Household Responses to Trade Shocks*

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PRELIMINARY: PLEASE DO NOT CIRCULATE OR CITE.

Abstract

We study household-level responses to increased import competition, using large-scale panel data of linked decadal censuses for households in England and Wales. We first document that in response to Chinese import competition, male workers respond in a variety of ways to the resulting decline in manufacturing: In addition to movement into other sectors of the economy and movement into unemployment, we find significant increases in self-employment, acting as buffer for affected workers. We then turn to responses at the family level. In line with increased importance of the family, we find a decline in the incidence of divorce among trade-affected women under 45. Partners of women affected by the trade shock provide insurance through an added-worker effect. Our results document substantial heterogeneity in effects and emphasise the importance of household responses for a complete understanding of the effects of import competition.

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

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1 Introduction

A large literature has documented persistent negative impacts on the employment and earnings of workers exposed to import competition in many countries.[1] This raises the question of which insurance mechanisms are available to the affected workers and their families. Does self-employment provide a buffer for workers who lose their jobs? Do families provide insurance by increasing partner labour supply, compensating for lost earnings? Do affected workers adjust the timing of their retirement?

In this paper, we investigate these adjustment mechanisms in response to increased import competition in the 2000s. Drawing on large-scale panel data that links individuals across decadal censuses in England and Wales, we study the effects of the rapid growth in Chinese manufacturing imports on individuals *and* their households. Our data allows us to observe changes in labour market status, including employment forms and reasons for inactivity. The UK is an interesting case for investigating the economic adjustment processes to trade shocks, given that it experienced the largest percentage decline in manufacturing employment among OECD countries between 1999 and 2007, at the same time as a large increase in its trade deficit with China (Dorn & Levell, 2021).

Our empirical approach compares own and partner outcomes for workers with similar characteristics, but who were initially employed in industries with different levels of exposure to import competition from China. We instrument for the growth in import competition in each industry using the growth in Chinese exports to other developed economies, following Autor et al. (2013, 2014). We measure how worker outcomes change from 2001 to 2011. Our main outcome variables are employment, self-employment and retirement; measures of family stability; and partner labour supply. We allow for heterogeneity in effects by gender and age, which we find to be quantitatively important.

We first document the direct effect of trade exposure on individuals' own labour market outcomes. We find a large negative effect of exposure to import competition on manufacturing employment. For men, unemployment increases significantly. However, we also find a significant increase in male self-employment. The effect on economic activity differs by age: young males decrease their labour market activity, while older males increase their activity due to reduced flows into retirement.

This set of findings suggests that male workers use self-employment and delayed retirement to offset the earnings effects of the shock. Both of these adjustment mechanisms to trade shocks have been hitherto relatively underexplored. While providing an alternative source of employment to displaced workers, self-employment is likely to be associated with economic insecurity for many former manufacturing employees: In the

[1] See, among others, Autor et al. (2013, 2014); Dauth et al. (2014, 2021); Balsvik et al. (2015); Utar (2018); Citino & Linarello (2021); De Lyon & Pessoa (2021). See Dorn & Levell (2021) for a summary.

UK, the vast majority of self-employed individuals are 'solo self-employed' (own account workers without employees), which is associated with low average earnings compared to employees and includes many 'gig-economy' occupations (Giupponi & Xu, 2020). The role of self-employment for displaced workers is perhaps analogous to the role played by the informal sector in developing countries, which has been found to similarly act as an employment 'buffer' against the effects of trade shocks (Dix-Carneiro et al., 2021). Our finding that trade-exposed male workers retire later is consistent with the increase in male self-employment, as self-employed workers tend to retire later than the employed (Crawford et al., 2021). Alternatively, delayed retirement is also another way workers can compensate for any income losses that result from exposure to import competition.

In contrast to the findings for men, we find no significant effects on labour force participation or rates of self-employment for women. Thus either the availability or use of these insurance mechanisms appears to differ by gender.

We next turn to the impact of trade shocks on family formation and dissolution. We find that for women below 45, exposure to import competition significantly reduces the likelihood of divorce or of living with a new partner. This could be because shocks leave married women more financially reliant on their current partners. However, we find no evidence that married men exposed to import competition are either more or less likely to get divorced. This latter finding contrasts with Autor et al. (2019), who find substantial negative effects of import competition in male-dominated industries on divorce and marriage rates in more exposed local labour markets in the US. This is despite the fact that rising import competition caused a comparable decline in manufacturing employment in the two countries (Dorn & Levell, 2021). Our results suggest that the negative implications of family breakdown and other social impacts that past studies have identified following reductions in manufacturing employment are not inevitable, and may depend on other aspects, such as institutions, which differ across countries.

Our final set of results concerns own responses to shocks affecting partners. Here, we find no evidence that women are more likely to enter or stay in the labour force in response to shocks affecting their male partners (irrespective of whether young children are present in the household). By contrast, we find there is an 'added worker effect' affecting men's labour supply. Men are significantly more likely to be working 10 years later if their female partner was initially employed in an exposed industry. This effect is larger for older men, who see greater reductions in inactivity in response to shocks affecting their partners. These effects run counter to the conventional wisdom that women's labour supply is more elastic in response to shocks affecting the household. They are however consistent with other studies which find limited added worker effects among women partners (Halla et al. (2020); Goux et al. (2014)). We note that older men respond to shocks affecting their partners in the same way that they respond to shocks affecting

themselves - through reduced flows into inactivity at older ages and through greater self-employment.

We subject all of our results to several robustness checks and sensitivity analyses. We verify that our results do not reflect industry-specific trends that predate the rise of import competition from China using data from the 1980s and 90s. We also assess the sensitivity of our results to various alternative samples and specifications, and to control for the impact of exposure to increased export demand from China or to exposure to increased import competition from Eastern Europe during this period. None of these checks substantially affect our findings.

Our work contributes to several broad strands of the literature. The first is the literature on the labour market effects of trade shocks. Recent work on this focuses on the consequences of increased import competition from China at the local labour market (Autor et al., 2013; Dauth et al., 2014; Balsvik et al., 2015; Foliano & Riley, 2017), firm (Utar, 2014; Bloom et al., 2016; Autor et al., 2020), and individual level (Autor et al., 2014; Utar, 2018; Dauth et al., 2021; Citino & Linarello, 2021; De Lyon & Pessoa, 2021).[2] We contribute to this particular literature by additionally documenting the workers' responses along the self-employment and retirement margins.

In studying family outcomes, this paper is also closely related to recent empirical studies on the impact of trade shocks on marriage and fertility. The literature on household level outcomes of import competition is much smaller than that studying employment and earnings, perhaps because the administrative datasets used to study the impacts of these shocks on individual workers often do not include information on other members of their household. Autor et al. (2019) study how Chinese import competition affects marriage, divorce and single parenthood rates across local labour markets in the US. Keller & Utar (2022) study the impacts of exposure to Chinese import competition on divorce rates and fertility in Denmark. Our finding on a reduction in divorce among women under 45 is consistent with the 'retreat to family' phenomenon proposed in Keller & Utar (2022), although we do not find evidence of the same effects on childbirth they document in their paper.

We also contribute to the empirical literature on 'added worker effects' (AWE), which studies spousal labour supply responses to labour demand shocks affecting their partners. Prior work has found mixed results and tended to focus on employment responses for women (Layard et al., 1980; Heckman & Macurdy, 1980, 1982; Lundberg, 1985; Maloney, 1987, 1991; Spletzer, 1997; Cullen & Gruber, 2000; Halla et al., 2020). In a cross-country comparison, Bredtmann et al. (2018) show that the existence and the magni-

[2] A broader literature examines the effects of trade shocks based on other episodes, including the large import tariff reductions in emerging economies such as India and Brazil (see, among others, Topalova (2010); Dix-Carneiro & Kovak (2017, 2019); Gaddis & Pieters (2017)).

tude of the AWE vary over the different welfare regimes within Europe. As opposed to these reduced-form estimates, studies estimating life cycle models have identified family labour supply as an important insurance mechanism to income shocks, allowing households to smooth consumption (Stephens, 2002; Attanasio et al., 2005; Blundell et al., 2016). We contribute to this literature by studying family labour supply responses in the context of a trade shock, which represents a large-scale structural change.[3] Our results contain important lessons for other ongoing structural shifts, such as technological progress.

More generally, this paper contributes to the understanding of differences in the effects of trade shocks across countries. Previous work has emphasised differences in institutions and labour market flexibility (Balsvik et al., 2015; Keller & Utar, 2022), and differences in trade patterns (Dauth et al., 2021; Giuntella et al., 2022) as potential explanations for the varying impact of Chinese import competition.

The remainder of this paper is as follows. Section 2 describes the ONS Longitudinal Study and other data sources we draw on. Section 3 sets out our empirical research design. We present the main results in Section 4: Section 4.1 shows how rising exposure to import competition affects the labour market status of individual workers. Section 4.2 considers the impacts on partnering and divorce. Section 4.3 looks at household labour supply responses. Section 5 concludes with a discussion of the implications of our findings. The Appendix presents supplemental results and robustness checks.

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). The LS contains linked census and life events data for a roughly 1% sample of the population of England and Wales (people born on one of four selected dates in a calendar year). It includes records on over 500,000 people usually resident in England and Wales from the 1971, 1981, 1991, 2001, and 2011 censuses. The LS contains core socio-demographic variables and information on the employment status, occupation, industry, marital status and location of sampled individuals. Life events data are also linked for LS members, including births to sample mothers, deaths, and cancer registrations.

The LS has a number of advantages for our purposes. First, it is a panel, allowing us to track individuals across different censuses held every 10 years. Most of our analysis con-

[3] Huber & Winkler (2019) study correlations in exposure to trade shocks within couples. While their paper focuses on how differences within couples affect the impact of trade shocks on across-household inequality, they also find that own earnings decrease if partners are positively exposed to export shocks.

cerns the impact of import competition on outcomes between the years 2001 and 2011. We 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, at home, etc). Administrative data sources often do not include this information. For instance, the UK Annual Survey of Hours and Earnings (ASHE) only cover 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) does not cover the self-employed. Third, it includes census information on co-residents of study members. This is essential, 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 Trade Data and Other Data Sources

To construct exposure to import competition, we draw on trade flows from the United Nations Commodity Trade Statistics Database (UN Comtrade). It contains detailed statistics on trade in individual commodities. We map the commodity codes from various years into the Classification of Product by Activity (CPA) codes, which are identical in their first four digits to 1992 UK Standard Industry Classification (SIC92) codes.[4] We deflate values so that they are expressed in 2010 pounds.[5]

To construct the import exposure measure, we need information on the output of different UK industries, which we compute using the Business Structure Database (BSD) (Office for National Statistics, 2021). The BSD is administrative data covering plant-level information on employment, turnover, geography, and main industry for almost all busi-

[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, accessible here: https://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL.

[5]These 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 in this 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 not affected by this issue.

ness organisations in the UK from 1997 until the present (only very small businesses are not included in the register).[6] We calculate the output for each industry by summing turnover across individual plants.

2.3 Sample Description

We track workers from 2001, the year China acceded to the World Trade Organization (WTO), and measure how outcomes change from 2001 to 2011. We focus on employees who were born between 1942 and 1983 and who were therefore aged between 18 and 59 in 2001. As a result, by 2011, some individuals in our sample are above the state pension age (which at this time 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. Previous studies of the impacts of trade shocks have restricted their samples to those of working age only, and so have not explored the role of this particular adjustment margin.[7]

Prior work has shown that the effects and responses to shocks differ greatly by gender and age (Keller & Utar, 2022; Salvanes et al., 2022), we thus split our sample into subgroups on these dimensions. Our sample includes 83,627 male employees (with almost 24% working in manufacturing in 2001) and 85,170 women employees (9% of whom were working in manufacturing in 2001). Splitting the sample by age, we denote those aged 18-44 in 2001 as 'young', and those aged 45-59 as 'old'.

Table 1 shows descriptives for our sample in 2001. 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 20 industries most exposed to Chinese import competition (Table A.1). Panel A presents some basic demographic characteristics. The average person in our main samples is about 39 years old, and approximately 26% of individuals have a college degree. Workers in manufacturing industries and especially highly trade-exposed industries are less likely to be college educated: only 20% of men and 11% of women in highly trade-exposed industries have a university degree. Panel B shows the information on individuals' marital status and family situation. Both men and women working in highly exposed industries are more likely to be married (or have a partner) than those working in non-manufacturing industries, highlighting the importance of studying partner responses and family dynamics in this context.

General patterns of employment differ across men and women. Panel C shows that 41% of female employees work part-time, while the fraction of male employees working

[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.

[7]For example, Autor et al. (2014) study a sample who are aged 22-64 over the whole period of analysis while Dauth et al. (2021) restrict their sample to individuals aged 22-54.

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	83,627	19,970	4,578	85,170	7,889	2,521
(with partners)	(57,415)	(14,651)	(3,258)	(58,084)	(5,510)	(1,797)
	Panel A. Demographic Characteristics					
Age	38.44	39.53	38.91	38.61	38.60	39.34
Foreign-born	0.083	0.069	0.095	0.081	0.093	0.120
College educated	0.267	0.193	0.185	0.259	0.161	0.107
	Panel B. Marriage and Family Characteristics					
Single	0.346	0.297	0.312	0.299	0.311	0.286
Married	0.581	0.625	0.610	0.583	0.574	0.604
Widowed	0.004	0.005	–	0.014	0.013	0.015
Divorced	0.068	0.073	0.075	0.104	0.102	0.095
Has Partner	0.687	0.729	0.713	0.683	0.699	0.714
Has Children	0.426	0.439	0.433	0.432	0.358	0.374
Has Young Children	0.157	0.157	0.171	0.126	0.116	0.110
	Panel C. Labour Market Characteristics					
Part-time	0.062	0.019	0.029	0.409	0.212	0.200
Hours worked	42.19	42.37	41.95	31.56	35.59	35.84
Low-skill	0.243	0.144	0.144	0.605	0.404	0.340
Blue-collar	0.302	0.499	0.500	0.054	0.316	0.464
White-collar	0.455	0.356	0.355	0.341	0.279	0.196
	Panel D. Partner Characteristics					
Partner age	39.70	40.18	39.46	43.21	42.88	43.54
Partner hours worked	21.51	20.77	20.61	38.88	38.77	38.11
Partner manufacturing	0.103	0.177	0.195	0.232	0.425	0.444
Partner active	0.786	0.790	0.770	0.929	0.929	0.925
Partner employed	0.730	0.741	0.716	0.764	0.784	0.780
Partner self-employed	0.039	0.032	0.033	0.147	0.127	0.126
Partner unemployed	0.017	0.017	0.020	0.018	0.018	0.019
Partner inactive home	0.151	0.146	0.167	0.007	–	–

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 industries most exposed to Chinese import competition (Table A.1). Cells marked "–" are cases where average values have been suppressed because they were calculated with fewer than 10 individuals. Source is ONS Longitudinal Study.

part-time is just 6% (21% and 2% if employed in manufacturing). Consequently, men work on average longer hours than women (42 vs 32 hours per week). Men and women are also employed in different occupations, which we group into low-skill, blue-collar, and white-collar occupations.[8] Overall, 24% of men work in low-skill occupations, 46% work in white-collar occupations and 30% work in blue-collar occupations. By contrast, 61% of women work in low-skill occupations, 34% in white-collar occupations and only 5% in blue-collar occupations. A much larger proportion of workers of both sexes are employed in blue-collar occupations in highly trade-exposed industries (columns 3 and 6) and the fractions of workers in these occupations are more similar for men and women: 50% of men employed in trade-exposed industries are employed in blue-collar industries compared to 46% of women. However, men in highly trade-exposed industries are much more likely to work in white-collar roles (36% of men compared to 20% of women), while women in these industries are much more likely to work in low-skill occupations.

For LS members with partners, Panel D summarises partner characteristics. The average man's partner is 40 years old and works approximately 22 hours per week. 21% of men's partners are not active participants in the labour market.[9] Only 10% of men's partners are employed in manufacturing (rising to 18% for the partners of men who are themselves employed in manufacturing). By contrast, the average partner of women is 43 years old and works 38 hours per week. Only 7% of them are inactive and 23% work in manufacturing (43% for partners of women who themselves work in manufacturing).

3 Empirical Approach

Our analysis exploits the rapid increase in Chinese exports surrounding China's entry into the WTO in 2001. This increase has been attributed to a number of factors including a reduction in trade uncertainty (Handley & Limao, 2017), a reduction in the tariffs China itself charged on its imported inputs (Pierce & Schott, 2016; Amiti et al., 2020), the end of international import quotas under the multi-fibre agreement (Keller & Utar, 2022), as well as continued rapid Chinese productivity growth during this period.

In the UK, real imports from China increased from approximately £20 billion in 2001 to around £50 billion in 2011. This led to China doubling its share of UK imports from 5% to over 10%. The extent of that import competition varied substantially across industries. Appendix Table A.1 shows the 20 industries most affected by import competition be-

[8] 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".

[9] Of these, about 71% report being inactive because they are "looking after the home".

tween 2001-2011. Imports were concentrated in low-tech manufacturing such as textiles, furniture and machinery production (e.g., the manufacture of games and toys; luggage and handbags; footwear; leather), consistent with China's strong comparative advantage in labour-intensive activities during this period (Amiti & Freund, 2010).

Our empirical strategy uses this cross-industry variation, following Autor et al. (2013, 2014). For a worker i initially employed in industry j,[10] exposure to import competition IE_j^{UK} is defined as the growth in imports from China during 2001-2011 relative to that industry's total domestic sales (i.e., industry turnover plus UK imports minus UK exports):

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

We compare own and partner outcomes for workers with similar characteristics, but who were initially employed in industries with different levels of exposure to import competition. The baseline specification controls for age and gender, 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. The coefficient β captures the effect of increased import competition. The vector X_{ij,t_0} contains baseline controls for workers' gender, five-year age groups and their interaction with gender, and foreign-born status. We include 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).[11] 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.[12] In the household-level analysis, we additionally include partners' age, and occupation and industry fixed effects. 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. We scale eq. (1) by the interquartile range of exposure across all manufacturing workers, such that the reported coefficients 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 ex-

[10] Workers' initial industry is the 3-digit SIC92 code of their employer in 2001 (a total of 179 industries).

[11] We show in the robustness checks that the occupation controls turn out not to affect our results.

[12] There are 186 TTWAs. These are generated such that at least 75% of the area's resident workforce work in the area and at least 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).

posure from China between 2001-2011 was 3.96 percentage points, and the interquartile range was 5.87 (Table A.4).[13]

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

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

where the numerator is the change in imports from China from 2001 to 2011 to other non-UK high-income countries.[14] Equation (3) uses turnover, import and export levels from 1997, the earliest year in which we observe industry turnover, to avoid the potential endogeneity of using 2001 imports and sales that may have already been influenced by Chinese import growth.[15] The identifying assumption underlying the use of this instrument is that common patterns in Chinese trade across developed countries do not reflect correlated demand or technology shocks across high-income countries. While this cannot be ruled out completely, 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.[16]

We run several checks to confirm that our results do indeed reflect the effects of increased import competition rather than other factors. 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 in Appendix B. We find no evidence that workers employed in 1981 in industries that would later be exposed to Chinese import competition saw greater exits from manufacturing or a higher

[13] In the Appendix, we investigate the degree to which partners are differently affected by increased Chinese import competition. The exposure of partners in the same household tends to be low, at just 0.22 across all workers (Table A.5). This means that in most cases when an LS member is exposed to a large trade shock, their partner is employed in an unexposed industry.

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

[15] In the Appendix, we regress the value in eq. (1) on the value in eq. (3), which is equivalent to the first-stage regression. The results in Table A.2 and Table A.3 show that import growth for different industries in these other countries is highly predictive of UK import growth from China.

[16] 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 isolate supply and trade cost-driven changes in China's export performance. See Autor et al. (2013, 2014) for further details.

unemployment rate in 1991. The effects of future import competition on unemployment and manufacturing employment are slightly greater when we measure them for the 1991-2001 period but they remain small and statistically insignificant at 5%. This is not unexpected as the rapid growth in Chinese imports to the UK began towards the end of this later period.

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, which is true for all industries and specifically for manufacturing industries. We discuss further robustness checks in the next section.

4 Results

4.1 Individual Labour Responses to Import Competition

In this section, we report results on how rising exposure to Chinese import competition affects the labour market status of individual workers. Table 2 shows regression results for different labour market outcomes: employment in manufacturing, unemployment, employment in any industry, self-employment and being active in the labour force (columns (1)-(5), respectively). By construction, the coefficients in columns (2)-(4) (employment, self-employment and unemployment) sum to those in column (5) (activity). The regressions in all columns are estimated using 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. We also report the mean of the dependent variable for each outcome to benchmark the magnitudes of the effects relative to general trends.

Panel A shows the results for all workers in our sample. Exposure to Chinese import competition significantly decreases the probability of being employed in manufacturing and increases the probability of unemployment. 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 0.5 ppt (for comparison regarding the scale of this 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 probability of being in employment or self-employment.

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	-7.483***	0.480**	-0.736	0.296	0.039
	(2.243)	(0.235)	(0.604)	(0.282)	(0.399)
Mean Dep. Var.	-7.60	2.65	-28.35	7.50	-18.19
First-Stage *F*-stat	[32.12]	[32.12]	[32.12]	[32.12]	[32.12]
Observations	168,797	168,797	168,797	168,797	168,797
	Panel B. Men				
Import Exposure	-7.410***	0.802***	-1.116*	0.897**	0.583*
	(2.187)	(0.274)	(0.675)	(0.371)	(0.348)
Mean Dep. Var.	-10.14	3.24	-27.87	10.23	-14.39
First-Stage *F*-stat	[29.23]	[29.23]	[29.23]	[29.23]	[29.23]
Observations	83,627	83,627	83,627	83,627	83,627
	Panel C. Women				
Import Exposure	-5.801**	0.057	-0.117	-0.620	-0.681
	(2.314)	(0.309)	(0.721)	(0.388)	(0.542)
Mean Dep. Var.	-5.12	2.07	-28.82	4.81	-21.92
First-Stage *F*-stat	[35.25]	[35.25]	[35.25]	[35.25]	[35.25]
Observations	85,170	85,170	85,170	85,170	85,170

Notes: 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 a 2-digit occupation, 1-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) 3-digit industry level. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Source is ONS Longitudinal Study.

As we discuss further below, however, this masks considerable differences among gender and age groups. In addition, workers initially employed in import-competing industries only found new employment in different, typically worse-paid, occupations. In the Appendix (Table A.6), we report results on how import competition affected 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 lower-paid, low-skill occupations. These results are consistent with findings that workers exposed to the China shock experienced lower earnings growth, conditional on employment, as shown in the US (Autor et al., 2014), Denmark (Utar, 2018) and the UK (De Lyon & Pessoa, 2021).

Panels B and C of Table 2 show how the effects of import competition 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 employment in manufacturing, compared to a 5.8 percentage point decline in female manufacturing employment. For men, there is also a significant increase in unemployment, alongside an increase 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.

As we noted above, an advantage of our data is that we are able to follow transitions into self-employment, which cannot be observed in other administrative datasets which follow employees only. 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 were self-employed increased by 10.1 percentage points among men and 4.8 ppt among women. Our results suggest that for men, rising import competition contributed to this trend. Self-employment may have acted as an 'employment buffer' for male workers, allowing displaced workers to remain in work following the shock. While a one-unit increase in import exposure decreases the likelihood that men are employees in 2011 by 1.1 ppt, it increases the likelihood they are self-employed by 0.9 ppt. Our results indicate that for male workers, these transitions were an important 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.

In Table 3 we report results split by age ('young' workers aged 18-44 in 2001 and 'old' workers aged 45-59) and gender. The impact of import exposure on manufacturing employment is substantially stronger for young workers than for old, 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 9 ppt for young men (6.3 ppt for young women) relative to 5 ppt for old men (4.8 ppt for old women).

Table 3 also reveals substantial differences in the labour market responses of young and old men. While young male workers exposed to import competition are much less likely to be in work (increases in self-employment are not sufficient to compensate for decreases in employment), the opposite is true for old 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 this effect, we decompose the effects on economic inactivity according to different possible reasons: retirement, studying, looking after the home, sickness, and 'other' reasons. The results are reported in Table A.7. The key reason for higher rates of economic activity is the reduced probability of retirement. Increasing import exposure from the 25th to the 75th percentile of the distribution among manufacturing

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. Young Men				
Import Exposure	-8.946***	0.870**	-2.041***	0.766**	-0.405**
	(2.520)	(0.357)	(0.686)	(0.401)	(0.206)
Mean Dep. Var.	-7.64	3.45	-19.04	11.63	-3.96
First-Stage F-stat	[26.20]	[26.20]	[26.20]	[26.20]	[26.20]
Observations	56,472	56,472	56,472	56,472	56,472
	Panel B. Old Men				
Import Exposure	-5.018**	0.717**	0.564	1.018*	2.298**
	(2.087)	(0.313)	(0.972)	(0.593)	(0.895)
Mean Dep. Var.	-15.34	2.82	-46.23	7.32	-36.09
First-Stage F-stat	[35.32]	[35.32]	[35.32]	[35.32]	[35.32]
Observations	27,155	27,155	27,155	27,155	27,155
	Panel C. Young Women				
Import Exposure	-6.268***	0.317	-0.312	-0.685	-0.679
	(2.276)	(0.441)	(0.596)	(0.459)	(0.421)
Mean Dep. Var.	-4.68	2.47	-18.21	5.68	-10.05
First-Stage F-stat	[31.42]	[31.42]	[31.42]	[31.42]	[31.42]
Observations	56,800	56,800	56,800	56,800	56,800
	Panel B. Old Women				
Import Exposure	-4.843*	-0.425**	0.430	-0.526	-0.521
	(2.726)	(0.199)	(1.254)	(0.443)	(1.070)
Mean Dep. Var.	-5.99	1.28	-50.05	3.07	-45.69
First-Stage F-stat	[40.95]	[40.95]	[40.95]	[40.95]	[40.95]
Observations	28,370	28,370	28,370	28,370	28,370

Notes: see notes 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. 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.

workers decreases the likelihood of retirement in 2011 by 3.5 percentage points. This is consistent with the large increase in self-employment shown in Panel B (Table 3), as older self-employed workers are substantially more likely to stay in paid work longer, and less likely to retire (Crawford et al. (2021); Banks (2016)). Another possible reason for delayed retirement is to compensate for reduced earnings following displacement, or a wealth effect on lifetime labour supply. The use of delayed retirement to compensate for lower retirement savings due to job loss has been explored in life-cycle models including Stock & Wise (1990), Scheiber (1992) and Merkurieva (2019), but this phenomenon is relatively

underexplored in the context of responses to trade competition. For women, we do not find a significant effect on self-employment or retirement.

In the Appendix, we report a range of additional robustness checks. We summarise them in Table C.1 and Table 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 (R&D stock, capital intensity, the Routine Task Intensity (RTI)). These additional controls do not affect our main results. We also show that our results do not change if we exclude occupation fixed effects. Third, we assess the sensitivity of our results to another major contemporary trade shock, namely the accession to the European Union of a number of Eastern European countries in 2004.[17] Accounting for import competition with Eastern Europe does not alter our main findings. This is consistent with findings reported by Foliano & Riley (2017), who look at the labour market effects of exposure of local labour markets in the UK to different sources of import competition and find exposure to these two shocks to be largely uncorrelated. Finally, we examine 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.[18]

4.2 Effects of Import Competition on Family Outcomes

We now turn to consider the impacts of import competition on partnering and divorce. Changes in family formation and family stability may be an important mechanism through which labour market shocks can affect broader social outcomes, including for subsequent generations. Recent work documents how trade shocks affect family outcomes, and the findings appear to differ depending on the context. Focusing on individuals aged 18-39, Autor et al. (2019) show how US areas more exposed to Chinese import competition saw significantly lower marriage rates, lower fertility, and increased single-parenthood and child poverty. They link the declines in marriage rates to higher crime and greater mortality among men in affected areas. However, the effects differ according to whether shocks predominantly affected male or female workers in the local labour market. In labour markets where relatively more men were affected, marriage rates and fertility declined. In labour markets where relatively more women were affected, marriage rates and fertility increased. Consistent with this latter result, Keller & Utar (2022) find that female workers

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

[18] Autor et al. (2013) also find that incorporating changes in US exports to China had no effect on 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 both 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 (2021)).

in Denmark who were exposed to Chinese competition in the apparel sector were more likely to have children, drop out of the labour force and get married than other comparable workers. The effects were greater for women in their late 30s, with fewer remaining fertile years. Unlike Autor et al. (2019), however, they did not find effects on marriage and fertility for men affected by the shock, who were also more likely to return to work. They argue their results are consistent with a reduction in the opportunity costs of raising a family for women, particularly for women with a short time left on their 'biological clock'. In Germany, Giuntella et al. (2022) find that exposure to import competition from China and Eastern Europe in the 2000s led to lower fertility, while greater exposure to export opportunities to this region increased it. They also find a negative and marginally significant effect on divorce for females.

Table 4: The Effects of Import Exposure on Divorce and Partnering

	(1) Δ married (if unmarried)	(2) Δ divorced (if married)	(3) Δ has part. (if couple)	(4) Δ has part. (if not couple)	(5) Δ new partner (if couple)
	Panel A. Young Men				
Import Exposure	0.428	0.216	0.211	-0.351	0.651
	(1.122)	(0.693)	(0.436)	(0.859)	(0.553)
First-Stage F-stat	[21.22]	[30.42]	[28.66]	[21.16]	[27.88]
Observations	29,854	26,648	34,636	21,866	30,699
	Panel B. Old Men				
Import Exposure	-3.218***	0.754	-1.304	-2.639	-0.856
	(1.237)	(0.768)	(0.878)	(2.192)	(0.618)
First-Stage F-stat	[47.76]	[33.06]	[36.84]	[28.64]	[36.62]
Observations	5,233	21,930	22,844	4,319	21,184
	Panel C. Young Women				
Import Exposure	-0.083	-2.041***	0.553	1.358	-1.201***
	(1.211)	(0.655)	(0.573)	(1.229)	(0.458)
First-Stage F-stat	[30.24]	[33.31]	[30.17]	[34.34]	[31.24]
Observations	28,716	28,126	36,004	20,838	30,698
	Panel D. Old Women				
Import Exposure	1.906	-0.097	0.824	0.905	0.013
	(1.475)	(0.461)	(0.680)	(1.429)	(0.320)
First-Stage F-stat	[38.69]	[41.65]	[40.05]	[44.05]	[40.46]
Observations	6,878	21,498	22,227	6,149	19,647

Notes: see notes of Table 2 for a list of the controls and details on the IV. In column (5), 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. In this process, we lose a few observations, which is the reason why the number of observations between columns 3 and 5 differs. 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.

Table 4 shows how import competition affected family status, split again by age and

gender. Column (1) focuses on marriage. Different from Autor et al. (2019), we do not find evidence for the effects on the marriage rates of young men who were initially unmarried, or on the divorce rates of young men who were initially married. Among old men, singles in exposed industries are by contrast significantly less likely to get married.

Turning to divorce, the results in column (2) imply that import competition leads to a reduction in the likelihood that trade-affected (married) women under 45 get divorced, which is consistent with Keller & Utar (2022) and Giuntella et al. (2022).[19] In particular, a one-unit increase in exposure to import competition decreases the likelihood of divorce by 2 percentage points. This response is greater in the presence of children in the household (not reported), where the estimated coefficient increases to 2.64 (standard error 0.77). Similarly, we find that exposure to import competition means that married women under 45 are less likely to find and cohabit with a new partner (column (5)).

Unlike Keller & Utar (2022), we do not find significant effects of import exposure on fertility, measured as the count of children aged under 10 in the 2011 wave (not reported), nor do we find significantly greater reductions in labour force participation among young women. This suggests the lower divorce rate among young women we observe is not driven by a fall in the opportunity costs of starting a family. A possible explanation for lower divorce rates among young women is that, by reducing their future expected earnings, exposure to import competition may leave women more financially reliant on their current partners.

4.3 Family Labour Supply Responses to Import Competition

In this section, we look at the responses of partners of those affected by import competition. We restrict attention to the sample of 'stable' couples (i.e., those who remain in the same relationship over the period 2001-2011), defined as households with LS members who have a partner in both waves, and whose partners' characteristics (year of birth and gender) do not change across both waves. We focus on heterosexual couples – including non-heterosexual couples in the analysis does not substantially change the results.

The own and partner labour supply responses in response to import competition are shown for men in Table 5 and for women in Table 6. In these regressions, we include controls for partner characteristics (partner's age, occupation, and one-digit industry fixed effects), in addition to the previous controls used in Section 4.1.

Table 5 shows that men's partners do not increase their labour market activity to compensate for any earnings losses they may have experienced as a result of rising import competition. Effects on the likelihood their partners are in work are negative, small, and

[19] 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 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	-7.715***	0.580**	-0.697	1.298***	1.182***	-0.764	-0.581
	(2.153)	(0.236)	(0.657)	(0.395)	(0.402)	(0.616)	(0.433)
Mean Dep. Var.	-11.20	2.18	-28.69	10.20	-16.31	-7.01	-6.91
First-Stage F-stat	[30.98]	[30.98]	[30.98]	[30.98]	[30.98]	[30.98]	[30.98]
Observations	51,302	51,302	51,302	51,302	51,302	51,302	51,302
				Panel B. Young Men			
Import Exposure	-9.406***	0.628**	-2.336***	1.622***	-0.085	-0.907	-0.457
	(2.503)	(0.312)	(0.677)	(0.502)	(0.225)	(0.553)	(0.565)
Mean Dep. Var.	-8.26	2.12	-17.25	12.08	-3.05	4.55	4.85
First-Stage F-stat	[27.53]	[27.53]	[27.53]	[27.53]	[27.53]	[27.53]	[27.53]
Observations	30,277	30,277	30,277	30,277	30,277	30,277	30,277
				Panel C. Old Men			
Import Exposure	-5.917***	0.444	1.603	0.722	2.770***	-0.807	-1.018
	(2.215)	(0.304)	(1.322)	(0.746)	(0.945)	(1.336)	(1.239)
Mean Dep. Var.	-15.43	2.26	-45.17	7.50	-35.41	-23.67	-23.83
First-Stage F-stat	[36.55]	[36.55]	[36.55]	[36.55]	[36.55]	[36.55]	[36.55]
Observations	21,025	21,025	21,025	21,025	21,025	21,025	21,025

Notes: in addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation, and one-digit industry fixed effects. Standard errors clustered at the 3-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.

Table 6: 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	-6.424***	-0.251	-0.212	-0.646*	-1.108	1.249***	1.064***
	(2.436)	(0.237)	(0.906)	(0.359)	(0.740)	(0.403)	(0.399)
Mean Dep. Var.	-5.21	1.46	-30.34	4.86	-24.02	-14.89	-14.42
First-Stage F-stat	[35.49]	[35.49]	[35.49]	[35.49]	[35.49]	[35.49]	[35.49]
Observations	49,767	49,767	49,767	49,767	49,767	49,767	49,767
				Panel B. Young Women			
Import Exposure	-6.820***	0.091	-0.353	-0.711	-0.973	1.092**	0.703**
	(2.364)	(0.335)	(0.810)	(0.455)	(0.606)	(0.506)	(0.329)
Mean Dep. Var.	-4.83	1.74	-17.53	6.02	-9.78	-3.26	-2.57
First-Stage F-stat	[30.91]	[30.91]	[30.91]	[30.91]	[30.91]	[30.91]	[30.91]
Observations	30,289	30,289	30,289	30,289	30,289	30,289	30,289
				Panel C. Old Women			
Import Exposure	-5.720**	-0.779***	0.103	-0.598	-1.273	1.627*	1.802**
	(2.914)	(0.227)	(1.824)	(0.513)	(1.711)	(0.848)	(0.811)
Mean Dep. Var.	-5.79	1.03	-50.25	3.05	-46.17	-32.98	-32.85
First-Stage F-stat	[40.86]	[40.86]	[40.86]	[40.86]	[40.86]	[40.86]	[40.86]
Observations	19,478	19,478	19,478	19,478	19,478	19,478	19,478

Notes: in addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation and one-digit industry fixed effects. Standard errors clustered at the 3-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.

not significantly different from zero. This is true for both young and old subsamples, despite the fact that young men are more likely to be unemployed in 2011 if in an exposed industry in 2001. In the Appendix, we also investigate heterogeneity in responses across subsamples, including whether children are present in the household or not, and whether partners were initially active in the labour market, employed full-time or employed part-time. The results do not change when we restrict the sample to those with children or young children, remaining negative and statistically insignificant (Table A.11).

A potential explanation for the absence of an added worker effect among women is that women's labour market responses are restricted by social norms that men should be the 'breadwinners' in the couple, particularly if increasing labour supply would make the woman the couple's main earner (Bertrand et al., 2015). Another possible explanation is that the UK unemployment benefit system, based on means-tested benefits over this period, creates disincentives for women to enter the labour market if their male partners lose their jobs (Bredtmann et al., 2018).

The results are different when it comes to the responses of men in households where women are exposed to rising import competition (Table 6). The 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 1.2 ppt. The effects are stronger for older women, for whom each one-unit increase in import exposure results in a 1.6 ppt increase in their partner's employment. The responses of men to import competition affecting their partners shown in Table 6, 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 (when there is of course more scope to increase activity). Thus, increased activity at older ages by men appears to be a means of compensating for lost household earnings, whether they arise through shocks affecting men directly or through shocks affecting their partners.

Appendix Table A.9 and Table A.10 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 almost entirely driven by an increase in self-employment. Partners of older 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 2.4 ppt. In other words, older men respond to shocks affecting their partners by increasing labour supply on both intensive and extensive margins.

The results on male partners' labour supply (Table A.12) show that male responses to shocks affecting their partners are greatest for families where the youngest child was aged 5-10. 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 are 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.12, Panels B.1, B.2, and B.4, respectively). This implies that much of the increase in labour force participation for male partners of workers exposed to import competition is driven by the fact fewer men with exposed partners 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 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, suggesting this is unlikely to be driving our results. To further check this, we restrict our sample to cases where the partners of LS members are not employed in trade-exposed industries. The results are shown in Table C.3 and Table C.4 for women and Table C.5 and Table C.6 for men. The results are qualitatively similar to those in our main sample, implying that cross-partner correlations in import exposure are not driving our findings.

To summarise, our results suggest that household labour supply is a potentially important channel of insurance, especially for women exposed to trade shocks: partners increase labour force participation in the form of self-employment and reduce inactivity at older ages.

5 Conclusion

In this paper, we use linked census data to investigate the responses of households in England and Wales to increased Chinese import competition in the 2000s. In addition to studying the impact of this shock on individuals' employment in manufacturing and participation in the workforce, we study broader margins of adjustment at both the individual *and* the household level, including the shock's impact on self-employment, retirement, family formation and family stability, and family labour supply. Our analysis allows for heterogeneity by gender and age.

We have three key findings. First, we show that the decline in manufacturing that resulted from the trade shock not only led to an increase in unemployment, but also to an increase in self-employment among males, acting as a buffer for affected workers. This suggests that trade exposure may have contributed to the rise in self-employment observed in the UK over recent years. It also emphasises the importance for researchers of observing self-employment outcomes to understand worker adjustment mechanisms,

especially in settings – such as the UK – where self-employment is increasing and accounting for a substantial share of the workforce. Self-employment includes both solo self-employment and self-employment with employees; this distinction and the transitions across these self-employment outcomes, therefore, matter for the interpretation of the effects, and we leave this for future research. We also observe a delay in retirement behaviour among older males; this could either reflect more flexible retirement patterns associated with self-employment, or workers extending their working lives in response to earnings losses.

Second, we find that, in the UK, import competition significantly reduces the likelihood of divorce for married women below 45. However, we find no evidence that the divorce rates of married men exposed to import competition are affected. This contrasts with Autor et al. (2019), who find substantial effects of import competition on divorce and marriage rates in local labour markets where male-dominated industries are exposed to the trade shock. Our results thus suggest that the negative pattern of family breakdown and other social impacts following reductions in manufacturing employment in the US (e.g., Che et al. (2018) on crime, Pierce & Schott (2020) on 'deaths of despair') are not inevitable, but may rather depend on local labour market conditions, flexibility and institutions. One possibility is that the scale and nature of these broader social impacts depend on whether affected individuals transition into inactivity or move into other forms of employment. Future research is needed to understand the importance of this particular channel.

Third, we find an 'added worker effect' that men are significantly more likely to be working ten years later if their female partner was initially employed in an exposed industry. The stronger responsiveness of males here mirrors our finding on gender differences regarding their own response to trade shock exposure. The effect is larger for older men, who see greater reductions in inactivity in response to shocks affecting their partners.

Overall, we show there is substantial heterogeneity in labour market and life decisions in response to increased import competition by gender, age, and family type. Men and women do not respond to trade shocks in the same way, nor do they respond in the same way to shocks affecting their partners. Future research should investigate to what extent these differences are driven by differences in opportunities or differences in constraints, such as social norms. More generally, heterogeneity in responses to labour market shocks is important for understanding how they will affect gender inequality.

Understanding how different workers and their families adapt to trade shocks, and how responses differ across them, is important for understanding the welfare implications of such shocks and for designing appropriate policy responses. The findings on the partner responses suggest that the family plays an important part in providing insurance

to workers; individuals without strong intra-household insurance are likely to be more in need of public insurance.

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APPENDIX FOR:

Household Responses to Trade Shocks

Aitor Irastorza-Fadrique, Peter Levell & Matthias Parey

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 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***
	(0.161)	(0.182)	(0.179)
R^2	0.744	0.769	0.772
Sample Size	168,797	168,797	115,523
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 5 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	0.982***	0.973***	0.974***	1.141***	1.127***	1.132***
	(0.153)	(0.180)	(0.173)	(0.176)	(0.190)	(0.193)
R^2	0.717	0.740	0.743	0.787	0.817	0.818
Sample Size	83,627	83,627	57,431	85,170	85,170	58,092
	Panel C. Young Men			**Panel D. Young Women**		
Import Exposure IV	0.989***	0.983***	0.985***	1.117***	1.111***	1.121***
	(0.159)	(0.192)	(0.184)	(0.181)	(0.198)	(0.204)
R^2	0.722	0.742	0.747	0.779	0.809	0.808
Sample Size	56,472	56,472	34,605	56,800	56,800	35,951
	Panel E. Old Men			**Panel F. Old Women**		
Import Exposure IV	0.966***	0.952***	0.954***	1.188***	1.157***	1.148***
	(0.143)	(0.160)	(0.157)	(0.168)	(0.181)	(0.181)
R^2	0.708	0.739	0.742	0.802	0.834	0.834
Sample Size	27,155	27,155	22,826	28,370	28,370	22,141
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 3-digit industry level 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	0.65	3.96	12.10
P90, P10 interval	[0.91, 0.00]	[12.77, 0.09]	[20.25, 6.13]
P75, P25 interval	[0.00, 0.00]	[6.12, 0.25]	[14.34, 6.31]
Observations	168,797	27,859	7,099
	Panel B. Men		
Import Exposure	0.85	3.58	11.58
P90, P10 interval	[1.97, 0.00]	[10.74, 0.07]	[17.23,6.13]
P75, P25 interval	[0.00, 0.00]	[5.57, 0.25]	[14.34, 6.31]
Observations	83,627	19,790	4,578
	Panel C. Women		
Import Exposure	0.49	4.93	13.04
P90, P10 interval	[0.13, 0.00]	[14.34, 0.21]	[20.26, 6.14]
P75, P25 interval	[0.00, 0.00]	[6.31, 0.38]	[17.22, 9.00]
Observations	85,170	7,889	2,521

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	0.220	0.216
	151,228	19,836
Men	0.165	0.181
	67,190	13,849
Women	0.274	0.243
	84,038	5,987
Young Men	0.142	0.175
	38,290	8,145
Young Women	0.265	0.263
	53,348	3,892
Old Men	0.197	0.189
	28,900	5,704
Old Women	0.288	0.209
	30,690	2,095

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

Table A.6: Import Exposure and Labour Reallocation

	(1) Δ low-skill	(2) Δ blue-collar	(3) Δ white-collar
	Panel A. All		
Import Exposure	1.465***	-2.056***	0.590
	(0.444)	(0.633)	(0.789)
First-stage F-stat	[31.00]	[31.00]	[31.00]
Observations	133,605	133,605	133,605
	Panel B. Men		
Import Exposure	1.172**	-2.708***	1.536*
	(0.468)	(0.811)	(0.851)
First-stage F-stat	[28.21]	[28.21]	[28.21]
Observations	68,875	68,875	68,875
	Panel C. Women		
Import Exposure	1.151*	0.594	-1.745**
	(0.611)	(0.531)	(0.816)
First-Stage F-stat	[33.78]	[33.78]	[33.78]
Observations	64,730	64,730	64,730

Notes: 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". 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.

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. Young Men					
Import Exposure	0.405**	-0.036	-0.069	0.257**	0.111	0.143
	(0.206)	(0.121)	(0.073)	(0.112)	(0.167)	(0.102)
First-Stage F-stat	[26.20]	[26.20]	[26.20]	[26.20]	[26.20]	[26.20]
Observations	56,472	56,472	56,472	56,472	56,472	56,472
	Panel B. Old Men					
Import Exposure	-2.298**	-3.472***	-0.057	0.590**	0.079	0.562**
	(0.895)	(0.856)	(0.041)	(0.234)	(0.356)	(0.226)
First-Stage F-stat	[35.32]	[35.32]	[35.32]	[35.32]	[35.32]	[35.32]
Observations	27,155	27,155	27,155	27,155	27,155	27,155
	Panel C. Young Women					
Import Exposure	0.679	-0.059	0.085	0.319	-0.002	0.336
	(0.421)	(0.079)	(0.109)	(0.401)	(0.205)	(0.221)
First-Stage F-stat	[31.42]	[31.42]	[31.42]	[31.42]	[31.42]	[31.42]
Observations	56,800	56,800	56,800	56,800	56,800	56,800
	Panel D. Old Women					
Import Exposure	0.521	0.330	-0.127	0.447*	-0.052	-0.075
	(1.070)	(0.831)	(0.086)	(0.242)	(0.277)	(0.208)
First-Stage F-stat	[40.95]	[40.95]	[40.95]	[40.95]	[40.95]	[40.95]
Observations	28,370	28,370	28,370	28,370	28,370	28,370

Notes: this table considers the labour market outcome of being inactive out of the labour force (column (1)). This is then decomposed into columns (2)-(6) based on the reason they are not working: because they are retired (column (2)), studying (column (3)), looking after the home (column (4)), sick (column (5)), or for other reasons (column (6)). Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table A.8: 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 Stable Couples				
Import Exposure	-7.715***	0.580***	-0.697	1.298***	1.182***
	(2.153)	(0.236)	(0.657)	(0.395)	(0.402)
Mean Dep. Var.	-11.20	2.18	-28.69	10.20	-16.31
First-Stage F-stat	[30.98]	[30.98]	[30.98]	[30.98]	[30.98]
Observations	51,302	51,302	51,302	51,302	51,302
	Panel B. Single Men (in 2001 and 2011)				
Import Exposure	-7.837***	1.439**	-1.842*	0.769	0.336
	(2.263)	(0.702)	(1.072)	(0.995)	(0.995)
Mean Dep. Var.	-8.03	5.60	-24.84	10.35	-8.892
First-Stage F-stat	[27.62]	[27.62]	[27.62]	[27.62]	[27.62]
Observations	17,578	17,578	17,578	17,578	17,578
	Panel C. Women in Stable Couples				
Import Exposure	-6.424***	-0.251	-0.212	-0.646*	-1.108
	(2.436)	(0.237)	(0.906)	(0.359)	(0.740)
Mean Dep. Var.	-5.21	1.46	-30.34	4.86	-24.02
First-Stage F-stat	[35.49]	[35.49]	[35.49]	[35.49]	[35.49]
Observations	49,767	49,767	49,767	49,767	49,767
	Panel B. Single Women (in 2001 and 2011)				
Import Exposure	-5.842**	1.376*	-0.164	0.063	1.275
	(2.199)	(0.785)	(1.064)	(0.655)	(0.878)
Mean Dep. Var.	-5.23	3.53	-20.68	4.71	-12.44
First-Stage F-stat	[29.92]	[29.92]	[29.92]	[29.92]	[29.92]
Observations	14,639	14,639	14,639	14,639	14,639

Notes: panels A-C (stable couples) and B-D (single) represent different samples for men and women, respectively. Stable couples refer to those who remain in the same relationship over the period 2001-2011. Single refers to those who never married and were without a partner in both 2001 and 2011. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation, and one-digit industry fixed effects. Standard errors clustered at the 3-digit industry level are reported in parentheses. The mean dependent variable and first-stage F statistics are reported below. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table A.9: 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	-0.581	-0.764	-0.616	-0.149	-1.384
	(0.433)	(0.616)	(0.731)	(0.288)	(0.851)
Mean Dep. Var.	-6.91	-7.01	-9.20	2.19	3.51
First-Stage *F*-stat	[30.98]	[30.98]	[30.98]	[30.98]	[34.34]
Observations	51,302	51,302	51,302	51,302	30,773
	Panel B. Partners of Young Men				
Import Exposure	-0.457	-0.907	-0.613	-0.294	-0.683
	(0.565)	(0.553)	(0.608)	(0.479)	(0.951)
Mean Dep. Var.	4.85	4.55	1.17	3.38	2.82
First-Stage *F*-stat	[27.53]	[27.53]	[27.53]	[27.53]	[30.17]
Observations	30,277	30,277	30,277	30,277	20,556
	Panel C. Partners of Old Men				
Import Exposure	-1.018	-0.807	-0.777	-0.031	-3.012**
	(1.239)	(1.336)	(1.172)	(0.561)	(1.555)
Mean Dep. Var.	-23.83	-23.67	-24.13	0.47	4.88
First-Stage *F*-stat	[36.55]	[36.55]	[36.55]	[36.55]	[47.29]
Observations	21,025	21,025	21,025	21,025	10,217

Notes: panels A (partners of men), B (partners of young men), and C (partners of old men) represent different samples of analysis. All regressions include the full set of controls as discussed in Section 3. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation, and one-digit industry fixed effects. Standard errors clustered at the (SIC92) 3-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 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	1.064***	1.249***	0.115	1.134***	1.227**
	(0.399)	(0.403)	(0.576)	(0.436)	(0.508)
Mean Dep. Var.	-14.42	-14.89	-16.86	1.96	6.99
First-Stage F-stat	[35.49]	[35.49]	[35.49]	[35.49]	[34.27]
Observations	49,767	49,767	49,767	49,767	37,018
	Panel B. Partners of Young Women				
Import Exposure	0.703**	1.092**	-0.173	1.265**	0.690
	(0.329)	(0.506)	(1.095)	(0.572)	(0.448)
Mean Dep. Var.	-2.57	-3.26	-8.33	5.07	3.72
First-Stage F-stat	[30.91]	[30.91]	[30.91]	[30.91]	[31.73]
Observations	30,289	30,289	30,289	30,289	26,997
	Panel C. Partners of Old Women				
Import Exposure	1.803**	1.627*	0.790	0.837	2.437**
	(0.811)	(0.848)	(1.090)	(0.785)	(1.178)
Mean Dep. Var.	-32.86	-32.98	-30.11	-2.86	15.84
First-Stage F-stat	[40.86]	[40.86]	[40.86]	[40.86]	[38.68]
Observations	19,478	19,478	19,478	19,478	10,021

Notes: see Table A.9 for details about samples and controls. 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.

Table A.11: 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	-0.148	-0.596	-0.118	-0.478	-2.154	28,012
	(0.514)	(0.562)	(0.641)	(0.361)	(1.365)	[33.57]
(A.1.1) youngest child aged 0-4	-0.484	-0.712	-0.180	-0.532	-2.932*	11,178
	(0.779)	(0.701)	(0.859)	(0.533)	(1.721)	[31.19]
(A.1.2) youngest child aged 5-10	-0.164	-0.336	1.437	-1.773*	-1.485	7,142
	(1.613)	(1.529)	(1.724)	(0.930)	(1.841)	[34.25]
(A.2) those without children	-1.097	-0.931	-1.076	0.145	0.123	23,290
	(0.922)	(1.056)	(1.151)	(0.446)	(1.763)	[27.89]
Panel B. Partners' (Women) Labour Status in 2001						
(B.1) women active in 2001	-0.463	-0.925	-0.530	-0.396	-1.384	40,429
	(0.739)	(0.713)	(0.844)	(0.359)	(0.851)	[33.33]
(B.2) women in work in 2001	-0.474	-0.787	-0.462	-0.325	-1.384	39,607
	(0.761)	(0.738)	(0.880)	(0.366)	(0.851)	[32.26]
(B.3) women part-time in 2001	-0.809	-0.978	0.279	-1.257**	-0.926	18,517
	(0.949)	(0.872)	(1.090)	(0.633)	(1.345)	[35.39]
(B.4) women full-time in 2001	-0.324	-0.735	-1.039	0.304	-0.821	21,090
	(0.801)	(0.842)	(1.302)	(0.702)	(1.142)	[29.24]

Notes: all regressions include the set of controls discussed in Section 3. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation, and one-digit industry fixed effects. Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table A.12: 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	1.314***	1.300*	-0.105	1.405	1.404*	23,699
	(0.462)	(0.725)	(1.626)	(1.057)	(0.839)	[40.73]
(A.1.1) youngest child aged 0-4	0.841*	1.285*	1.417	-0.132	0.574	7,450
	(0.441)	(0.753)	(2.126)	(1.742)	(1.176)	[43.12]
(A.1.2) youngest child aged 5-10	1.661**	2.296**	-1.549	3.846**	1.871	6,371
	(0.781)	(0.996)	(1.658)	(1.768)	(1.190)	[34.07]
(A.2) those without a dependent child	0.831	1.209**	0.359	0.850	1.016*	26,070
	(0.516)	(0.477)	(0.953)	(0.902)	(0.544)	[29.94]
Panel B. Partners' (Men) Labour Status in 2001						
(B.1) men active in 2001	1.021***	1.358***	-0.023	1.381***	1.227**	46,543
	(0.391)	(0.394)	(0.613)	(0.489)	(0.508)	[34.30]
(B.2) men in work in 2001	0.913**	1.257***	-0.068	1.325**	1.227**	45723
	(0.406)	(0.372)	(0.637)	(0.541)	(0.508)	[34.22]
(B.3) men part-time in 2001	-0.024	1.889	-6.353	8.242	5.865	2,117
	(1.973)	(2.101)	(5.276)	(5.160)	(3.721)	[35.87]
(B.4) men full-time in 2001	0.919**	1.201***	0.191	1.011	1.016**	43,606
	(0.422)	(0.357)	(0.706)	(0.615)	(0.457)	[33.54]

Notes: all regressions include the set of controls discussed in Section 3. In addition to the controls described in the notes of Table 2, all regressions control for partner characteristics: partners' age, occupation, and one-digit industry fixed effects. Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

B Placebo Checks

Figure B.1: Placebo Exercise. Manufacturing Employment.

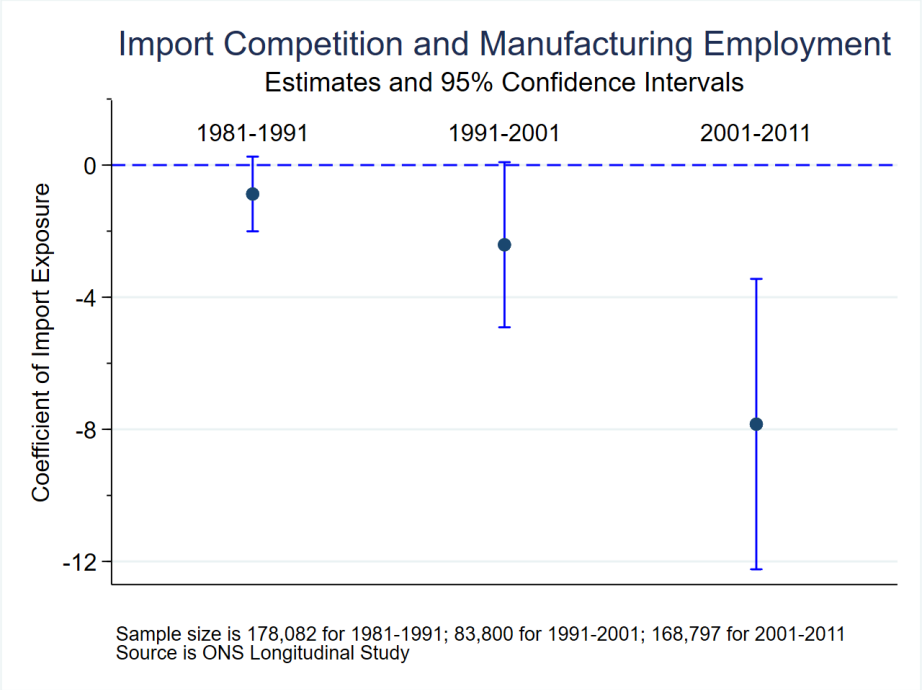

Figure B.2: Placebo Exercise. Unemployment.

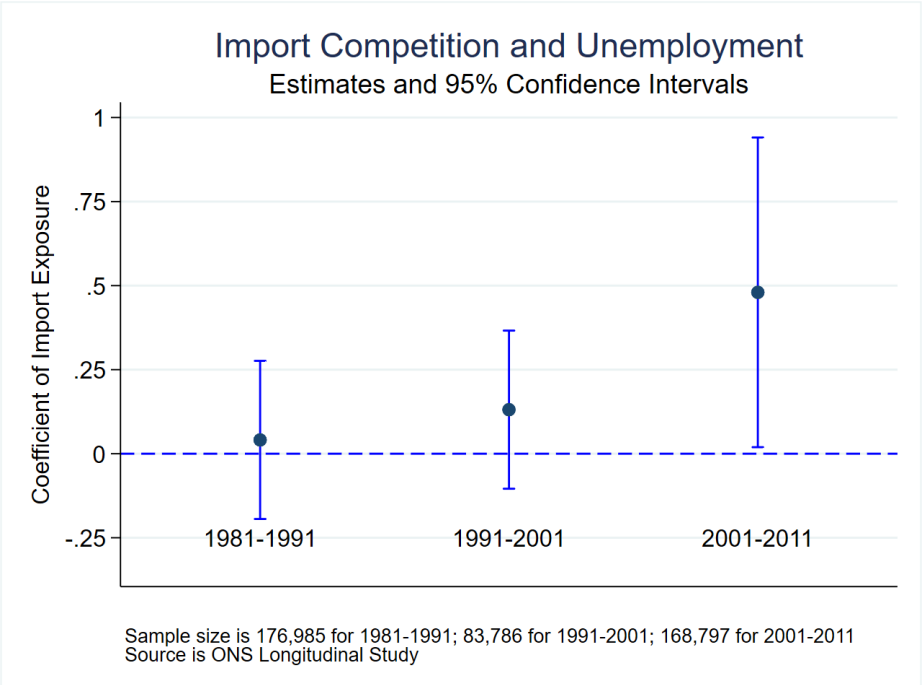

Table B.1: Placebo Exercise. 1981-1991.

	(1) Δ manuf	(2) Δ unempl	(3) Δ in work	(4) Δ active
	Panel A. All			
Import Exposure	-0.875	0.041	0.115	0.106
	(0.577)	(0.120)	(0.215)	(0.179)
First-Stage F-stat	[17.53]	[17.51]	[17.51]	[17.49]
Observations	178,082	176,985	176,985	178,066
	Panel B. Men			
Import Exposure	-0.526	-0.033	0.402	0.330*
	(0.659)	(0.155)	(0.245)	(0.192)
First-Stage F-stat	[24.12]	[23.92]	[23.92]	[24.00]
Observations	104,523	103,822	103,822	104,512
	Panel C. Women			
Import Exposure	0.176	0.153	0.216	0.294
	(0.449)	(0.126)	(0.292)	(0.297)
First-Stage F-stat	[12.68]	[12.76]	[12.76]	[12.68]
Observations	73,559	73,163	73,163	73,554

Notes: 'being in work' cannot be decomposed between being in work as an employee and being self-employed in 1981. Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table B.2: Placebo Exercise. 1991-2001.

	(1) Δ manuf	(2) Δ unempl	(3) Δ in work	(4) Δ empl	(5) Δ self-empl	(6) Δ active
			Panel A. All			
Import Exposure	-2.412*	0.131	-0.391	-0.452	0.060	-0.261
	(1.275)	(0.120)	(0.298)	(0.406)	(0.225)	(0.289)
First-Stage F-stat	[76.98]	[76.98]	[76.98]	[76.98]	[76.98]	[76.98]
Observations	83,786	83,786	83,786	83,786	83,786	83,786
			Panel B. Men			
Import Exposure	-2.957*	0.027	-0.035	-0.616	0.580	-0.008
	(1.730)	(0.203)	(0.354)	(0.594)	(0.505)	(0.371)
First-Stage F-stat	[83.54]	[83.54]	[83.54]	[83.54]	[83.54]	[83.54]
Observations	50,484	50,484	50,484	50,484	50,484	50,484
			Panel C. Women			
Import Exposure	-0.187	0.258	-0.598	-0.062	-0.536	-0.341
	(0.417)	(0.230)	(0.367)	(0.682)	(0.386)	(0.347)
First-Stage F-stat	[59.35]	[59.35]	[59.35]	[59.35]	[59.35]	[59.35]
Observations	33,302	33,302	33,302	33,302	33,302	33,302

Notes: standard errors clustered at the 3-digit industry level reported in parentheses.
*p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

C Further Robustness Checks

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

	Panel A. Manufacturing Employment.			Panel B. Unemployment.		
	Men	Young Men	Old Men	Men	Young Men	Old Men
A. Excluding EU countries	-7.587***	-9.264***	-5.024**	0.830***	0.913**	0.721**
	(2.223)	(2.605)	(2.032)	(0.288)	(0.383)	(0.313)
B. Adding industry controls	-7.495***	-9.132***	-4.919**	0.816***	0.884**	0.714**
	(2.149)	(2.525)	(1.968)	(0.281)	(0.366)	(0.324)
C. Adding occupation controls	-7.424***	-8.952***	-5.056**	0.811***	0.885**	0.717**
	(2.186)	(2.517)	(2.086)	(0.273)	(0.356)	(0.315)
D. No occupation fixed effects	-7.591***	-9.134***	-5.138**	0.757***	0.892**	0.681**
	(2.295)	(2.632)	(2.184)	(0.262)	(0.337)	(0.316)
E. Trade with Eastern Europe	-6.433**	-8.272***	-3.524	0.738**	0.804*	0.627
	(2.575)	(2.804)	(2.607)	(0.350)	(0.456)	(0.383)
F. Export Exposure	-7.269***	-8.645***	-5.065**	0.769***	0.789**	0.748**
	(2.271)	(2.591)	(2.147)	(0.261)	(0.347)	(0.339)
	Panel C. Employment.			Panel D. Self-Employment.		
	Men	Young Men	Old Men	Men	Young Men	Old Men
A. Excluding EU countries	-1.179*	-2.138***	0.630	0.881**	0.744*	0.976
	(0.697)	(0.670)	(1.064)	(0.376)	(0.392)	(0.642)
B. Adding industry controls	-1.004	-1.842***	0.612	0.678*	0.526	0.826
	(0.676)	(0.663)	(1.024)	(0.379)	(0.385)	(0.583)
C. Adding occupation controls	-1.121*	-2.064***	0.607	0.881**	0.763*	0.964*
	(0.668)	(0.685)	(0.957)	(0.273)	(0.404)	(0.583)
D. No occupation fixed effects	-1.019	-1.820**	0.407	0.902**	0.698*	1.205*
	(0.717)	(0.779)	(1.005)	(0.416)	(0.414)	(0.666)
E. Trade with Eastern Europe	-1.312	-2.206**	0.237	1.389***	1.127**	1.809***
	(0.851)	(0.923)	(1.056)	(0.452)	(0.491)	(0.699)
F. Export Exposure	-1.059	-1.845***	0.444	0.800**	0.645	0.959
	(0.688)	(0.702)	(0.999)	(0.384)	(0.436)	(0.588)

Notes: sample size is 83,627 for men; 56,472 for young men; and 27,155 for old men. This table summarises the robustness checks for our main results. A excludes European Union countries when constructing eq. (3). B and C consider a richer set of industry- and occupation-specific controls: R&D stock, capital intensity, and the Routine Task Intensity (RTI). D does not include occupation fixed effects. E accounts for import competition with Easter Europe. F accounts for export exposure. Standard errors clustered at the 3-digit industry level 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	Young Women	Old Women	Women	Young Women	Old Women
A. Excluding EU countries	-5.830**	-6.483***	-4.519*	0.110	0.365	-0.376*
	(2.315)	(2.340)	(2.670)	(0.332)	(0.463)	(0.223)
B. Adding industry controls	-5.823***	-6.319***	-4.768*	0.056	0.331	-0.475**
	(2.246)	(2.215)	(2.640)	(0.309)	(0.439)	(0.203)
C. Adding occupation controls	-5.823**	-6.283***	-4.879*	0.048	0.315	-0.453**
	(2.314)	(2.275)	(2.728)	(0.312)	(0.441)	(0.200)
D. No occupation fixed effects	-5.865**	-6.262***	-5.013*	0.106	0.384	-0.398**
	(2.545)	(2.395)	(2.917)	(0.301)	(0.437)	(0.197)
E. Trade with Eastern Europe	-5.943**	-6.591***	-4.760	0.034	0.318	-0.457**
	(2.427)	(2.328)	(2.905)	(0.263)	(0.382)	(0.181)
F. Export Exposure	-5.748**	-6.098**	-4.980*	0.071	0.333	-0.415**
	(2.405)	(2.391)	(2.780)	(0.309)	(0.442)	(0.204)
	Panel C. Employment.			Panel D. Self-Employment.		
	Women	Young Women	Old Women	Women	Young Women	Old Women
A. Excluding EU countries	-0.073	-0.460	0.834	-0.615	0.642	-0.583
	(0.751)	(0.654)	(1.304)	(0.379)	(0.461)	(0.458)
B. Adding industry controls	0.011	-0.099	0.370	-0.724*	-0.813*	-0.583
	(0.717)	(0.583)	(1.262)	(0.386)	(0.460)	(0.441)
C. Adding occupation controls	-0.097	-0.301	0.470	-0.627	-0.687	-0.542
	(0.716)	(0.596)	(1.232)	(0.390)	(0.461)	(0.439)
D. No occupation fixed effects	-0.165	-0.296	0.132	-0.809*	-0.886*	-0.657
	(0.747)	(0.628)	(1.277)	(0.435)	(0.502)	(0.488)
E. Trade with Eastern Europe	-0.358	-0.425	0.051	-0.395	-0.451	-0.330
	(0.713)	(0.604)	(1.134)	(0.339)	(0.404)	(0.377)
F. Export Exposure	-0.114	-0.171	0.247	-0.696*	-0.827*	-0.513
	(0.729)	(0.604)	(1.219)	(0.400)	(0.457)	(0.444)

Notes: sample size is 85,170 for women; 56,800 for young women; and 28,370 for old women. See notes in Table C.1 for details.
*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 Women's Labour Supply Responses (I)

	(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. Men				
Import Exposure	-0.009	-0.213	0.266	-0.478	-1.335
	(0.775)	(0.689)	(0.838)	(0.412)	(0.817)
First-Stage F-stat	[31.99]	[31.99]	[31.99]	[31.99]	[33.53]
Observations	36,515	36,515	36,515	36,515	28,398
	Panel B. Young Men				
Import Exposure	-0.240	-0.692	-0.137	-0.555	-1.049
	(0.472)	(0.516)	(0.687)	(0.648)	(1.123)
First-Stage F-stat	[28.37]	[28.37]	[28.37]	[28.37]	[29.07]
Observations	21,459	21,459	21,459	21,459	18,942
	Panel C. Old Men				
Import Exposure	0.135	0.353	0.805	-0.218	-2.018
	(1.691)	(1.620)	(1.439)	(0.330)	(1.523)
First-Stage F-stat	[38.69]	[38.69]	[38.69]	[38.69]	[47.65]
Observations	15,056	15,056	15,056	15,056	9,456

Notes: standard errors clustered at the 3-digit industry level 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 Women's Labour Supply Responses (II)

	(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 dependent child	-0.132	-0.382	0.657	-1.039	-2.025	18,985
	(0.598)	(0.665)	(0.733)	(0.583)	(1.382)	[35.65]
(A.1.1) dependent child aged 0-4	-0.511	-1.324	0.368	-1.692*	-3.063	6,270
	(0.795)	(0.845)	(1.095)	(0.922)	(2.045)	[42.60]
(A.1.2) dependent child aged 5-10	0.482	0.970	3.272**	-2.302	-0.530	5,205
	(1.454)	(1.571)	(1.436)	(1.445)	(1.973)	[31.66]
(A.2) those without a dependent child	0.185	-0.019	-0.136	0.116	0.196	17,530
	(1.395)	(1.264)	(1.477)	(0.522)	(1.765)	[28.65]
Panel B. Partners' Labour Status in 2001						
(B.1) partner active in 2001	-0.009	-0.213	0.266	-0.478	-1.335	36,515
	(0.775)	(0.689)	(0.838)	(0.412)	(0.817)	[31.99]
(B.2) partner in work in 2001	-0.009	-0.213	0.266	-0.478	-1.335	36,515
	(0.775)	(0.689)	(0.838)	(0.412)	(0.817)	[31.99]
(B.3) partner part-time in 2001	-0.813	-0.926	0.556	-1.482**	-0.875	17,657
	(0.953)	(0.883)	(1.102)	(0.673)	(1.616)	[33.83]
(B.4) partner full-time in 2001	0.639	0.366	-0.048	0.413	-1.001	18,858
	(0.904)	(0.821)	(1.430)	(0.876)	(1.111)	[29.29]

Notes: rows B.1 and B.2 are the same as the partner being not exposed is conditional on reporting the industry of employment (hence, the partner needs to be active and in work). Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table C.5: Robustness Sample. Partner Not Exposed to Import Competition. Import Exposure and Men's Labour Supply Responses (I)

	(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. Women				
Import Exposure	0.943***	1.269***	0.468	0.802	1.340***
	(0.456)	(0.495)	(0.733)	(0.614)	(0.399)
First-Stage F-stat	[31.38]	[31.38]	[31.38]	[31.38]	[31.50]
Observations	37,221	37,221	37,221	37,221	30,159
	Panel B. Young Women				
Import Exposure	0.398	0.863	-0.191	1.054	1.000*
	(0.488)	(0.549)	(1.258)	(0.995)	(0.546)
First-Stage F-stat	[25.97]	[25.97]	[25.97]	[25.97]	[27.53]
Observations	23,554	23,554	23,554	23,554	22,018
	Panel C. Old Women				
Import Exposure	2.441*	2.476*	2.162*	0.314	2.216**
	(1.343)	(1.387)	(1.306)	(0.814)	(0.970)
First-Stage F-stat	[39.75]	[39.75]	[39.75]	[39.75]	[39.33]
Observations	13,667	13,667	13,667	13,667	8,141

Notes: standard errors clustered at the 3-digit industry level reported in parentheses.
*p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.

Table C.6: Robustness Sample. Partner Not Exposed to Import Competition.
Import Exposure and Men's Labour Supply Responses (II)

	(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 dependent child	1.577***	0.893	0.009	0.884	1.610*	18,194
	(0.461)	(0.929)	(1.993)	(1.433)	(0.961)	[42.12]
(A.1.1) dependent child aged 0-4	1.312**	1.621**	2.523	-0.902	1.496	5,807
	(0.528)	(0.704)	(2.329)	(2.103)	(1.553)	[41.40]
(A.1.2) dependent child aged 5-10	2.631***	2.603*	-1.373	3.975	0.687	4,868
	(0.982)	(1.362)	(2.841)	(2.722)	(2.648)	[37.97]
(A.2) those without a dependent child	0.492	1.594**	1.010	0.584	1.149	19,027
	(0.734)	(0.694)	(1.136)	(1.058)	(0.702)	[24.29]
Panel B. Partners' Labour Status in 2001						
(B.1) partner active in 2001	0.943**	1.269**	0.468	0.802	1.340**	37,221
	(0.456)	(0.495)	(0.733)	(0.614)	(0.399)	[31.38]
(B.2) partner in work in 2001	0.943**	1.269**	0.468	0.802	1.340**	37,221
	(0.456)	(0.495)	(0.733)	(0.614)	(0.399)	[31.38]
(B.3) partner part-time in 2001	-1.437	1.677	0.113	1.565	13.84**	1,882
	(2.630)	(3.012)	(6.436)	(5.768)	(6.943)	[39.71]
(B.4) partner full-time in 2001	0.930**	1.165**	0.446	0.719	1.119***	35,339
	(0.456)	(0.462)	(0.713)	(0.680)	(0.410)	[31.17]

Notes: rows B.1 and B.2 are the same as the partner being not exposed is conditional on reporting the industry of employment (hence, the partner needs to be active and in work). Standard errors clustered at the 3-digit industry level reported in parentheses. *p $<$ 0.1, **p $<$ 0.05, ***p $<$ 0.01. Source is ONS Longitudinal Study.