Putting trade and births together: Estimating the effects of globalization on fertility

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Abstract

The paper presents an analysis of the relationship between globalisation and fertility. Globalisation is measured in terms of exposure to international trade, which is held up against individuals' decision making in terms of childbearing. The underlying hypothesis is that higher levels of international competition affects fertility behaviour in a negative way. The hypothesis is tested by using the British Household Panel Survey whereas exposure to international trade is accounted in terms of Import Competition Shocks from China. Using an Instrumental Variable approach, we show that those women who work in an industry that faced a higher level of competition from China have a lower probability of having a child. The results are supplemented by several robustness checks that confirm the main analysis.

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Introduction

The sustained decline in world-wide fertility which began in the last decades of the XIX century and gained momentum between the 1950s and the 1960s, is one of the most important and profound demographic changes in recent human history. In this paper we investigate whether and how globalization, and more specifically international trade, play a role in explaining this fertility decline.

In the realm of globalization, where international convergence is a key tenet, it is tempting to conclude that the global fertility decline is one of its outcomes. Indeed, the opening of borders and ever increasing communications across societies, should encourage convergence through sharing of ideas and behaviour. As a matter of fact, much has been written about globalization and how it may affect our lives and the future of our societies, but this literature is often imprecise about what this construct actually entails, and it is not always clear on the causal pathways from globalization to specific events and behaviours. Most would think of globalization as the world becoming more integrated and interconnected in a range spheres. However, the original idea of the term globalization refers to the diffusion of international trade and when globalization is used as an argument for economic growth, it is usually referred to the idea of greater openness in trade.

Our study draw on different strands in the literature. The first refers to demographic studies concerned with explaining and theorising the great demographic changes during the 20^{th} century. Many of those studies do in fact address the connection between globalization and fertility, since they investigate how the diffusion of new customs, ideas or social norms across the world has contributed to modifying individuals' habits and preferences (Inglehart, 1977; Van De Kaa, 1987). One first contribution in this sense was proposed by (Davis, 1937), who suggested that changes in the structure of society would result in a ripening "incongruity" between family and the industrial economy that would cause a reduction of fertility. Other studies are being more concrete and investigate the link between globalization and fertility, attempting to explain any source of correlation between the two. Among them,

(Caldwell, 2001) proposes a theory by which globalization has a role in the reduction of fertility by changing the economic structure of a country and hence its social and demographic habits.

The second strand refers to a large body of studies that considers the effect of changing labour markets on fertility, which we present in more detail later on in the paper. A third and final line of relevant literature stems from international economics. International trade has historically been one of the main drivers of development and economic growth in the post-modern world and today it constitutes the channel through which most of the goods we make use of every day are made available to us. Starting from Adam Smith's *Wealth of Nations* (1776) – where the notion of benefits from trade was first introduced, there is no surprise that economists have produced a large body of literature on how trade affects the well being of nations and its people. This literature even touches on the topic of fertility (see for example Gries & Grundmann, 2014; Do, Levchenko, & Raddatz, 2016), though arguments are based on a Ricardian comparative advantage framework where countries specialize in either female-labor-intensive or male-labor-intensive goods.

This paper makes a first step in using a precise measure of globalization to establish how it relates to individuals' likelihood of having children. In particular, we exploit the large increase in imports from China after its entry into the WTO in December of 2001. Our empirical strategy follows the Import Competition Shock (ICS) framework. This was first proposed by Autor et al. (2013) and employed for analysing the effect of increased international trade on various outcomes of interest. The relevance of the ICS framework in empirical studies comes from the fact that it allows to identify an exogenous source of variation in the data – the rapid increase in Chinese importance in international trade – and use it to measure the exposure of people working in a certain industry or region and link it to the consequences of globalization. While we will discuss more in depth this measure later on, its crucial advantage is easily summarised: when a relationship between a change in exposure to trade (measured by the ICS) and another outcome variable is observed, it is possible, under certain conditions, to claim that such relationship is of causal nature.

The results we find point to a significant negative effect of trade-shocks on fertility: the more a woman's sector of employment is exposed to import competition from China, the lower the probability that she will have a child in the following years. This may be due to a number of different causes which we discuss, but it suggests that there exists a hidden cost of globalization that is not taken into account. The rest of this paper is structured as follows: in the next section, we will discuss the theoretical background related to employment and fertility, afterwards we present the data and the methodology used, underlining the importance of the Import Competition Shock framework and carefully explaining the reasons for the necessity of utilising an instrumental variable and the motivations behind adopting the one we utilised. Then, we describe the results of our regression analysis, explaining why we can claim that we are measuring a causal effect, as well as underlining possible alternative explanations for our result. Furthermore, we present several sensitivity analysis to show the robustness of our results.

Background

The broad picture of global fertility trends would suggest a convergence towards low fertility, a concept that brings resonance with the more general literature of globalization. The existing literature share two commonalities. First, most studies on the fertility-transition underline the astonishing comprehensiveness of this trend, recognising it as a truly global process (Van De Kaa, 1987; Lesthaeghe, 2007). Secondly, the studies underline the central importance of women in the decision-making processes determining fertility, which have given rise to the term "globalization of fertility behavior" of women (Caldwell, 2001). Aside from the obvious biological burden related to childbearing and birth, indeed, women face significantly higher social, economic and psychological trade-offs when committing to the decision of raising a child with respect to men. Factors constraining the ability of women to develop a successful and satisfactory professional career are fundamental in driving fertility decline. Starting in the late 1980s, a large body of studies aimed at explaining the root causes behind the sustained fertility decline (Van De Kaa, 1987; Lesthaeghe, 2007; McDon-

ald, 2013; Esping-Andersen & Billari, 2015). Many other studies emphasised massive family planning programs as a turning point, thereby spurring sustained fertility decline in developing countries. Yet other studies reconcile the global drop in fertility with the diffusion of new social and cultural values (Inglehart & Baker, 2000). Other studies document the connection between the new demographic habits and economic development, analysing how differences in labor-market institutions, wage growth and income redistribution policies generate economic trade-offs for women that affect their decisions regarding childbearing and the number of children to have.

Meanwhile, an important body of research has focused on the potential costs of trade-openness. This literature has developed in recent years within the field of economics, as a response to the overly enthusiastic pro-globalization wave that had characterised the 1980s and 90s. An introductory contribution in this respect had already been presented by Stolper and Samuelson (1941), who, using the Hecksher-Ohlin model of trade, showed that a potentially large group of citizens may suffer losses from trade as their salaries fall or their jobs get displaced due to competition from abroad. More recently, empirical analysis spearheaded by Autor et al. (2013; 2014; 2016), (Dauth, Findeisen, & Suedekum, 2014) and (Bloom, Draca, & Van Reenen, 2016), show how globalization and trade have affected individual labour market outcomes such as unemployment, labour-force participation and job vacancies in the past decades. Furthermore, it has been shown that additionally to increasing the probability of being either unemployed or inactive, the ICS is also been linked to an increase in risky and damaging behaviours, higher levels of mental distress and lower workers' health. Therefore, this shock can be thought as an increase in job insecurity and a decrease of subjective well being, i.e. workers who operate within a sector that has a higher exposure to import competition from China should feel a higher level of job insecurity and a lower level of subjective well being (for a full literature review of ICS read Autor et al., 2013; Dorn, Hanson, et al., 2018)

Whereas this study breaks grounds in the sense that it establishes estimates of a more causal nature of globalization on fertility, there is a relevant literature concerning the effects

of economic shocks on fertility. This line of studies are informative for our analysis, and within this rather large literature, there is yet again a subgroup of studies that focus in on the impact of unemployment on fertility behaviour (Currie & Schwandt, 2014). However, a great deal of these studies consider aggregate-level analyses of changes in total fertility rates (TFRs) in response to changing unemployment rates and female labour force participation across the OECD countries (e.g. Brewster & Rindfuss, 2000; Ahn & Mira, 2002; Adsera, 2004; Engelhardt & Prskawetz, 2004; Esping-Andersen, 2009; Sobotka, Skirbekk, & Philipov, 2011). Others, though smaller in numbers, consider how an individual's unemployment experience and fertility behaviour are related (e.g. Kravdal et al., 2002; Tölke & Diewald, 2003; Adsera, 2005; González & Jurado-Guerrero, 2006; Kreyenfeld, 2009; Özcan, Mayer, & Luedicke, 2010; Adsera, 2011; Kreyenfeld & Andersson, 2014). Out of these, perhaps the most relevant ones are those where unemployment comes about from exogenous shocks, and therefore aiming at establishing estimates of a more causal nature. Andersen and Ozcan (2011) make use of firm and plant closures in Denmark as an exogenous source of unemployment status, and analyse how unemployment that results from this kind of job displacement affects the timing of the birth of an individual's first and second child. Lindo (2010) used the husband's job loss as a negative shock to the family's income to estimate the wife's fertility response. Del Bono, Weber, and Winter-Ebmer (2012) analysed the effects of all career interruptions due to job displacements (irrespective of unemployment experience) on individuals' fertility levels.

Data

We take as units of observation individuals working in different industries in the UK manufacturing sector and we check whether an increased degree of competition changes the probability of having a child in the following years. Hence, three elements are needed: data on individual characteristics, including the sector in which the individual works, data on fertility, and third, a measure of the degree of competition for each sector. For the first two, we rely on the British Household Panel Survey, BHPS, while for the latter we calculate the Import Competition Shock by using data from COMTRADE.

The British Household Panel Survey, is a database that covers a representative sample of the British population aged 16 and more from 1991 to 2008, for a total of 18 waves. Each individual is interviewed every year. Furthermore, the survey is household based, meaning that each person within a household is interviewed yearly. If an individual leaves the original household to form a new one, he or she keeps being interviewed and all the new family members become part of the survey. For the purpose of this analysis, we used the eight waves from 2001 to 2008.

The BHPS contains all the individual-level information needed for our study, featuring for each year:

- the **industry** in which each individual is employed, reported using the Standard Industry Classification of 1992 (SIC92), which has a coding frame identical to the European Community Classification of Economic Activity (NACE Rev. 1.1);
- the **number of children** born in an individual's family;
- **demographic variables**, such as sex and age, which we use to screen our data or as control variables in our regressions;
- the **education** of each individual.

We restrict our investigation to individuals who work in the manufacturing sector. This sector has felt the impact of a jump in in international trade and globalization given the entry of China in the WTO more than any other. However, the nature of the sub-sectors differ, and not all of them have been impacted in the same way. That said, the sample is relatively homogeneous in terms of skills-composition of the workforce. The sector is identified by the two digit NACE code, which ranges from 15 to 36. We also restrict our sample to individuals aged between 18 and 50 years of age. This is done in order to keep observations who are in the childbearing age.

Childbearing decisions are relatively inelastic to short-term changes in trade intensity. A one-year change in import competition may not have a strong and immediate effect in

terms of the probability of having a child in the same year. Childbearing typically takes a great deal of planning, and will have long term effects on the individuals' lives. Moreover, period-fertility measures relating to a short time frame such as one year, might yield unreliable estimates when related in time to another indicator, due to the 9-months gap between the decision of conceiving and the actual birth and to possible birth-postponement effects which could result as missing births in the data. In other words, a panel structure where the number of children born in a given year is regressed on the import shock in that year's sector of occupation, may not reflect the actual impact of the import shock. As a result, we select the 2001–2005 five-year period to analyze the main employment sector of each woman, for then to consider the subsequent 2006–2008 three-years period in terms of childbearing events. The choice for these particular time intervals is partly dictated by data availability but it certainly fits well the objective of our study. On the one hand, 2001 represents a watershed year in terms of trade bonds between developed countries and China, as on December 11$^{\text{th}}$ of that year, China officially entered the WTO and accelerated its still ongoing commercial expansion with the rest of the world. On the other hand, limiting the dependent-variable reference period to 2006-2008 allows us to avoid the inclusion of potential distortions in fertility trends due to the economic crisis (Sobotka et al., 2011).

From the first half of our partitioned data set, we identify the industry in which each individual has worked most years during the 2001-2005 time period. We account for the fact of losing a job in the manufacturing industry, both to another industry or to unemployment. The motivation for doing this is to ensure that workers who were employed in the manufacturing sector and who have been either fired or had to change sector the next year are considered, as it is possible that this change is due to international competition.

From the second half of our data set, we derive a dummy variable indicating whether a person has had a new child in the period 2006–2008. A fertility event is determined over having an additional child in the household, and with this dummy we have a measure of fertility similar to countless studies before us. The two samples combined provides therefore individual level characteristics of the last year surveyed, the industry in which each woman

has worked the most during 2001–2005 and the dummy on whether she has had a child or not.

Finally, to complete the data set, we add the measure of Import Competition Shock for each industry taken into consideration. This is our measure of exposure to globalization and it is crucial for the causal effect claim that we make. Namely, the ICS uses the shock on international trade and globalization caused by the political changes in China at the beginning of the 1980s and its entrance in WTO in 2001. These changes have made China the largest exporter of manufactured goods in the world in a very short time span. Hence, the ICS accounts for the change in imports of manufactured goods per worker from China to the UK in the period from 1998 to 2005, weighted by the relative size of each industry in the British economy. In order to build our measure of import competition, we merged data from COMTRADE and the British Office for National Statistics (ONS). From COMTRADE we extracted UK and US imports from China at the NACE 2 digit industry level in 1998 and in 2005 (US values are used in our IV strategy). From the ONS we take the number of employees for each NACE 2 digit British manufacturing industry in 1998. Our measure of import competition shock for a given industry j is then:

$$ICS_j = \frac{IMP_{j,2005} - IMP_{j,1998}}{employees_{j,1998}}$$

In the following tables and figures we present the summary statistics of the variables we use and the measure of Import Competition Shock.

Table 1: Summary Statistics

	Mean	Standard Deviation	Observations
Birth	0.06	0.2376	1000
Age	36.32	8.1233	1000
		Frequency	
Female		331	
No education		76	
Lower education		58	
Middle education		353	
Higher education		479	

Table 1 provides descriptive statistics for the individual variables entering our regression framework. We can see that the mean age of in our sample is around 36, women represent only a third of the sample and that a majority of people have some form of higher education.

In Table 2 we present the division into 2 digit NACE industries of the manufacturing sector with a short description. Furthermore, we report the number of employees in each industry for the years 1998 and 2005, its relative change and also the change in the amount of UK imports from China from 1998 to 2005. From this table it is possible to see the industries that were affected the most by the increase of international competition from China. For instance firms operating in the manufacturing of office machine and computers (NACE 30) faced the highest level of competition from Chinese imports and also experienced a drop of 48% of employees.

Table 2: NACE 2 digit detail

NACE	Label Manufacture of:	Employees 1998	2005	Change	Change in Import
15	food products and beverages	524429	458286	-13%	121%
17	textiles	170894	84179	-51%	378%
18	wearing apparel; dressing; dyeing of fur	142939	39163	-73%	737%
19	Tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear	31827	9506	-70%	495%
20	wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	82382	77001	-7%	520%
21	pulp, paper and paper products	109498	74693	-32%	850%
22	Publishing, printing and reproduction of recorded media	367710	313640	-15%	924%
23	coke, refined petroleum products and nuclear fuel	27227	22438	-18%	-50%
24	chemicals and chemical products	270377	212371	-21%	223%
25	rubber and plastic products	261938	200697	-23%	358%
26	other non-metallic mineral products	142469	110800	-22%	482%
27	basic metals	131289	74822	-43%	312%
28	fabricated metal products, except machinery and equipment	397092	318063	-20%	500%
29	machinery and equipment n.e.c.	389456	280432	-28%	800%
30	office machinery and computers	54279	28058	-48%	2700%
31	electrical machinery and apparatus n.e.c.	191587	125829	-34%	525%
32	radio, television and communication equipment and apparatus	135317	65528	-52%	1532%
33	medical, precision and optical instruments, watches and clocks	141515	117575	-17%	872%
34	motor vehicles, trailers and semi-trailers	249948	191326	-23%	2095%
35	other transport equipment	172227	148990	-13%	115%
36	furniture; manufacturing n.e.c.	212420	161581	-24%	714%

Figure 1 shows the import competition shock per worker in every industry considered in our analysis. The higher shocks were experienced by NACE 19, 30, 32 and 36 sectors, while NACE 15, 23, 34 and 35 exhibit particular low values. Note that we do not have observations for NACE 16 in our sample.

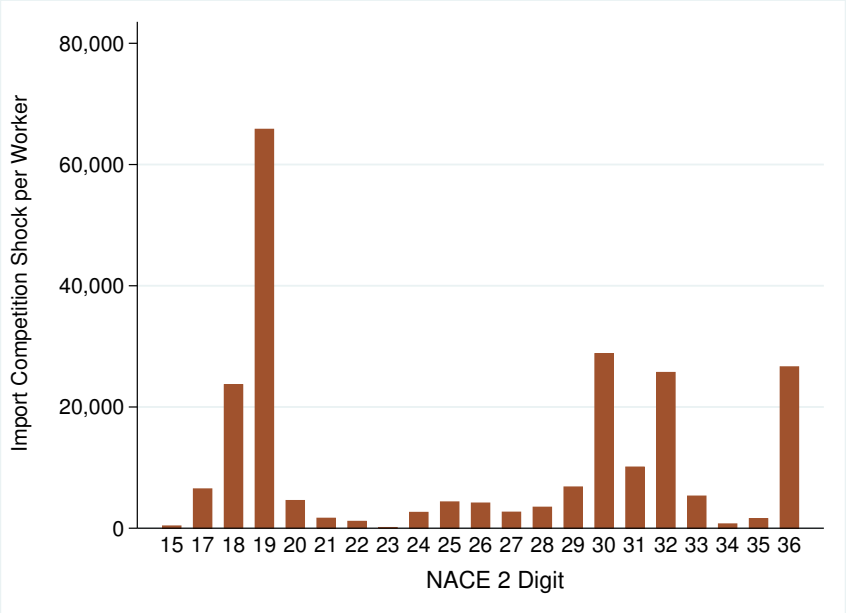
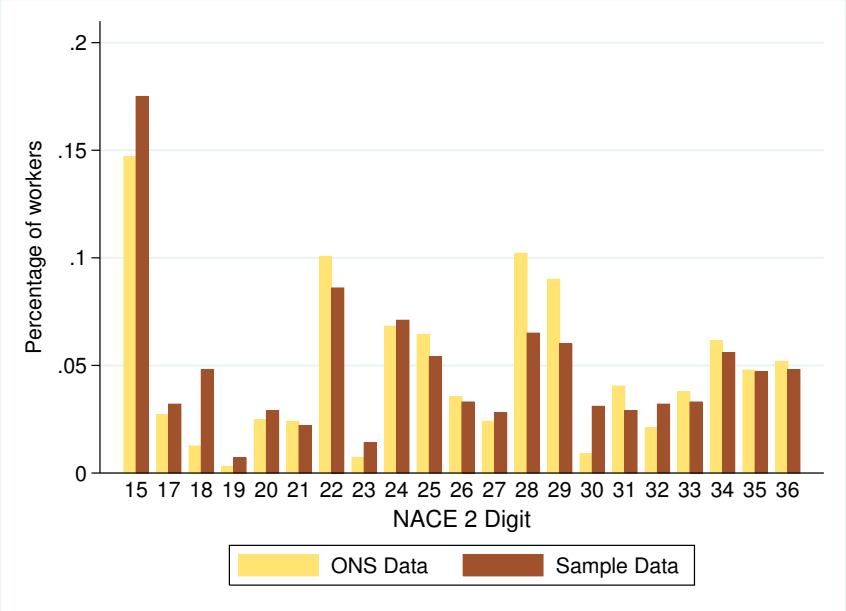


Figure 1: Import Competition Shock per worker - Industry Level

Finally, Figure 2 shows, by comparing data retrieved from ONS and our sample, that even after all the steps we did in building the final sample we did not lose its representativeness with respect to employment by sector. The only exceptions are NACE 15, 18, 28, 29, but the differences never exceeds 5 percentage points.



Methodology

The analysis is performed using standard OLS regression, having as dependent variable the probability of having a child of individual i who works in sector j and as independent the ICS of sector j. It must be clear to the reader that we have started from a panel data set, but after the cleaning highlighted above, we have obtained a single period cross-individual data set. Hence, we can use simple OLS. However, given the nature of the analysis, we correct the errors for clusters implying that we are assuming that within each NACE sector errors are correlated. The model takes the following form:

$$Birth_{i,j} = \alpha + \beta_1 ICS_j + \beta_2 X_i + \epsilon_j$$

The regressor X_i contains individual controls such as age, age squared and education. Our parameter of interest is β_1 as it tells us by how much an increase of the ICS measure affects the probability of an individual having a child. Regarding endogeneity, while we do not have to worry about reverse causality, due to the timing of the events and the way measure them, we could have one possible issue with the identification of this parameters as there could be the presence of omitted variable bias correlated both with ICS and giving birth. For instance, a positive domestic demand shock may be associated with a higher willingness of having a child and at the same time and simultaneously lead to higher imports. This would induce an upward bias in the OLS estimate of β_1. Instead, the case of a technological shock may have negative effect on some industries, which causes its workers to have a lower willingness of having a child, meanwhile the economy as a whole has a greater reliance of imported products of such industry. This would lead to a downward bias in the OLS estimate of β_1.

To solve for these identification issues, we use an instrumental variable and the 2SLS estimator. We instrument ICS in the UK with ICS in the United States, hence isolating only variation due to exogenous changes in supply conditions in China. This type of instrument is commonly used in the ICS literature, for instance see Autor et al. (2014) and Colantone et al. (2016, 2017; 2017), and we refer to these papers for an extensive discussion of the exclusion restriction.

Results

In this section we present the results using OLS and 2SLS estimators. Notice that all the results are shown in standard deviations. Hence, an increase in one standard deviation of the ICS changes the probability of having a child by β_1.

In the following table, Table 3, it is possible to see the coefficients obtained from the regression of the dummy variable indicating whether the person has had a child on the standardized ICS for each industry. We use different specifications, namely in column 1 the most basic result is shown, with no controls or interactions. In column 2, 3 and 4 the specifications include a gender dummy, where a value of 1 is assigned to female, an interaction term between the import competition shock and the gender and either age or education level as controls.

From this table, it is possible to see that there is a strong and significant negative relation between ICS and probability of giving birth when focusing on female. Indeed, notice that the coefficient for the effect of the ICS in column 1 is negative but not significant. By including the interaction term between ICS and the gender it is possible to observe that the first coefficient remains insignificant, however the interaction term becomes negative and significant. This means that workers employed in an industry which has a higher level of competition from China have lower likelihood of giving birth. Focusing on the magnitude, we can see that an increase of one standard deviation of ICS, leads to an decrease of 2.6 % - 2.8% in the probability of having a child.

This relation holds even when adding as control age and the square of age. In this case, we can also observe the standard inverse U-shape between age and fertility: we see less birth at very low and very high ages. Finally, the result persists also when adding a control of the level of education.

Table 3: OLS results

	(1)	(2)	(3)	(4)
Standardized ICS	-0.00936	0.00128	-0.00102	-0.000793
	(-0.85)	(0.10)	(-0.08)	(-0.06)
ICS * Gender		-0.0262**	-0.0284**	-0.0285**
		(-2.37)	(-2.30)	(-2.28)
Gender Dummy		0.0117	-0.00476	-0.00620
		(0.69)	(-0.30)	(-0.37)
Age			0.0631***	0.0642***
			(4.67)	(4.92)
Age Squared			-0.000980***	-0.000994***
			(-5.38)	(-5.64)
Higher Education				-0.0149
				(-0.62)
Observations	1000	1000	1000	1000

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

While these initial result seem inline with our main hypothesize, due to the identification issue discussed above, we cannot confidently claim causality. Hence, the need of the IV whose results are presented below in Table 4. Also in this case we use three specifications characterized in the same way as above.

Table 4: 2SLS results

	(1)	(2)	(3)	(4)
Standardized ICS	-0.00296	0.00760	0.00553	0.00576
	(-0.27)	(0.60)	(0.45)	(0.46)
ICS * Gender		-0.0282**	-0.0301**	-0.0298**
		(-2.37)	(-2.01)	(-1.96)
Gender Dummy		0.0110	-0.00560	-0.00713
		(0.67)	(-0.37)	(-0.44)
Age			0.0625***	0.0636***
			(4.73)	(4.97)
Age Squared			-0.000972***	-0.000986***
			(-5.45)	(-5.70)
Higher Education				-0.0152
				(-0.66)
First Stage Results				
Standardized ICS for US	.9422***	.9278***	.9267***	.9273***
	(17.49)	(17.52)	(17.56)	(17.84)
Kleibergen-Paap F-Statistic	9552.475	938.294	939.833	925.260
Observations	1000	1000	1000	1000

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

From these results, we can see that firstly, the negative significant relation between ICS and probability of having a child for women still holds, hence robust. Secondly, we can see from the first stage regression that we have a strong instrument and by referring to the

discussion on the external validity, we can conclude that our instrument is valid, i.e. it satisfies the requirements of relevance and exogeneity. Furthermore, the coefficient obtained in the IV is lower, i.e more negative. Namely, for the specification in column 4, in the OLS we have a coefficient of -0.0285, while for the 2SLS -0.0298 (both significant at the 5% level). This implies that when using the standard OLS we had an upward bias of β_1, which means that there exists at least one omitted variable which is correlated with ICS and probability of giving birth.

Robustness check

In this section we present several checks to show that the results obtained are robust to different specifications. These checks have been used in studies similar to this ones for instance by Autor et al. (2013) and Colantone et al. (2014; 2017). The robustness checks are divided into four sections: alternative IVs, contemporaneous shocks, additional controls and placebo analysis and the results obtained are presented in the table at the end of the section, Table 5.

Alternative Instrumental Variables

Firstly we show that by using different instruments our result hold. More specifically we reduce the sample to omit the industries which have shocks highly correlated across countries. More precisely, for the first estimate in Table 5 we have dropped the industries that have an output highly correlated with the British GDP's cycle (Colantone et al., 2017).[1] For the second estimate we have excluded the most energy-intensive industries (Autor et al., 2013).[2] Finally, we have exclude the industries which have experienced substantial fluctuations over

[1]These are manufacturing of coke, refined petroleum products and nuclear fuel (NACE 23); manufacturing of rubber and plastic products (NACE 25), and manufacturing of radio, television and communication equipment and apparatus (NACE 32).

[2]These are manufacturing of pulp, paper and paper products (NACE 21); manufacturing of coke, refined petroleum products and nuclear fuel (NACE 23); manufacturing of chemicals and chemical products (NACE 24); manufacturing of other non-metallic mineral products (NACE 26) and manufacturing of basic metals (NACE 27).

the sample period across countries, due to technological innovations, housing booms, and the rapid growth of emerging economies.[3] As it is possible to see, the results are inline with the ones found before, with the interaction term between import competition shock and gender still negative and significant.

Contemporaneous shocks

We then control for the presence of contemporaneous shocks at the industry level. Following Colantone and Crinò (2014), we divided industries into four bins based on the observed change during 2001 and 2005 of labour productivity, number of employees and turnover. We hence add the corresponding bin to our baseline specification. Still, our coefficient of interest does not lose its magnitude and significance.

Further controls

Moving onward and focusing on adding further controls, we included the legal marital status of the person and whether or not their spouse worked in manufacturing or not. In the first estimation, line 7 of Table 5, we separated with the use of a dummy variable the people who had never been married versus the rest, which involved the ones who had been married at the time, the units who were separated, divorced or widowed, and the observations that were in a civil relationship of some form. The effect of the interaction remains negative and significant and also that, as expected, the never married had less children.

Furthermore, we consider the fact that in some cases there exits a household effect, namely that the a person who works in manufacturing and whose spouse works also in manufacturing should be affected more by the increase of international competition from China. Hence, to account for this family effect, we omit from the sample the units who have

[3]These are manufacture of textiles (NACE 17); manufacturing of wearing apparel; dressing and dyeing of fur (NACE 18); tanning and dressing of leather; manufacturing of luggage, handbags, saddlery, harness and footwear (NACE 19); manufacturing of other non-metallic mineral products (NACE 26); manufacturing of fabricated metal products, except machinery and equipment (NACE 28) and manufacturing of office machinery and computers (NACE 30).

a spouse who is also accounted. We firstly take out the male spouse, line 8, and then the female one, line 9. As expected from the previous results, the effect remains significant in for the former but not for the latter specification. This means that it exists a family effect, but still this effect is stronger for the women.

Placebo tests

Finally, we show the results for a Placebo test. In this case we use as dependent variable a dummy for birth constructed in the same way as the one we have used till now, with the only difference that the time period evaluated is from firstly from 1998 to 2000, hence before the entry of China in the World Trade Organization, and secondly from 2001 to 2005. The fact that the first is not significant at all and that the second is slightly significant and lower in effect than the result from the main specification fortifies the fact that our result does not come from a spurious relation between having a child and import competition shock.

Table 5: Robustness Checks

	Coeff.	t-Stat	Obs.	KP F-Stat
Alternative IVs				
1) Excluding industries correlated to UK GDP	-0.0166**	(-2.09)	900	452.998
2) Excluding most energy intensive industries	-0.0292*	(-1.85)	832	945.182
3) Excluding most volatile industries	-0.0555***	(-3.05)	784	1286.585
Contemporaneous shocks				
4) Labour productivity growth	-0.0297**	(-2.00)	1000	80.599
5) Employment growth	-0.0298*	(-1.96)	1000	136.121
6) Turnover growth	-0.0319**	(-2.03)	1000	132.650
Additional controls				
7) Never Married Dummy	-0.0276*	(-1.71)	1000	914.897
8) Excluding male	-0.0310**	(-1.99)	955	924.251
9) Excluding female	-0.0212	(-1.36)	954	839.917
Placebo analysis				
10) Period 1998-2000	0.00424	(0.31)	1124	154.549
11) Period 2001-2005	-0.0215*	(-1.91)	1688	85.832

All the regressions presented use the specification used in column (4) of Table 3 and are estimated using 2SLS. The coefficient shown refers to the interaction between ICS and the gender dummy.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Conclusion

In this paper we have tested the hypothesis that an higher exposure to import competition leads to a lower probability of having a child. By using the BHPS and measuring import competition shock following the seminal paper by Autor et al. (2013), we have shown that such hypothesis holds. Furthermore, by using an instrumental variable and a 2SLS estimator, we can confidently claim a causal relation between the two.

Conceptually, the results we have shown, imply that globalization and international competition has a serious, yet hidden, cost on our society. Indeed, in the UK, but more generally

in the entire Western Europe, below replacement fertility rates is an issue of concern (Demography Report, EC, 2015). To tackle effectively this issue, it is essential to understand the reasons which brings families to have less children. Many arguments and various theories have been proposed to explain low fertility. Recently, much focus have been placed on the global economic crisis, which indeed brought about a fertility decline. The import competition shock shares many elements with the economic recession. Both had the effect of lowering real incomes for those exposed, and at the same time, introduced a stronger sense of uncertainty. In particular, the economic crisis brought about hardship in terms of unemployment - especially for the young, thereby triggering fertility postponement. Interestingly, specific programs aiming at limiting globalization costs, do already exist, like the US Trade Adjustment Assistance for Workers, which provides a variety of reemployment services to displaced workers who have lost their jobs or suffered a reduction of hours and wages as a result of increased imports or shifts in production outside the United States. An interesting line of research would be to study to what extent such policy initiatives have buffered the negative effect of the trade competition shock on fertility.

Another relevant remark is the fact that we have shown how a positive shock in import competition affected negatively fertility rates in the UK. We have not discussed the opposite, i.e. that a reduction in import competition leads to an increase in fertility rates. There are several possible motivations why the latter may not hold. For instance individuals and couples adjust more strongly to negative events than positive ones. There are several relevant explanations for the negative effect however. One hand, the trade shock, will either lead to loss of work, or at least the fear of losing one employment. As children necessarily have long terms impact, heightened uncertainty make couples postponing such irreversible events. Moreover, in line with the studies of Colantone et al. (2017) and the literature on fertility and subjective well-being (Aassve, Mencarini, & Sironi, 2015; Le Moglie, Mencarini, & Rapallini, 2015; Matysiak, Mencarini, & Vignoli, 2016; Kohler & Mencarini, 2016), mental distress and unhappiness may play important mediating roles in this relationship. Indeed, Colantone et al. (2017) shows that higher exposure to globalization and more specifically to import from China leads to higher mental distress. Meanwhile, the literature on subjective well-being

and fertility argues that higher subjective well-being lead to higher fertility. Hence, these aspects taken together, hints at the likely mechanism by which globalization and import competition affects fertility rates in the UK.

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