.320)
Observations	5,025	21,440	20,769

Notes: Table shows the effect of import exposure on individuals' family status. Column (1) shows the effects on marriage for a sample of initially unmarried people. Column (2) shows the effects on divorce for a sample of initially married individuals. Column (3) shows the effects on new partnering, that is, finding and cohabiting with a new person. Recall that we denote those aged 18-44 in 2001 as 'young' and those aged 45-59 as 'old'. We use age and other characteristics of the partner to assess whether partners of LS members observed in two different waves are likely to be the same individual or not. See note of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the 3-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

It is instructive to compare these results on the partnering effects of import competition to those from other countries. Our results are notably different to those on the effects of the China trade shock in the US. Focusing on individuals aged 18-39, Autor et al. (2019) show that US areas more exposed to Chinese import competition saw significantly lower marriage rates, increased single-parenthood and lower fertility.[19] Our results on divorce

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[19]A notable difference in the research design of Autor et al. (2019) relative to ours is that they study outcomes at the level of local labour markets, whereas we study outcomes at the level of individual workers. Results from these two approaches may differ if there are significant spillovers within local labour markets, or strong effects on the marriage rates of new labour market entrants (who are excluded from our panel data regressions). To facilitate comparison with the results in Autor et al. (2019), we report impacts on average marriage and divorce rates of young people across travel-to-work areas in Appendix Table A.8. The results from this exercise are consistent with those from our panel data regressions: we find no impact of import exposure on marriage rates and a negative impact on women's divorce rates.

and marriage are much more similar to papers that study the impact of import competition in other European countries. Studying the case of Denmark, Keller & Utar (2022) find that female workers in firms exposed to Chinese import competition were more likely to drop out of the labour force, get married and have children than other comparable workers, and that married women were less likely to get divorced. The effects were greater for women in their late 30s, who have fewer remaining fertile years. They argue their results are consistent with trade-induced income changes leading to a reduction in the opportunity costs of raising a family for women (a hypothesis we investigate for our setting in Section 5). In Germany, Giuntella et al. (2022) find a negative and marginally significant effect of exposure to import competition from Eastern Europe and China on women's divorce rates, and no evidence of effects on either men's or women's marriage rates.

4.2 Spillovers Within the Household: Partners' Responses

We have shown that men and women respond differently in their labour supply when their industry is affected by import competition. In this section, we study the extent to which there are differences in response to partner exposure (added worker effects). We do that by looking at the responses of *partners* of those affected by import competition. We restrict attention to 'stable' couples who were together throughout both 2001 and 2011, and who have consistent characteristics (i.e. the year of birth and gender) across the two censuses.[20]

The own and partner labour supply responses in response to import competition are shown for men in Table 6 and for women in Table 7. As discussed in Section 3, these regressions include controls for partner characteristics in addition to the ones used in the preceding section. The own-response effect sizes in these tables (columns (1)-(5)) differ from those in Table 2 and 3 mainly because those initially in couples respond to the shock differently to singles. Appendix Table A.9 shows the effects for those initially in couples alongside those who were not: Men in couples who are exposed to import competition are just as likely to leave manufacturing as initially single men but are relatively less likely to be unemployed, and more likely to shift towards self-employment. Women initially in couples also behave differently to initially single women following the trade shock; those in couples are more likely to leave the labour force and become inactive than single women, who are instead more likely to move into unemployment.

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[20]For ease of exposition, we focus on opposite-sex couples. Including same-sex couples does not change our results. We require both partners to have non-missing values in occupation and industry. Because we focus on stable couples, we can measure outcomes for both LS members and their (non-LS member) partners across censuses. We therefore include both LS members and non-LS members in our sample for these regressions.

Table 6: Import Exposure and Family Labour Supply Responses (MEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
				Panel A. Men			
Import Exposure	-7.725***	0.540**	-0.435	0.976**	1.081**	0.270	0.272
	(2.104)	(0.221)	(0.574)	(0.381)	(0.451)	(0.530)	(0.487)
Mean Dep. Var.	-11.32	2.12	-19.21	10.01	-17.08	-8.30	-8.16
First-Stage F-stat	[32.63]	[32.63]	[32.63]	[32.63]	[32.63]	[32.63]	[32.63]
Observations	91,406	91,406	91,406	91,406	91,406	91,406	91,406
				Panel B. Younger Men (aged 18-44)			
Import Exposure	-9.595***	0.625*	-1.916***	1.119**	-0.172	-0.320	-0.227
	(2.381)	(0.378)	(0.629)	(0.441)	(0.237)	(1.047)	(1.032)
Mean Dep. Var.	-8.06	2.01	-4.89	11.93	-2.87	3.94	4.25
First-Stage F-stat	[29.88]	[29.88]	[29.88]	[29.88]	[29.88]	[29.88]	[29.88]
Observations	51,865	51,865	51,865	51,865	51,865	51,865	51,865
				Panel C. Older Men (aged 45-59)			
Import Exposure	-5.796**	0.446**	1.340	0.751	2.538***	1.080	0.962
	(2.266)	(0.221)	(1.256)	(0.638)	(0.924)	(0.845)	(0.839)
Mean Dep. Var.	-15.59	2.27	-45.47	7.49	-35.72	-24.37	-24.46
First-Stage F-stat	[36.41]	[36.41]	[36.41]	[36.41]	[36.41]	[36.41]	[36.41]
Observations	39,541	39,541	39,541	39,541	39,541	39,541	39,541

Notes: Table shows the effects of import exposure on men's own labour supply and the labour supply of their female partners. Samples are for those in stable couples (those who remain in the same relationship over the period 2001-2011). In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table 7: Import Exposure and Family Labour Supply Responses (WOMEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
Panel A. Women							
Import Exposure	-5.716**	-0.0462	-0.0596	-0.400	-0.341	1.519***	1.381***
	(2.461)	(0.144)	(0.754)	(0.661)	(0.333)	(0.393)	(0.368)
Mean Dep. Var.	-5.18	1.35	-30.68	-25.98	-24.63	-15.65	-15.22
First-Stage F-stat	[39.38]	[39.38]	[39.38]	[39.38]	[39.38]	[39.38]	[39.38]
Observations	90,620	90,620	90,620	90,620	90,620	90,620	90,620
Panel B. Younger Women (aged 18-44)							
Import Exposure	-6.247***	0.181	-0.546	-1.069*	-0.523	0.921**	0.946***
	(2.379)	(0.228)	(0.740)	(0.562)	(0.416)	(0.394)	(0.283)
Mean Dep. Var.	-4.70	1.63	-17.03	-11.16	-9.53	-3.26	-2.55
First-Stage F-stat	[35.05]	[35.05]	[35.05]	[35.05]	[35.05]	[35.05]	[35.05]
Observations	53,381	53,381	53,381	53,381	53,381	53,381	53,381
Panel C. Older Women (aged 45-59)							
Import Exposure	-5.001*	-0.351**	0.645	0.507	-0.139	2.473***	2.149**
	(2.874)	(0.177)	(1.432)	(1.304)	(0.381)	(0.933)	(0.926)
Mean Dep. Var.	-5.86	0.94	-50.24	-47.23	-46.29	-33.42	-33.38
First-Stage F-stat	[44.25]	[44.25]	[44.25]	[44.25]	[44.25]	[44.25]	[44.25]
Observations	37,239	37,239	37,239	37,239	37,239	37,239	37,239

Notes: Table shows the effects of import exposure on women's own labour supply and the labour supply of their male partners. Samples are for those in stable couples (those who remain in the same relationship over the period 2001-2011). In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

The final two columns of Table 6 and 7 investigate added worker effects, focusing on the extensive margin of responses (we discuss the intensive margin below). From Table 6, we find no evidence that women in stable couples increase their labour market activity to compensate for rising import competition experienced by their male partner. The estimates are positive but small and not statistically significant at conventional levels (columns (6)-(7)). The results split by age suggest that female partners of older men may be more responsive, but the estimates are not precise.[21]

The results are very different when it comes to the responses of men in households where women are exposed to rising import competition (Table 7). The male partners of women in trade-exposed industries increase their labour supply: each one-unit increase in import exposure raises the probability their partner is in work by 1.5 ppt (column (6)). The effects are stronger for those older, for whom each one-unit increase in import exposure results in a 2.5 ppt increase in their partner's employment. The responses of men to import competition affecting their partners shown in Table 7, mirror those we found for older men directly affected by import competition shown in Table 3, showing an increase in labour market activity at older ages. Thus, increased labour force activity among males at older ages is a response to import exposure, whether it arises through shocks affecting men directly or through shocks affecting their partners.

Appendix Table A.10 and A.11 split the changes in the probabilities partners are in work into self-employment and employment, by gender. The increase in labour supply by the male partners is in large part driven by an increase in self-employment. Partners of women exposed to trade shocks are also less likely to transition into part-time employment: each one-unit increase in women's import exposure increases the probability their partners remain in full-time work by 1.2 ppt. Men thus respond to shocks affecting their partners by rising labour supply on both intensive and extensive margins.

A natural question is whether the increase in male partners' activity is an increase in activity from men who were initially inactive, or a reduction in flows into inactivity from those who were initially active. We first note that about 93% of male partners were active in 2001 (see Table 1). We find that the effects of import exposure on male partner's labour supply are similar when we condition on households where male partners were initially active in the labour market or in (full-time) work in 2001 (see Table A.13, Panels B.1, B.2, and B.4, respectively). This implies that much of the increase in labour force participation of men in households in which women are exposed to import competition is driven by the fact these men are less likely to move into inactivity by 2011. Male partners who were initially working full-time are also less likely to transition to part-time work when their

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[21]In the Appendix, we further investigate heterogeneity in responses across subsamples (Table A.12). Panel A splits the sample of female partners according to the presence of children. The estimates for different subgroups with and without children are imprecise, but suggest larger effects on employment among female partners in families with children. Conditional on working, these women are more likely to enter part-time work. For those without children, the changes across labour market outcomes are negative, but none are statistically significant.

partners are exposed to Chinese import competition.

A further question is whether our results are driven by the fact that partners are exposed to correlated shocks if, for example, partners work in the same industry. As we discussed in Section 3, the cross-partner correlation in import exposure is low (Table A.5), suggesting this is unlikely to be driving our results. To further check this, we remove cases where partners were employed in goods industries that saw positive import growth from China from our sample. The results are shown in Table C.3 and C.4 for women and men, respectively. The results are similar to those in our main sample, implying that correlation in import exposure within couples is not driving our findings.

A final question is whether the differences in partners' labour supply documented in this section reflect the import shocks that occurred over this period, or pre-existing differences in partner's behaviour across industries (for example, male partners of women in the most exposed industries might have always been more likely to have longer working lives, rather than this being a response to their partner's import exposure). To check this, we carry out another placebo exercise, testing whether changes in own- and partner-employment statuses occurred in the 1990s in response to industries' *future* exposure to the China shock. The results are shown in Table B.2 and B.3. We find that the coefficients on future import exposure (for both, men and women) are all small and not statistically different from zero in this prior period, lending further support to our interpretation of the results.

Taking the results in this section together, we find there are substantial asymmetries in men's and women's responses to increased Chinese import competition, both when they are directly exposed to import competition and when their partner is exposed to import competition. Men are more likely to shift into self-employment and to lengthen their working lives when either they or their partners are employed in an exposed industry, while the same is not true for women. We next consider possible explanations for these differences.

5   What Accounts for Different Responses by Gender?

In this section, we consider three possible reasons for the differences in responses to import shocks by gender we have documented. The first is whether it is the differing occupational and employment characteristics of male and female manufacturing workers that account for the differences in the results. We then consider potential effects on fertility, and finally investigate differences in self-employment patterns.

5.1 Gender Differences in Occupation Groups and Employment Forms

To investigate the first of these possibilities, we construct probability weights such that the weighted sample of male workers matches the distribution of baseline characteristics of female workers, and a weighted sample of female workers matches the distribution of baseline characteristics of male workers. We then rerun our regressions of employment outcomes on Chinese import exposure for men and women using weighted least squares.[22]

We use the entropy balancing approach (Hainmueller, 2012), where we re-weight the data so that the first and second moments of a set of variables are identical across genders. The variables we use are hours worked, part-time/full-time status, whether working in manufacturing, one-digit industry, and broad occupation sector (low-skill, blue-collar, or white-collar occupations, as described above). In practical terms, this means that we assign greater weights to male workers working in female-dominated occupations, or part-time work, when estimating results for our male-subsample, and we assign greater weights to female workers employed in male-dominated occupations, and working full-time, when analysing our female sample.[23]

Table 8 shows how our regression results on the effects of import exposure on employment outcomes change when we apply weights to our sample of men (panel A) and to our sample of women (panel B). The resulting weighted estimates (in blue) are less precisely estimated than the unweighted regression coefficients, but the coefficients on import exposure are similar. In both the weighted and unweighted regressions, male workers are more likely to move into unemployment and self-employment, and less likely to enter retirement if exposed to Chinese import competition, while the same is not true for female workers. The effects of import exposure on women's employment outcomes remain small. We conclude that the differences we have documented in the labour market effects of import exposure for men and women are not due to baseline differences in their broad occupations or hours worked. We now proceed to investigate two further possible explanations for the gender differences in responses: the role of fertility and the role of outside options.

5.2 Fertility

One potential explanation for the gender differences could be the differing roles of men and women in looking after children. Women may be more likely to drop out of the labour force to raise children in response to a labour market shock, through differences in

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[22]Illing et al. (2024) also use a re-weighting strategy to understand gender differences in employment patterns following job loss.

[23]To avoid outliers, we top-code observations with excessively large weights (those for whom there are few good matches among workers of the opposite sex). Specifically, we top-code weights at 50 which affects 15 individuals (out of 85,170) in our female sample and 2 individuals (out of 83,267) in the male sample.

Table 8: Unweighted vs Weighted Results

	(1) Δ manuf	(2) Δ unempl	(3) Δ empl	(4) Δ self-empl	(5) Δ active	(6) Δ retired
Panel A. Men						
Import Exposure	-7.376***	0.733***	-0.976	0.898**	0.654**	-1.280***
(unweighted)	(2.199)	(0.258)	(0.640)	(0.377)	(0.330)	(0.353)
Import Exposure	-5.936***	0.873**	-1.571*	1.029	0.332	-1.165***
(weighted)	(2.046)	(0.345)	(0.941)	(0.679)	(0.600)	(0.372)
Observations	81,304	81,304	81,304	81,304	81,304	81,304
Panel B. Women						
Import Exposure	-5.868**	0.101	-0.150	-0.610	-0.659	0.145
(unweighted)	(2.322)	(0.305)	(0.693)	(0.394)	(0.509)	(0.327)
Import Exposure	-7.053***	0.008	0.369	-0.515	-0.137	-0.107
(weighted)	(2.710)	(0.515)	(1.004)	(0.524)	(0.691)	(0.516)
Observations	82,810	82,810	82,810	82,810	82,810	82,810

Notes: Table shows how the results on the effects of import exposure on employment outcomes change when we apply weights to our sample of men (Panel A) and to our sample of women (panel B), highlighted in blue. Entropy balancing is used to construct weights. The weights are produced such that the first and second moments of covariates (hours worked, part-time/full-time status, whether working in manufacturing, one-digit industry, and broad occupation sector) are identical across genders after re-weighting. See note of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the three-digit industry level reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

comparative advantage in market vs home production. This mechanism was investigated in the context of an import shock in Keller & Utar (2022), who note an increase in fertility along with a reduction in divorce rates for women working for Danish firms that were more exposed to Chinese import competition in the 2000s. They refer to this particular cause of the difference in employment and partnering responses by men and women as a 'retreat to family'. On the other hand, Giuntella et al. (2022) find a reduction in fertility among German workers exposed to import competition from China and Eastern Europe. Del Bono et al. (2012) also find that job loss leads to a reduction in fertility, particularly among skilled workers, which they attribute to a need among affected women to regain firm-specific human capital once they are re-employed.

We have shown in Section 4.1 that, consistent with Keller & Utar (2022), import exposure leads to a reduction in the probability that married younger women divorce from their partners or cohabit with a new partner. We now examine whether we find similar evidence of a response in fertility among younger women. For this purpose, we exploit birth register data linked to female LS members who became mothers between 2001 and 2011.

Table 9: Impact of Import Exposure on Fertility of Younger Women

	(1) child after 2001	(2) child after 2001	(3) By Initial Occupation Low-skill	(4) blue-collar	(5) white-collar
Import Exposure	-0.149	0.230	-0.538	0.274	-0.538
	(0.690)	(0.533)	(1.266)	(0.585)	(1.164)
Mean Dep. Var.	29.90	27.66	27.93	23.81	34.05
Observations	55,304	35,155	32,832	2,801	19,671
Partner controls	No	Yes	No	No	No

Notes: Table shows the effects of import exposure on women's fertility outcomes (i.e. whether a child was born between 2001 and 2011) for women aged 18-44 in 2001. See note of Table 2 for a list of the controls and details on the IV. Column (2) additionally controls for partner characteristics, namely partners' age, one-digit occupation and one-digit industry. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p <$ 0.1, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table 9 presents the results. Columns (1)-(2) consider our main outcome for fertility, namely whether a child was born between 2001 and 2011. Column (1) includes the full set of controls discussed in Section 3. Column (2) further controls for partners' characteristics. The estimates from both models are small and statistically insignificant. Approximately 30% of women in our sample have a child over this period, and a one-unit increase in import exposure only increases this probability by just 0.23 percentage points when accounting for partners' characteristics (column (2)). In columns (3)-(5), we decompose the sample by initial broad occupation (whether working in a low-skill, blue-collar, or white-collar occupation), however, we do not find statistically significant results for any of these subgroups.

Overall, the limited impacts on fertility are not suggestive of the 'retreat to family' phenomenon. Thus, changing fertility does not appear to account for the gender differences in labour market outcomes documented thus far.

5.3 Opportunities in the Self-employed Sector

Another possible explanation for gender differences is the role of outside options. Men, whether directly exposed to import competition, or indirectly, exposed through their partners, are more likely to shift into self-employment in response to the shock while women are not. In this subsection, we examine whether the occupational structure of self-employment may provide men with greater opportunities in this sector, affording them an employment buffer not available to the same extent to women.

We start by considering the gender balance of employment within the self-employed sector. To do this, we classify occupations into three mutually exclusive categories based on their gender composition in 2001: male-dominated (i.e. more than 75% of workers

in that occupation were men), female-dominated (i.e. more than 75% of workers were women), and gender-neutral occupations. The left panel of Figure 2 shows that self-employment in 2011 was almost twice as important in male-dominated occupations compared to female-dominated occupations. Those working in male-dominated occupations are therefore more likely to have greater opportunities for self-employment.

A related question is whether self-employed jobs tend to be in male-dominated occupations (which depends on the overall importance of 'male-dominated jobs'). The right panel of Figure 2 shows that self-employed workers in 2011 were much more likely to be employed in male-dominated occupations, and gender-neutral occupations, than were employees. Out of total employment in 2011, male-dominated occupations represented 28.5%, female-dominated 26.4%, with the remaining being gender-neutral. If we take self-employment in 2011, however, male-dominated occupations represented 50% out of the total, gender-neutral occupations 37%, with female-dominated occupations accounting for just 13%.

These figures highlight the quantitative importance of male-dominated occupations in the self-employed sector, which may explain the greater flows of male workers responding to import competition into self-employment than female workers.

Figure 2: Self-Employment and Gender

(a) % Self-employed by Occupations' Gender Composition

(b) Occupations' Gender Composition in Employment and Self-Employment
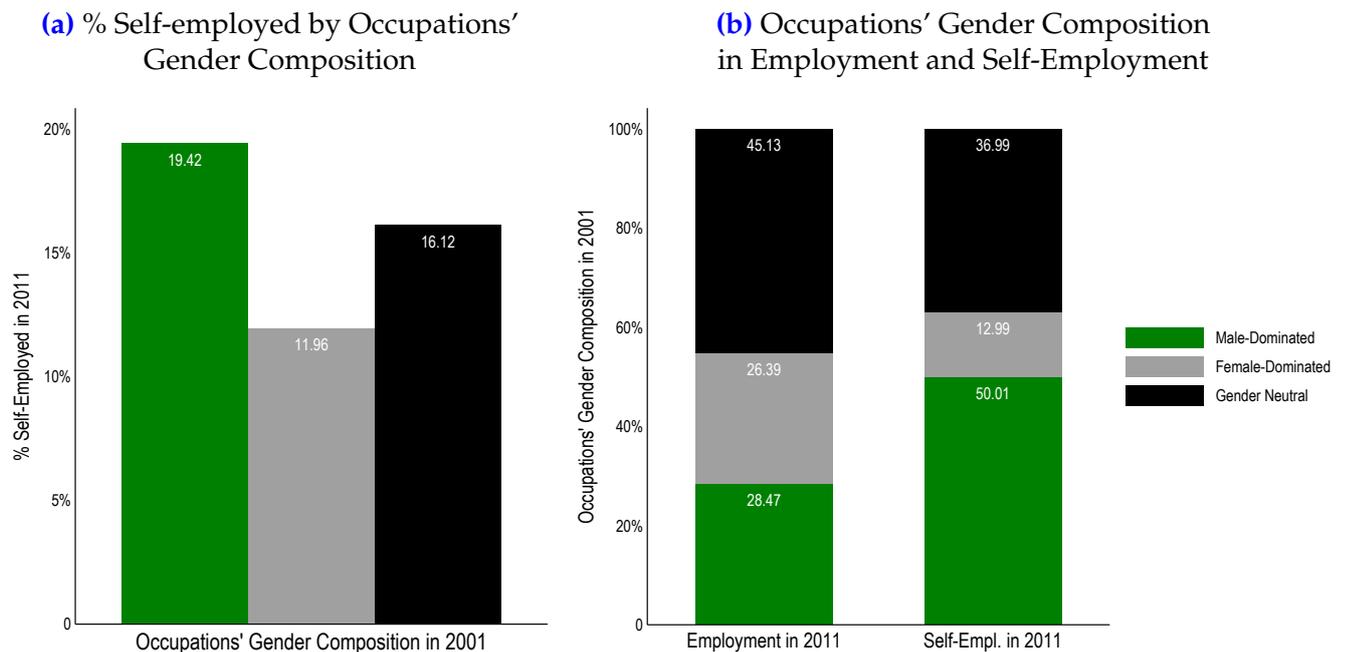
Notes: The left panel of the Figure shows the self-employed share by occupations' gender composition. The right panel shows occupations' gender composition in employment and self-employment. Occupations are classified in three mutually exclusive categories based on their gender composition in 2001: male-dominated (i.e. more than 75% of workers in that occupation were men), female-dominated (i.e. more than 75% of workers were women), and gender-neutral occupations (otherwise). Total sample is 242,636. Sample of self-employed is 29,814. Source is ONS Longitudinal Study.

To investigate the role of these male-dominated occupations in the response to import competition, Panels A and B of Table 10 decompose the impact on self-employment by

occupations' gender composition. For ease of comparison, column (1) reports the overall estimate obtained in the previous section (column (4) in Table 2). The results in columns (2)-(4) imply that around 65% (0.588/0.898) of the self-employment effect for men is accounted for by flows into male-dominated occupations (such as plumbers, taxi drivers), rather than in gender-neutral or female-dominated occupations (such as care workers and hairdressers).[24] Male-dominated jobs thus account for the lion's share of new self-employed roles taken up by male workers exposed to the China shock.

Table 10: Impact on Self-Employment by Occupations' Gender Composition

	(1) Δ self-empl	(2) Male-dominated	(3) Female-dominated	(4) Gender neutral occ.
Own Responses		Panel A. Men		
Import Exposure	0.898**	0.588**	-0.051**	0.361*
	(0.377)	(0.296)	(0.024)	(0.210)
Observations	81,304	81,304	81,304	81,304
		Panel B. Women		
Import Exposure	-0.610	-0.014	-0.264	-0.332
	(0.394)	(0.146)	(0.168)	(0.245)
Observations	82,810	82,810	82,810	82,810
Partner Responses		Panel C. Men's Partners (Women)		
Import Exposure	-0.399*	0.039	-0.211	-0.227
	(0.239)	(0.072)	(0.143)	(0.149)
Observations	91,406	91,406	91,406	91,406
		Panel D. Women's Partners (Men)		
Import Exposure	1.084***	0.934***	0.110**	0.040
	(0.275)	(0.275)	(0.055)	(0.180)
Observations	90,620	90,620	90,620	90,620

Notes: Table shows the effects of import exposure on self-employment in Panels A-B and the effects of import exposure on partner's self-employment in Panels C-D, separately by occupations' gender composition. Occupations are classified into three mutually exclusive categories based on their gender composition in 2001: male-dominated (i.e. more than 75% of workers in that occupation were men), female-dominated (i.e. more than 75% of workers were women), and gender-neutral occupations (otherwise). For panels A-B, see note of Table 2 for a list of the controls and details on the IV. For panels C-D, see note of Table 6. Standard errors clustered at the 3-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Similarly, Panels C-D of Table 10 decompose the impact on partner's self-employment by occupations' gender composition. Column (1) repeats the estimate presented in column (4) of Table A.10 and A.11. The results in columns (2)-(4) show that male-dominated

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[24]This is equal to the overall share of *male* self-employment in these occupations (65%).

occupations account for almost the entire increase in self-employment among men responding to shocks affecting their female partners (0.934/1.084).

In sum, differences in employment responses to the shock by gender could well reflect differing opportunities in the self-employed sector: male workers exposed to import competition largely enter self-employed jobs in historically male-dominated occupations, as do men increasing labour supply in response to shocks affecting their partners.

6 Conclusion

In this paper, we use longitudinal census data from England and Wales to study both own and partner responses to trade shocks affecting households in the 2000s. We find that men in households exposed to import competition respond by increasing labour force participation at older ages, and by moving into self-employment. This is true both in response to their own import exposure, and when their female partner is exposed to the shock. We do not find evidence for these responses among women, who do not increase labour supply if their male partners were initially employed in exposed industries.

Self-employment plays an important role in accounting for the difference in responses across genders. Those working in the self-employed sector are more likely to be in male-dominated occupations, and these appear to provide men exposed to import competition with an employment buffer. Similarly, male-dominated occupations account for almost the entire increase in self-employment among men responding to shocks affecting their partners.

Our results show that partners provide insurance against negative labour market shocks stemming from import competition. However, the nature of this insurance depends on the gender of those affected. One implication of our findings is that the impact of future shocks is likely to depend on the gender composition of workers in affected industries. A second implication is that single-headed households affected by a shock may be in greater need of public insurance.

Our findings point towards several potential avenues for future research. Gender norms and incentives for secondary earners may also play a role in accounting for asymmetries in men's and women's labour supply decisions (Bertrand et al. (2015); Bredtmann et al. (2018)), and these could be investigated in future work. Going beyond labour supply, a second question is how trade exposure affects intra-household allocations and bargaining, and the consequences these may have for individual welfare. Another avenue is to study how trade shocks, or other structural changes to the labour market, affect longer-run outcomes among subsequent generations. Intergenerationally linked data will make such investigations possible for a growing range of outcomes going forward.

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APPENDIX FOR:

Household Responses to Trade Shocks

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A Supplemental Results and Tables

Table A.1: Top 20 Industries Most Exposed to Import Competition.

Industry (UK SIC92 classification)	Employment Share, % (all manufacturing industries)
Games and Toys	0.30
Luggage, Handbags	0.11
Footwear	0.38
Leather	-
Transport Equipment not elsewhere classified	-
Sports Goods	0.15
Wearing Apparel; Dressing and Dyeing of Fur	2.45
Domestic Appliances not elsewhere classified	0.82
Office Machinery and Computers	1.57
Manufacturing not otherwise specified	1.90
Radio, Television and Communication Equipment	2.81
Furniture	3.74
Miscellaneous Manufacturing not elsewhere classified	1.41
Textiles	3.46
Cutting, Shaping and Finishing of Stone	0.11
Musical Instruments	0.10
Rubber Products	0.94
Refractory Ceramic Products	0.78
Electrical Machinery not elsewhere classified	4.18
Glass and Glass Products	0.91

Notes: This table shows the 20 industries three-digit SIC92 industries most affected by import competition between 2001-2011. See Section 3 for details about how import exposure is constructed. Source is ONS Longitudinal Study.

Table A.2: First-Stage Regressions (All Employees)

	(1) No Controls	(2) Individual Controls	(3) Partner Controls
Import Exposure IV	1.041***	1.034***	1.035***
	(0.160)	(0.182)	(0.179)
R^2	0.743	0.769	0.771
Sample Size	164,114	164,114	112,828
Controls	No	Yes	Yes
Ind, Occ, TTWA FE	No	Yes	Yes
Partner FE	No	No	Yes

Notes: This table shows the first-stage results, where we regress exposure to import competition (see eq. (1)) on the instrument (see eq. (3)) for all employees. See notes of Table 2 and Table 6 for a list of the controls. Section 3 provides more details. Standard errors clustered at the industry level. ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.3: First-Stage Regressions (By Age and Gender)

	Panel A. Men			Panel B. Women		
Import Exposure IV	0.981***	0.972***	0.976***	1.142***	1.128***	1.129***
	(0.153)	(0.180)	(0.174)	(0.175)	(0.189)	(0.193)
R^2	0.716	0.739	0.742	0.787	0.817	0.817
Sample Size	81,304	81,304	56,127	82,810	82,810	56,701
	Panel C. Younger Men			**Panel D. Younger Women**		
Import Exposure IV	0.989***	0.982***	0.989***	1.118***	1.112***	1.119***
	(0.159)	(0.192)	(0.185)	(0.179)	(0.196)	(0.203)
R^2	0.720	0.741	0.746	0.780	0.810	0.809
Sample Size	54,839	54,839	33,807	55,304	55,304	35,152
	Panel E. Older Men			**Panel F. Older Women**		
Import Exposure IV	0.965***	0.950***	0.953***	1.191***	1.158***	1.144***
	(0.144)	(0.161)	(0.158)	(0.169)	(0.182)	(0.183)
R^2	0.706	0.738	0.740	0.802	0.833	0.833
Sample Size	26,465	26,465	22,320	27,506	27,506	21,549
Controls	No	Yes	Yes	No	Yes	Yes
Ind, Occ, TTWA FE	No	Yes	Yes	No	Yes	Yes
Partner FE	No	No	Yes	No	No	Yes

Notes: This table shows the first-stage results, where we regress exposure to import competition (see eq. (1)) on the instrument (see eq. (3)). See Section 3 for more details. Standard errors clustered at the three-digit industry level are reported in parentheses. ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.4: Descriptive Overview. Import Exposure by Gender

	(1) All Workers	(2) Manufacturing Workers	(3) High Exposed Workers
Panel A. All			
Import Exposure	0.63	3.82	10.81
P90, P10 interval	[1.62, 0.00]	[9.99, 0.07]	[18.51, 6.04]
P75, P25 interval	[0.00, 0.00]	[6.02, 0.22]	[10.91, 7.56]
Observations	164,114	27,148	6,908
Panel B. Men			
Import Exposure	0.84	3.50	10.26
P90, P10 interval	[2.69, 0.00]	[9.82, 0.04]	[13.99, 6.04]
P75, P25 interval	[0.00, 0.00]	[4.37, 0.22]	[10.91, 7.56]
Observations	81,304	19,488	4,464
Panel C. Women			
Import Exposure	0.43	4.65	11.79
P90, P10 interval	[0.01, 0.00]	[10.91, 0.18]	[18.51, 6.04]
P75, P25 interval	[0.00, 0.00]	[7.56, 0.35]	[13.99, 8.85]
Observations	82,810	7,660	2,444

Notes: See Section 3 for details about how import exposure is constructed. Sources are ONS Longitudinal Study and UN Comtrade Database.

Table A.5: Import Exposure within Households

	Correlation with Partner's Exposure	
	All Industries	Manufacturing
All	0.135	0.198
	95,012	15,944
Men	0.132	0.148
	43,269	11,044
Women	0.151	0.241
	51,743	4,900
Younger Men	0.138	0.159
	26,081	6,568
Younger Women	0.167	0.273
	33,341	3,267
Older Men	0.125	0.134
	17,188	4,476
Older Women	0.120	0.172
	18,402	1,633

Notes: Sample size reported below the correlation coefficient.
Source is ONS Longitudinal Study.

Figure A.1: Import Exposure and Labour Market Responses by Gender and Age
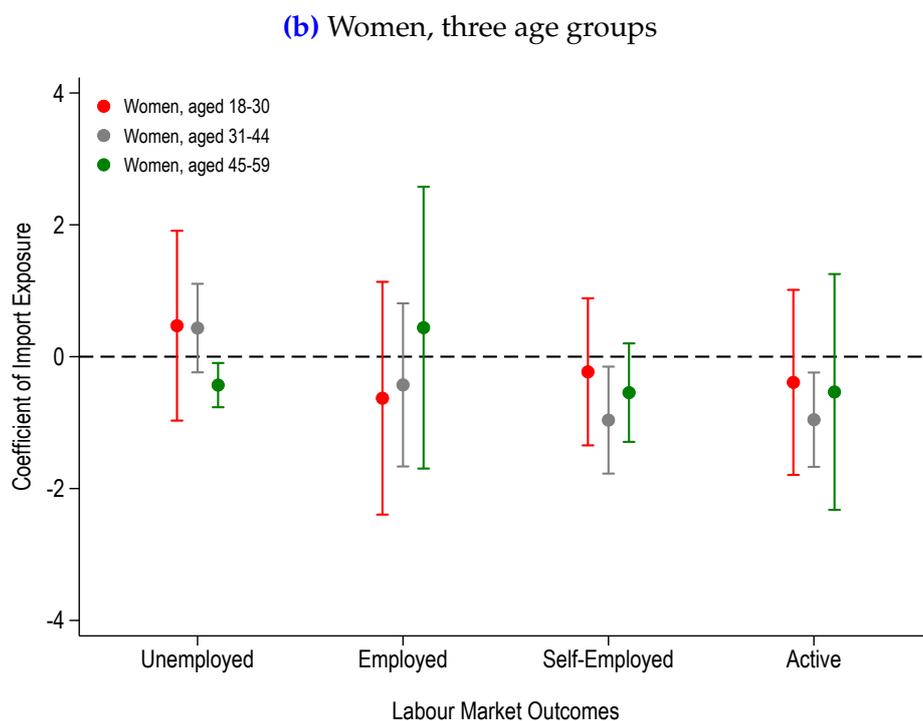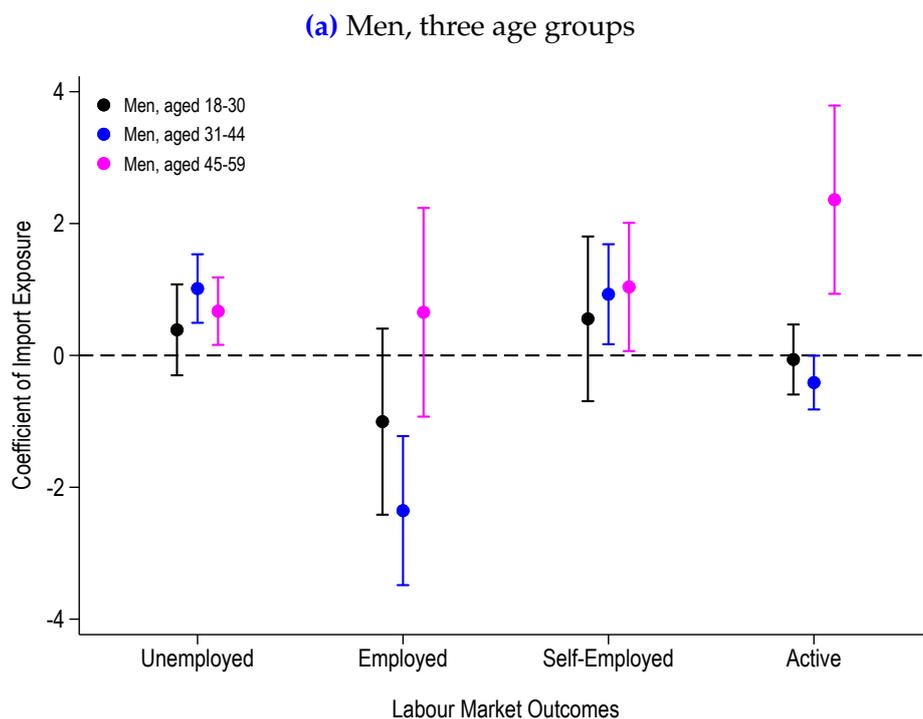
(a) Men, three age groups

(b) Women, three age groups

Notes: The figure shows the effects of import exposure on individual labour market outcomes by gender and age. Coefficient and the corresponding 95% confidence intervals reported. We consider three different age groups: those aged 18-30, 31-44, and 45-59 in 2001. See notes of Table 3 for more details. Sample sizes for men are: 22,123 for those aged 18-30; 32,716 for those aged 31-44; 26,465 for those aged 45-59. Sample sizes for women are: 22,409 for those aged 18-30; 32,895 for those aged 31-44; 27,506 for those aged 45-59. Source is ONS Longitudinal Study.

Figure A.2: Import Competition and Occupations
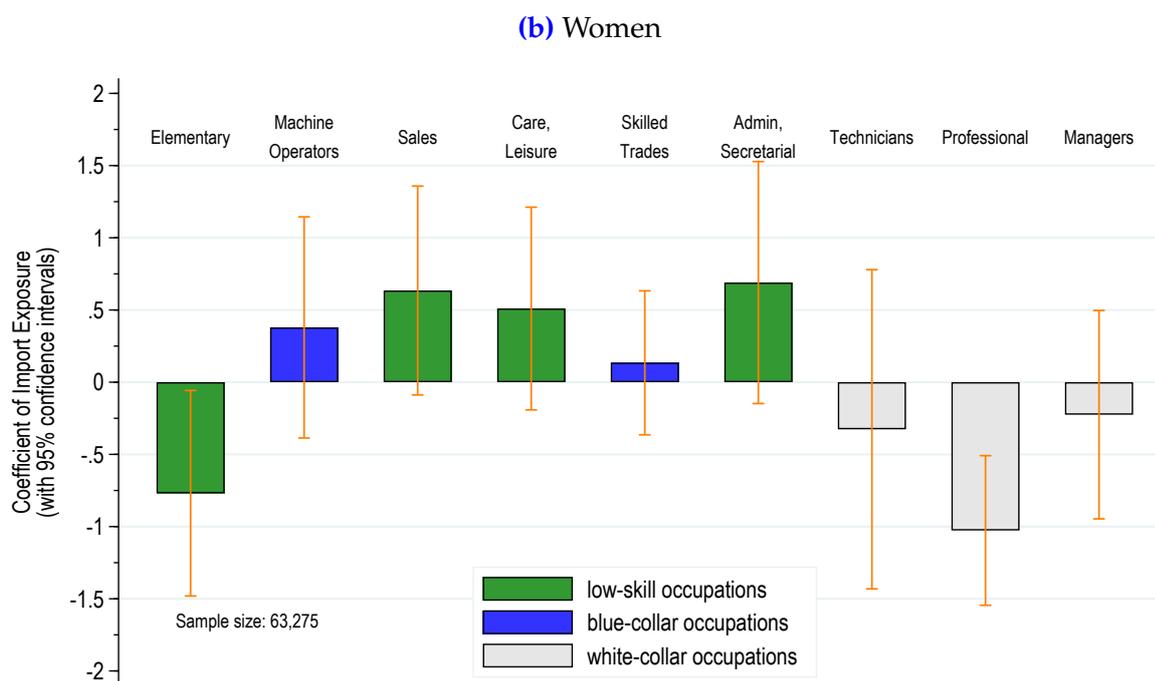
(a) Men

(b) Women

Notes: The figure shows the effects of import exposure on flows into different occupational groups conditional on remaining in employment. Estimates of β in eq. (2) and their 95% confidence intervals reported. Blue-collar workers are those employed in "skilled trades occupations" and "process, plant and machine operatives". Low-skill workers are those employed in "administrative and secretarial occupations", "caring, leisure and other service occupations", "sales and customer service occupations" and "elementary occupations". Finally, white-collar workers are defined as those working in "managers, directors and senior officials", "professional occupations", and "associate professional and technical occupations". This follows from the UK Standard Occupational Classification SOC2000. Sample size is 67,146 for men and 63,275 for women. Source is ONS Longitudinal Study.

Table A.6: Import Exposure and Types of Self-Employment (by Age and Gender)

	(1) SE	(2) Solo SE	(3) SE with employees	(1) SE	(2) Solo SE	(3) SE with employees
	Panel A. Men			**Panel B. Women**		
Import Exposure	0.898**	0.554**	0.344**	-0.610	-0.663*	0.053
	(0.377)	(0.261)	(0.173)	(0.394)	(0.375)	(0.114)
First-stage F-stat	[29.13]	[29.13]	[29.13]	[35.65]	[35.65]	[35.65]
Sample Size	81,304	81,304	81,304	82,810	82,810	82,810
	Panel C. Younger Men			**Panel D. Younger Women**		
Import Exposure	0.755*	0.366	0.389**	-0.661	-0.751*	0.089
	(0.418)	(0.308)	(0.194)	(0.469)	(0.423)	(0.186)
First-stage F-stat	[26.27]	[26.27]	[26.27]	[32.11]	[32.11]	[32.11]
Sample Size	54,839	54,839	54,839	55,304	55,304	55,304
	Panel E. Older Men			**Panel F. Older Women**		
Import Exposure	1.038*	0.768*	0.270	-0.545	-0.525	-0.019
	(0.591)	(0.434)	(0.325)	(0.454)	(0.404)	(0.123)
First-stage F-stat	[34.78]	[34.78]	[34.78]	[40.47]	[40.47]	[40.47]
Sample Size	26,465	26,465	26,465	27,506	27,506	27,506

Notes: Table shows the effects of import exposure on whether or not individuals go into self-employment (SE), solo self-employment (solo SE) and self-employment with employees. See notes of Table 2 for a list of the controls and details on the IV. Panels (a) and (b) consider men and women, respectively. Panels (c)-(f) show results by different age and gender subsamples. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.7: Import Exposure and Economic (In)activity

	(1) Δ inactivity	(2) Δ retired	(3) Δ studying	(4) Δ at home	(5) Δ sickness	(6) Δ other
	Panel A. Younger Men					
Import Exposure	0.351*	-0.065	-0.017	0.221	0.089	0.124
	(0.200)	(0.122)	(0.0649)	(0.136)	(0.156)	(0.082)
First-Stage *F*-stat	[26.27]	[26.27]	[26.27]	[26.27]	[26.27]	[26.27]
Observations	54,839	54,839	54,839	54,839	54,839	54,839
	Panel B. Older Men					
Import Exposure	-2.362***	-3.500***	-0.056	0.532**	0.110	0.551***
	(0.868)	(0.856)	(0.042)	(0.212)	(0.363)	(0.198)
First-Stage *F*-stat	[34.78]	[34.78]	[34.78]	[34.78]	[34.78]	[34.78]
Observations	26,465	26,465	26,465	26,465	26,465	26,465
	Panel C. Younger Women					
Import Exposure	0.638*	-0.053	0.080	0.247	0.041	0.322*
	(0.382)	(0.078)	(0.107)	(0.360)	(0.178)	(0.188)
First-Stage *F*-stat	[32.11]	[32.11]	[32.11]	[32.11]	[32.11]	[32.11]
Observations	55,304	55,304	55,304	55,304	55,304	55,304
	Panel D. Older Women					
Import Exposure	0.535	0.238	-0.119	0.437**	-0.032	0.0109
	(1.087)	(0.870)	(0.081)	(0.222)	(0.270)	(0.202)
First-Stage *F*-stat	[40.47]	[40.47]	[40.47]	[40.47]	[40.47]	[40.47]
Observations	27,506	27,506	27,506	27,506	27,506	27,506

Notes: Table reports the effect of import exposure on whether or not individuals are inactive in the labour force (column (1)). This is then decomposed into columns (2)-(6) based on the reason they are not participating: because they are retired (column (2)), studying (column (3)), looking after the home (column (4)), sick (column (5)), or for other reasons (column (6)). See notes of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the three-digit industry level reported are are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.8: TTWA-level analysis. Summary Table.

TTWA-level analysis	(1) Manuf empl (all)	(2) Non-manuf empl (all)	(3) Marriage share (all)	(4) Divorce share (all)	(5) Divorce share (women)
Import Exposure	-1.765***	1.166***	2.381	-0.920***	-1.080*
	(0.535)	(0.414)	(1.523)	(0.229)	(0.572)
First-stage F-stat	20.14	20.14	20.14	20.14	19.73
Mean Outcome Variable	-4.69	4.45	-8.69	-2.04	-2.18
Level in 2001	11.82	62.47	47.67	7.71	9.06
Observations	186	186	186	186	186

Notes: Table presents the results of the local labour market analysis for the main outcomes. It shows that our main results do not depend on the research design and hold on different levels of aggregation. Here, import exposure is defined at the level of Travel-to-work-area (TTWA), based on initial (pre-shock) industry structure of the area, as in Autor et al. (2013). The number of observations is thus equal to 186, the number of TTWAs in England and Wales. To ease comparison with Autor et al. (2019), the sample is restricted to young people aged 18-44. All specifications control for the following baseline (2001) characteristics of TTWAs: the share of manufacturing out of population aged 18-44, share of people with higher education, share of foreign born, regional dummies, and female employment share. Specifications are weighted by initial working age population in each TTWA. Standard errors are clustered at the region level. There are, in total, 11 regions. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.9: Import Exposure and Labour Market Responses by Family Type

	(1) Δ manuf	(2) Δ unempl	(3) Δ empl	(4) Δ self-empl	(5) Δ active
	Panel A. Men in Couples in 2001				
Import Exposure	-7.429***	0.492**	-0.872	1.053**	0.673*
	(2.110)	(0.196)	(0.732)	(0.417)	(0.403)
Mean Dep. Var.	-11.12	2.52	-28.78	10.17	-16.06
First-Stage *F*-stat	[31.58]	[31.58]	[31.58]	[31.58]	[31.58]
Observations	56,127	56,127	56,127	56,127	56,127
	Panel B. Men Not in Couples in 2001				
Import Exposure	-7.294***	1.236**	-1.041	0.618	0.814
	(2.654)	(0.622)	(0.894)	(0.382)	(0.622)
Mean Dep. Var.	-7.93	4.73	-25.11	10.37	-10.01
First-Stage *F*-stat	[22.69]	[22.69]	[22.69]	[22.69]	[22.69]
Observations	25,177	25,177	25,177	25,177	25,177
	Panel C. Women in Couples in 2001				
Import Exposure	-6.426***	-0.246	-0.252	-0.722**	-1.219*
	(2.382)	(0.224)	(0.833)	(0.361)	(0.681)
Mean Dep. Var.	-5.19	1.69	-29.86	4.87	-23.30
First-Stage *F*-stat	[34.28]	[34.28]	[34.28]	[34.28]	[34.28]
Observations	56,701	56,701	56,701	56,701	56,701
	Panel B. Women Not in Couples in 2001				
Import Exposure	-4.671*	0.975	-0.019	-0.314	0.643
	(2.409)	(0.908)	(1.069)	(0.682)	(0.964)
Mean Dep. Var.	-4.84	2.84	-25.27	4.72	-17.71
First-Stage *F*-stat	[39.58]	[39.58]	[39.58]	[39.58]	[39.58]
Observations	26,109	26,109	26,109	26,109	26,109

Notes: Table shows effect of import exposure on individual labour market outcomes for men and women initially in couples (Panels A and C) and men and women initially not in couples (panels B and D). See notes of Table 2 for a list of the control and details on the IV. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.10: Import Exposure and Women's Labour Supply Responses by Age

	(1) Δ partner active	(2) Δ partner in work	(3) Δ partner employed	(4) Δ partner self-empl	(5) Δ partner full-time
	Panel A. Partners of Men				
Import Exposure	0.272	0.270	0.669	-0.399*	-1.470*
	(0.487)	(0.530)	(0.671)	(0.239)	(0.767)
Mean Dep. Var.	-8.16	-8.30	-10.48	2.17	4.03
First-Stage *F*-stat	[32.63]	[32.63]	[32.63]	[32.63]	[35.06]
Observations	91,406	91,406	91,406	91,406	55,167
	Panel B. Partners of Younger Men				
Import Exposure	-0.227	-0.320	-0.233	-0.087	-0.779
	(1.032)	(1.047)	(0.989)	(0.335)	(0.916)
Mean Dep. Var.	4.25	3.94	0.44	3.50	3.44
First-Stage *F*-stat	[29.88]	[29.88]	[29.88]	[29.88]	[32.88]
Observations	51,865	51,865	51,865	51,865	35,860
	Panel C. Partners of Older Men				
Import Exposure	0.962	1.080	1.850**	-0.769	-2.881***
	(0.839)	(0.845)	(0.833)	(0.532)	(0.929)
Mean Dep. Var.	-24.46	-24.37	-24.80	0.44	5.15
First-Stage *F*-stat	[36.41]	[36.41]	[36.41]	[36.41]	[39.56]
Observations	39,541	39,541	39,541	39,541	19,307

Notes: Table shows the effects of import exposure on the labour supply of men's female partners. Panels A (partners of all men), B (partners of younger men), and C (partners of older men) report results for different sub-samples. The sample size in column (5) is smaller due to two reasons: (i) being conditional on working, (ii) not everyone reporting hours worked. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.11: Import Exposure and Men's Labour Supply Responses by Age

	(1) Δ partner active	(2) Δ partner in work	(3) Δ partner employed	(4) Δ partner self-empl	(5) Δ partner full-time
Panel A. Partners of Women					
Import Exposure	1.381***	1.519***	0.435	1.084***	1.161**
	(0.368)	(0.393)	(0.475)	(0.275)	(0.501)
Mean Dep. Var.	-15.22	-15.65	-17.34	1.69	7.23
First-Stage F-stat	[39.38]	[39.38]	[39.38]	[39.38]	[38.63]
Observations	90,620	90,620	90,620	90,620	66,990
Panel B. Partners of Younger Women					
Import Exposure	0.946***	0.921**	-0.156	1.078*	1.006**
	(0.283)	(0.394)	(0.868)	(0.619)	(0.423)
Mean Dep. Var.	-2.55	-3.26	-8.19	4.94	3.68
First-Stage F-stat	[35.05]	[35.05]	[35.05]	[35.05]	[36.03]
Observations	53,381	53,381	53,381	53,381	47,871
Panel C. Partners of Older Women					
Import Exposure	2.149**	2.473***	1.395	1.078	1.384
	(0.926)	(0.933)	(1.111)	(0.717)	(1.000)
Mean Dep. Var.	-33.38	-33.42	-30.46	-2.96	16.11
First-Stage F-stat	[44.25]	[44.25]	[44.25]	[44.25]	[43.72]
Observations	37,239	37,239	37,239	37,239	19,119

Notes: Table shows the effects of import exposure on the labour supply of women's male partners. Panels A (partners of all women), B (partners of younger women), and C (partners of older women) report results for different sub-samples. The sample size in column (5) is smaller due to two reasons: (i) being conditional on working, (ii) not everyone reporting hours worked. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.12: Import Exposure and Women's Labour Supply Responses.
By Presence of Children and Labour Market Status in 2001.

	(1) Δ partner active	(2) Δ partner in work	(3) Δ partner employed	(4) Δ partner self-empl	(5) Δ partner full-time	(6) Sample Size [F-S *F*-stat]
Panel A. Presence of Children in 2001						
(A.1) those with at least one child	1.254	1.119	1.285	-0.166	-1.920**	49,467
	(1.223)	(1.241)	(1.168)	(0.341)	(0.748)	[31.50]
(A.1.1) youngest child aged 0-4	1.753	1.486	1.520	-0.034	-4.838***	19,294
	(1.953)	(1.733)	(1.803)	(0.485)	(1.290)	[31.22]
(A.1.2) youngest child aged 5-9	0.852	1.128	1.499	-0.371	-0.783	12,533
	(1.674)	(1.689)	(1.682)	(0.529)	(1.563)	[26.44]
(A.2) those without children	-0.802	-0.627	0.097	-0.724	-0.443	41,939
	(0.953)	(0.985)	(0.795)	(0.454)	(1.313)	[34.03]
Panel B. Partners' (Women) Labour Status in 2001						
(B.1) women active in 2001	-0.154	-0.207	0.297	-0.504*	-1.470*	72,722
	(0.662)	(0.664)	(0.722)	(0.289)	(0.767)	[34.61]
(B.2) women in work in 2001	-0.045	-0.249	0.255	-0.504*	-1.470*	71,349
	(0.679)	(0.589)	(0.649)	(0.300)	(0.767)	[33.93]
(B.3) women part-time in 2001	-0.287	-0.357	0.652	-1.009*	-1.258	33,835
	(0.762)	(0.673)	(0.858)	(0.578)	(1.041)	[34.86]
(B.4) women full-time in 2001	0.114	-0.190	-0.111	-0.079	0.026	37,514
	(0.788)	(0.732)	(0.983)	(0.473)	(1.066)	[32.68]

Notes: Table shows the effects of import exposure on the labour supply of men's female partners. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level reported are in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table A.13: Import Exposure and Men's Labour Supply Responses.
By Presence of Children and Labour Market Status in 2001.

	(1) Δ partner active	(2) Δ partner in work	(3) Δ partner employed	(4) Δ partner self-empl	(5) Δ partner full-time	(6) Sample Size [F-S *F*-stat]
Panel A. Presence of Children in 2001						
(A.1) those with at least one child	1.208***	0.863	-0.0317	0.895	1.324*	43,563
	(0.410)	(0.578)	(1.014)	(0.697)	(0.780)	[43.21]
(A.1.1) youngest child aged 0-4	0.847*	1.422**	1.066	0.356	1.959**	13,663
	(0.445)	(0.552)	(1.738)	(1.488)	(0.909)	[42.09]
(A.1.2) youngest child aged 5-9	0.583	0.0708	-2.219*	2.290*	-1.916*	11,639
	(0.468)	(0.820)	(1.263)	(1.284)	(1.150)	[44.58]
(A.2) those without a dependent child	1.480**	1.963***	0.802	1.161**	1.024**	47,057
	(0.604)	(0.636)	(0.900)	(0.549)	(0.447)	[36.65]
Panel B. Partners' (Men) Labour Status in 2001						
(B.1) men active in 2001	0.891***	0.994***	-0.102	1.096***	1.161**	84,740
	(0.301)	(0.309)	(0.439)	(0.301)	(0.501)	[39.00]
(B.2) men in work in 2001	0.796***	0.923***	-0.168	1.092***	1.161**	83,327
	(0.308)	(0.288)	(0.409)	(0.299)	(0.501)	[38.95]
(B.3) men part-time in 2001	1.091	1.163	-0.285	1.448	2.985	3,993
	(1.717)	(2.027)	(4.183)	(4.444)	(3.594)	[37.64]
(B.4) men full-time in 2001	0.824***	0.945***	-0.141	1.086***	0.831**	79,334
	(0.295)	(0.269)	(0.460)	(0.356)	(0.367)	[38.74]

Notes: Table shows the effects of import exposure on the labour supply of women's male partners. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.
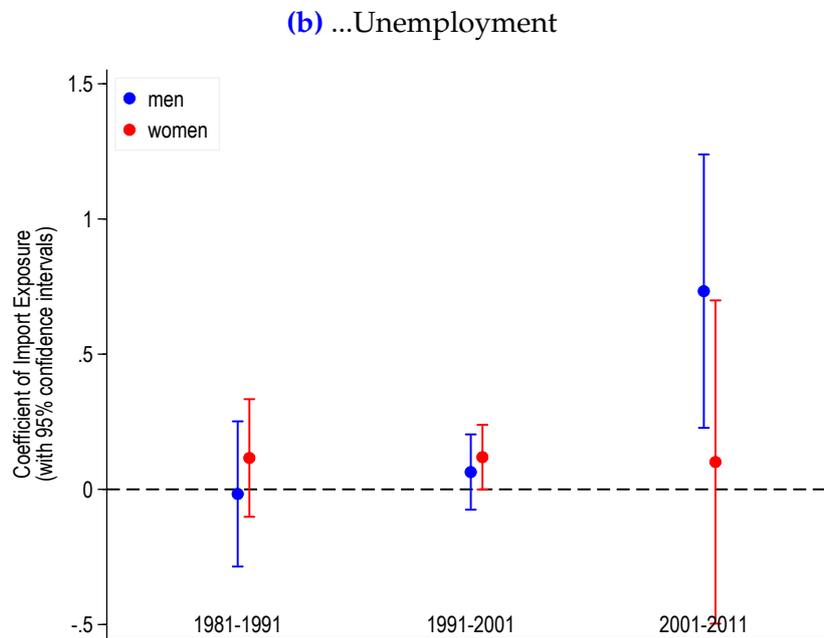
B Placebo Checks

Figure B.1: Placebo Exercises. 2001-2011 Industry Import Exposure and...

(a) ...Manufacturing Employment

(b) ...Unemployment
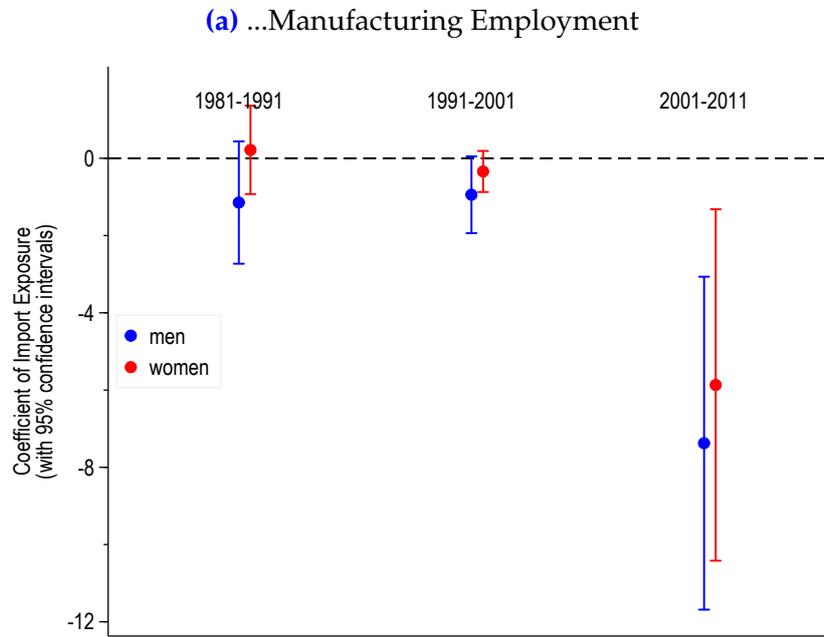
Notes: Sample sizes for men are: 97,507 in 1981-1991; 88,117 in 1991-2001; 81,304 in 2001-2011. Sample sizes for women are: 63,881 in 1981-1991; 78,892 in 1991-2001; 82,810 in 2001-2011. Source is ONS Longitudinal Study.

Table B.1: Placebo Exercise.

	(1) Δ manuf	(2) Δ unempl	(3) Δ in work	(4) Δ active	(5) Δ empl	(6) Δ self-empl
			Panel A. Men. 1981-1991.			
Import Exposure	-1.146	0.413	-0.018	0.396*		
	(0.808)	(0.257)	(0.137)	(0.223)		
First-Stage *F*-stat	[22.35]	[22.35]	[22.35]	[22.35]		
Observations	97,507	97,507	97,507	97,507		
			Panel B. Women. 1981-1991.			
Import Exposure	0.218	0.434	0.116	0.549		
	(0.584)	(0.360)	(0.111)	(0.351)		
First-Stage *F*-stat	[10.16]	[10.16]	[10.16]	[10.16]		
Observations	63,881	63,881	63,881	63,881		
			Panel C. Men. 1991-2001.			
Import Exposure	-0.943*	0.064	-0.054	0.010	-0.150	0.096
	(0.507)	(0.071)	(0.143)	(0.167)	(0.177)	(0.197)
First-Stage *F*-stat	[108.10]	[108.10]	[108.10]	[108.10]	[108.10]	[108.10]
Observations	88,117	88,117	88,117	88,117	88,117	88,117
			Panel D. Women. 1991-2001.			
Import Exposure	-0.341	0.119*	-0.248	-0.129	-0.171	-0.077
	(0.271)	(0.061)	(0.161)	(0.156)	(0.171)	(0.082)
First-Stage *F*-stat	[72.28]	[72.28]	[72.28]	[72.28]	[72.28]	[72.28]
Observations	78,892	78,892	78,892	78,892	78,892	78,892

Notes: Table reports results of regressing changes in labour market outcomes between 1981-1991 and 1991-2001 in industries' future changes in import exposure (2001-2011). 'Being in work' cannot be decomposed between being in work as an employee and being self-employed in 1981. See notes of Table 2 for a list of the controls and details on the IV. Standard errors clustered at the three-digit industry level reported are in parentheses. *$p < 0.1$. Source is ONS Longitudinal Study.

Table B.2: Placebo 1991-2001. Import Exposure and Family Labour Supply Responses. (MEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
Panel A. Men							
Import Exposure	-0.605	0.152**	0.073	-0.020	0.205	-0.099	0.051
	(0.500)	(0.061)	(0.175)	(0.183)	(0.187)	(0.263)	(0.238)
Mean Dep. Var.	-10.81	1.54	-33.10	12.47	-19.09	-11.08	-11.94
First-Stage F-stat	[98.54]	[98.54]	[98.54]	[98.54]	[98.54]	[98.54]	[98.54]
Observations	92,755	92,755	92,755	92,755	92,755	92,755	92,755
Panel B. Younger Men (aged 18-44)							
Import Exposure	-0.948	0.072	-0.081	0.053	0.044	-0.330	-0.137
	(0.687)	(0.059)	(0.254)	(0.241)	(0.113)	(0.258)	(0.227)
Mean Dep. Var.	-5.95	1.49	-19.74	13.28	-4.97	3.31	2.37
First-Stage F-stat	[105.9]	[105.9]	[105.9]	[105.9]	[105.9]	[105.9]	[105.9]
Observations	58,439	58,439	58,439	58,439	58,439	58,439	58,439
Panel C. Older Men (aged 45-59)							
Import Exposure	-0.053	0.275***	0.374	-0.167	0.481	0.248	0.321
	(0.498)	(0.106)	(0.380)	(0.153)	(0.443)	(0.399)	(0.381)
Mean Dep. Var.	-19.09	1.63	-55.85	11.08	-43.13	-35.58	-36.33
First-Stage F-stat	[88.96]	[88.96]	[88.96]	[88.96]	[88.96]	[88.96]	[88.96]
Observations	34,316	34,316	34,316	34,316	34,316	34,316	34,316

Notes: Table reports results of regressing changes in labour market outcomes (own as well as partners') between 1991-2001 in industries' future changes in import exposure (2001-2011). Samples are for those in stable couples (those who remain in the same relationship over the period 1991-2001). In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table B.3: Placebo 1991-2001. Import Exposure and Family Labour Supply Responses. (WOMEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
Panel A. Women							
Import Exposure	-0.375*	0.042	-0.262	-0.117	-0.336**	-0.165	-0.142
	(0.205)	(0.053)	(0.199)	(0.115)	(0.171)	(0.135)	(0.115)
Mean Dep. Var.	-7.40	0.99	-34.72	5.19	-28.54	-19.03	-20.50
First-Stage F-stat	[70.18]	[70.18]	[70.18]	[70.18]	[70.18]	[70.18]	[70.18]
Observations	88,560	88,562	88,562	88,562	88,562	88,562	88,562
Panel B. Younger Women (aged 18-44)							
Import Exposure	-0.330	-0.011	-0.170	-0.205	-0.386**	-0.122	-0.0986
	(0.266)	(0.076)	(0.211)	(0.130)	(0.171)	(0.135)	(0.105)
Mean Dep. Var.	-5.97	1.18	-21.92	6.00	-14.73	-5.96	-7.13
First-Stage F-stat	[68.19]	[68.18]	[68.18]	[68.18]	[68.18]	[68.18]	[68.18]
Observations	58,082	58,083	58,083	58,083	58,083	58,083	58,083
Panel C. Older Women (aged 45-59)							
Import Exposure	-0.380	0.134**	-0.425*	0.041	-0.250	-0.243	-0.210
	(0.285)	(0.063)	(0.253)	(0.150)	(0.262)	(0.265)	(0.244)
Mean Dep. Var.	-10.15	0.64	-59.12	3.63	-54.85	-43.95	-46.00
First-Stage F-stat	[74.09]	[74.09]	[74.09]	[74.09]	[74.09]	[74.09]	[74.09]
Observations	30,478	30,479	30,479	30,479	30,479	30,479	30,479

Notes: Table reports results of regressing changes in labour market outcomes (own as well as partners') between 1991-2001 in industries' future changes in import exposure (2001-2011). Samples are for those in stable couples (those who remain in the same relationship over the period 1991-2001). In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

C   Robustness Checks

Table C.1: Summary of Main Robustness Checks. MEN.

	Panel A. Manufacturing Employment.			Panel B. Unemployment.		
	Men	Younger Men	Older Men	Men	Younger Men	Older Men
A. Excluding EU countries	-7.571***	-9.190***	-5.139**	0.767***	0.842**	0.668**
	(2.243)	(2.642)	(1.996)	(0.268)	(0.346)	(0.312)
B. Adding industry controls	-7.407***	-8.969***	-5.034***	0.734***	0.799**	0.630**
	(2.143)	(2.531)	(1.921)	(0.264)	(0.336)	(0.321)
C. Adding occupation controls	-7.391***	-8.877***	-5.118**	0.742***	0.801**	0.674**
	(2.198)	(2.547)	(2.044)	(0.258)	(0.325)	(0.311)
D. No occupation fixed effects	-7.556***	-9.051***	-5.212**	0.694***	0.755**	0.634**
	(2.306)	(2.660)	(2.141)	(0.248)	(0.306)	(0.314)
E. Region fixed effects	-7.401***	-8.948***	-5.020**	0.728***	0.782**	0.645**
	(2.225)	(2.577)	(2.113)	(0.250)	(0.316)	(0.307)
F. Trade with Eastern Europe	-6.296**	-8.143***	-3.392	0.629*	0.631	0.633*
	(2.570)	(2.825)	(2.537)	(0.327)	(0.409)	(0.361)
G. Export Exposure	-7.234***	-8.561***	-5.139**	0.704***	0.716**	0.700**
	(2.283)	(2.619)	(2.105)	(0.245)	(0.315)	(0.332)

	Panel C. Employment.			Panel D. Self-Employment.		
	Men	Younger Men	Older Men	Men	Younger Men	Older Men
A. Excluding EU countries	-1.068	-2.006***	0.661	0.894**	0.747*	1.005
	(0.672)	(0.639)	(1.073)	(0.388)	(0.414)	(0.642)
B. Adding industry controls	-0.846	-1.670***	0.688	0.686*	0.502	0.885
	(0.636)	(0.605)	(1.032)	(0.387)	(0.394)	(0.578)
C. Adding occupation controls	-0.977	-1.916***	0.710	0.880**	0.750*	0.980*
	(0.633)	(0.650)	(0.946)	(0.376)	(0.422)	(0.581)
D. No occupation fixed effects	-0.897	-1.693**	0.475	0.910**	0.689	1.253*
	(0.682)	(0.747)	(0.993)	(0.426)	(0.464)	(0.664)
E. Region fixed effects	-0.944	-1.937***	0.882	0.927**	0.819**	1.030*
	(0.619)	(0.630)	(1.019)	(0.363)	(0.409)	(0.590)
F. Trade with Eastern Europe	-1.121	-2.039**	0.440	1.351***	1.079**	1.784**
	(0.770)	(0.831)	(1.025)	(0.449)	(0.491)	(0.712)
G. Export Exposure	-0.915	-1.687**	0.523	0.795**	0.621	0.979*
	(0.651)	(0.669)	(0.983)	(0.392)	(0.457)	(0.587)

Notes: Table summarises the robustness checks for our main results for men. Sample size is 83,627 for men; 56,472 for younger men; and 27,155 for older men. See notes of Table 2 for a list of the controls and details on the IV. A excludes European Union countries when constructing eq. (3). B considers industry-specific controls, which are the intensity of R&D stock over capital, ICT stock intensity over capital, computer stock intensity over capital, and the intensity of net capital stock over industry output (measured in the year 1997 and at the two-digit SIC92 industry level). C considers occupation-specific controls, which are the Routine Task Intensity (RTI, Autor et al. (2003)) and the offshorability index (measured in the year 2001 and at the four-digit SOC2000 occupation categories. D does not include occupation fixed effects. E replaces TTWA fixed effects with fixed effects for 11 regions. F accounts for import competition with Eastern Europe. G accounts for export exposure. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table C.2: Summary of Main Robustness Checks. WOMEN.

	Panel A. Manufacturing Employment.			Panel B. Unemployment.		
	Women	Younger Women	Older Women	Women	Younger Women	Older Women
A. Excluding EU countries	-5.902**	-6.574***	-4.509*	0.152	0.434	-0.380*
	(2.325)	(2.352)	(2.687)	(0.330)	(0.461)	(0.229)
B. Adding industry controls	-5.906***	-6.421***	-4.780*	0.0988	0.400	-0.476**
	(2.258)	(2.226)	(2.663)	(0.302)	(0.432)	(0.208)
C. Adding occupation controls	-5.888**	-6.375***	-4.854*	0.0951	0.391	-0.455**
	(2.322)	(2.283)	(2.746)	(0.307)	(0.435)	(0.206)
D. No occupation fixed effects	-5.923**	-6.367***	-4.954*	0.136	0.439	-0.411**
	(2.458)	(2.399)	(2.931)	(0.299)	(0.433)	(0.203)
E. Region fixed effects	-5.874**	-6.347***	-4.869*	0.133	0.437	-0.424**
	(2.341)	(2.297)	(2.774)	(0.303)	(0.430)	(0.210)
F. Trade with Eastern Europe	-6.021**	-6.714***	-4.723	0.0811	0.400	-0.463**
	(2.436)	(2.334)	(2.919)	(0.252)	(0.368)	(0.187)
G. Export Exposure	-5.827**	-6.217***	-4.941*	0.114	0.405	-0.421**
	(2.413)	(2.402)	(2.793)	(0.304)	(0.436)	(0.208)

	Panel C. Employment.			Panel D. Self-Employment.		
	Women	Younger Women	Older Women	Women	Younger Women	Older Women
A. Excluding EU countries	-0.095	-0.491	0.835	-0.610	-0.625	-0.606
	(0.723)	(0.610)	(1.347)	(0.386)	(0.471)	(0.469)
B. Adding industry controls	-0.0154	-0.141	0.362	-0.696*	-0.762	-0.606
	(0.685)	(0.534)	(1.308)	(0.388)	(0.464)	(0.447)
C. Adding occupation controls	-0.129	-0.355	0.487	-0.620	-0.666	-0.563
	(0.690)	(0.559)	(1.274)	(0.397)	(0.471)	(0.450)
D. No occupation fixed effects	-0.170	-0.336	0.209	-0.790*	-0.842*	-0.695
	(0.718)	(0.588)	(1.317)	(0.440)	(0.508)	(0.501)
E. Region fixed effects	-0.213	-0.411	0.295	-0.625*	-0.662	-0.558
	(0.673)	(0.538)	(1.313)	(0.380)	(0.445)	(0.451)
F. Trade with Eastern Europe	-0.363	-0.416	0.0443	-0.387	-0.427	-0.354
	(0.705)	(0.572)	(1.170)	(0.349)	(0.418)	(0.391)
G. Export Exposure	-0.129	-0.208	0.279	-0.688*	-0.807*	-0.531
	(0.703)	(0.559)	(1.264)	(0.405)	(0.464)	(0.455)

Notes: Table summarises the robustness checks for our main results for women. See notes of Table 2 for a list of the controls and details on the IV. Sample size is 85,170 for women; 56,800 for younger women; and 28,370 for older women. See notes in Table C.1 for details of different specifications. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table C.3: Robustness Sample. Partner Not Exposed to Import Competition.
Import Exposure and Family Labour Supply Responses (MEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
Panel A. Men							
Import Exposure	-7.866***	0.542*	-0.374	0.895*	1.063**	0.509	0.487
	(2.186)	(0.277)	(0.725)	(0.474)	(0.537)	(0.592)	(0.563)
Mean Dep. Var.	-10.68	2.12	-29.39	9.91	-17.36	-6.54	-6.60
First-Stage F-stat	[31.46]	[31.46]	[31.46]	[31.46]	[31.46]	[31.46]	[31.46]
Observations	81,912	81,912	81,912	81,912	81,912	81,912	81,912
Panel B. Younger Men (aged 18-44)							
Import Exposure	-9.889***	0.631	-1.586**	0.870*	-0.0859	0.0512	0.0529
	(2.432)	(0.463)	(0.708)	(0.527)	(0.251)	(1.294)	(1.290)
Mean Dep. Var.	-7.43	2.02	-16.78	11.86	-2.89	6.04	6.14
First-Stage F-stat	[28.79]	[28.79]	[28.79]	[28.79]	[28.79]	[28.79]	[28.79]
Observations	46,234	46,234	46,234	46,234	46,234	46,234	46,234
Panel C. Older Men (aged 45-59)							
Import Exposure	-5.842**	0.444*	1.028	0.860	2.332**	1.211	1.157
	(2.355)	(0.255)	(1.436)	(0.716)	(1.026)	(0.916)	(0.914)
Mean Dep. Var.	-14.90	2.24	-45.74	7.38	-36.12	-22.83	-23.11
First-Stage F-stat	[35.35]	[35.35]	[35.35]	[35.35]	[35.35]	[35.35]	[35.35]
Observations	35,678	35,678	35,678	35,678	35,678	35,678	35,678

Notes: Table shows the effects of import exposure on men's own labour supply and the labour supply of their female partners. Sample is those with partners who are working in industries not exposed to import competition. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

Table C.4: Robustness Sample. Partner Not Exposed to Import Competition.
Import Exposure and Family Labour Supply Responses (WOMEN)

	OWN RESPONSE					PARTNER RESPONSE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Δ manuf	Δ unempl	Δ empl	Δ self-empl	Δ active	Δ partner in work	Δ partner active
	Panel A. Women						
Import Exposure	-6.977**	-0.108	-0.255	-0.149	-0.512	1.685***	1.533***
	(2.883)	(0.212)	(0.746)	(0.324)	(0.742)	(0.623)	(0.526)
Mean Dep. Var.	-4.000	1.329	-31.57	4.791	-25.45	-14.19	-14.33
First-Stage F-stat	[36.21]	[36.21]	[36.21]	[36.21]	[36.21]	[36.21]	[36.21]
Observations	66,672	66,672	66,672	66,672	66,672	66,672	66,672
	Panel B. Younger Women (aged 18-44)						
Import Exposure	-7.388***	0.172	-0.421	-0.601	-0.850*	1.842***	1.424***
	(2.808)	(0.390)	(0.737)	(0.426)	(0.443)	(0.591)	(0.376)
Mean Dep. Var.	-3.484	1.621	-17.59	6.034	-9.932	-2.205	-1.997
First-Stage F-stat	[29.23]	[29.23]	[29.23]	[29.23]	[29.23]	[29.23]	[29.23]
Observations	38,866	38,866	38,866	38,866	38,866	38,866	38,866
	Panel C. Older Women (aged 45-59)						
Import Exposure	-6.478**	-0.408**	-0.137	0.407	-0.139	1.605	1.750
	(3.269)	(0.175)	(1.701)	(0.406)	(1.523)	(1.241)	(1.238)
Mean Dep. Var.	-4.722	0.921	-51.13	3.053	-47.15	-30.94	-31.57
First-Stage F-stat	[43.18]	[43.18]	[43.18]	[43.18]	[43.18]	[43.18]	[43.18]
Observations	27,806	27,806	27,806	27,806	27,806	27,806	27,806

Notes: Table shows the effects of import exposure on men's own labour supply and the labour supply of their female partners. Sample is those with partners who are working in industries not exposed to import competition. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, partners' foreign-born status, one-digit occupation, and one-digit industry fixed effects. Standard errors clustered at the three-digit industry level are reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.