The Effects of Immigration on Household Services,
Labour Supply and Fertility

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Abstract

There is broad evidence from many developed countries that fertility and female labour force participation are no longer negatively correlated. At the same time immigrants seem to be affecting the market for household services. This paper analyses the effect of immigration on the trade-off between labour supply and fertility decisions of British women, with a focus on the role of immigration on household services. We use individual data from the British Household Panel Survey (BHPS) and we compute the share of immigrants in local areas using the British Quarterly Labour Force Survey (QLFS). Adopting an instrumental variable approach, our results show that immigrants increase the labour supply of highly educated women and cumulated fertility of older women. In addition the results seem to be driven by the contribution of immigrants to household production. Raising the share of immigrants in the local labour force increases the market size of household services, and reduces their market costs. Overall we interpret these effects as operating through a reduction in the trade-off between working and child care, observed in the UK.

Keywords: labour supply, fertility, immigration, household services.

JEL codes: D10, F22, J13, J22, J61.

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1 Introduction

After the mid 1980's a reversal of the negative relationship between fertility and female labour force participation has been reported across developed countries (Ahn and Mira, 2002; Rindfuss et al., 2003). Countries with a higher female labour force participation also enjoy a higher total fertility rate (TFR). This trend seems to be explained by country-specific factors, and by country-heterogeneity in the magnitude of the negative within-country correlation (Kögel, 2004). Institutional factors, labour market rigidities, and unemployment have been considered responsible for this reversal (Adserà, 2004). The availability of childcare, the flexibility of working hours, the diffusion of part-time jobs, and maternity leave schemes may explain the reversal in the negative correlation between child care and female labour force participation. More recently (Furtado and Hock, 2010) point out to an additional factor potentially responsible for the observed reduction in the trade-off between fertility and labour supply: the role played by low skilled immigrants in the household services sector, in particular child care.[1] Immigrants, by increasing the size and reducing the market cost of child care, reduced the negative correlation between fertility and labour supply for highly educated US women.

According to the theory the effect of a reduction in child care cost on fertility and labour supply decisions is ambiguous, depending on which mechanism prevails between substitution and income effect (Willis, 1973; Blau and Robins, 1989). If the child is a normal good, a reduction in the cost of child rearing would increase the demand for children through the standard income effect, as a consequence the labour supply decreases. On the contrary, the labour supply would increase if the substitution effect prevails, given the increased opportunity cost of child-rearing brought about by a reduction in child care costs. In addition, the

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[1]Furtado and Hock (2010) represents the first study looking at this mechanism. The paper looks at the aggregate level, and concentrate only on high educated women using cells defined by age-brackets, city and time.

quantity income elasticity of demand for children can be rather small with respect to the quality income elasticity (Becker, 1965), in particular for high earning women. Therefore women may react by increasing the quality of child care instead of having an additional child. On the other hand, if immigrants affect only household services, but no child care, the theory (Cortès and Tessada, 2011), confirmed by the empirical evidence (Cortès and Tessada, 2011; Barone and Mocetti, 2011; Farrè et al., 2011), suggests that high educated (wage) women react by increasing their labour supply. Therefore, in case of no direct effect on child care cost, ultimately there would be a reduction in fertility, due to the time constraint linking the two choices. An absence of reduction in fertility would occur only if immigrants, in addition to reducing the cost of household services (and increasing labour supply), also reduce the negative correlation between child-rearing and work, by easing the trade-off between the two decisions.

This paper contributes to the literature on the determinants of fertility and labour supply, as well as to the literature on the impact of immigration on the host country labour market. The aim is to look at the effect of immigration on both labour supply and fertility decisions of British women using individual data. Despite the broad evidence on the effect of immigration on labour supply, the evidence on fertility is still very scarce.[2] In order to interpret our results, we also complement the analysis by looking at the effect of immigration on the labour market structure of household services. Defining the share of immigrants at the district level (local authority district), and using an instrumental variable approach á la Card (2001) based on the past distribution of immigrants, our results show that immigration during the period 2003-2007 brought about a reduction in the market cost of household services and an increase in their size. These effects are driven by domestic services such as housekeeping, personal services, and food preparation, rather than by child care services.

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[2]To our knowledge, only Furtado (2014) recently analyses the effect of low-skilled immigration on fertility decisions for US highly educated women.

In addition, an increase in the local share of immigrants raised the labour supply of highly educated British young women at the intensive margin, without having any effect on their fertility decisions, though a positive effect on the cumulative fertility of older women. For high wage women in couples both fertility and labour supply increase as the local share of immigrants rises. Overall we interpret these effects of immigration as operating through a reduction in the negative correlation between fertility and labour supply. Therefore we can argue that the immigration to the UK, by affecting the market structure of domestic services, contributed to explain the observed reduction in the trade-off between labour supply and child care for high educated women.

The UK seems to be a particularly suitable country to analyse this question. First of all, it is one of the countries experiencing, over the last two decades, a positive correlation between fertility and female labour force participation.[3] Of particular interest, our descriptive evidence suggests that the reduction in the negative correlation between labour supply and fertility seems to be driven by high educated women with a fertility spell, a child less than one year old (Table 2), and by local areas with higher share of immigrants (Table 3). In addition, over the same period, the UK has witnessed a steady increase in the number of immigrants.[4]

Given these stylized facts, first we analyse whether immigrants, by concentrating in the household services sector, affect both the size and the market cost of the latter as found for other countries (Cortès and Tessada, 2011; Barone and Mocetti, 2011; Farrè et al., 2011; Furtado and Hock, 2010). If immigrants can be thought as substitutes for time-intensive

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[3]Between 1995 and 2008 both TFR and female labour force participation followed an upward trend. The TFR was equal to 1.7 in 1995 and reached 1.96 in 2008 (Office for National Statistics, ONS), a value only slightly below the replacement level (2.1). Over the same time-span, the labour force participation for women raised from 73 percent to 77 percent (ONS from Labour Force Survey.

[4]At the beginning of the 1990Âťs, immigrants represented 6.7% of the total resident population (1991 UK Census), and they reached 11.4% in 2008. Our analysis, due to data limitation as explained below, covers the period between 2003-2007. Over this period, immigrants were 8% of the labour force in 2003 and reached 11% in 2007 (QLFS).

tasks representing the household production, those who can be affected the most are women, the main responsible within the family.[5] In particular the high skilled ones with the highest opportunity cost of time[6] and the highest labour market attachment. The contribution of immigrants is valuable for natives under many respects. The services provided by immigrants can be more flexible in terms of opening hours and more convenient in terms of proximity with respect to existing services, thus more compatible with full-time jobs or the rigid working schedule typical of high educated women.[7] Higher availability ultimately translates into an indirect reduction in the costs of these services, e.g. search cost, assumed to be high for high educated women. Moreover, immigrants can make these services more affordable by directly reducing their market cost, pushing down the wages of those employed in this sector. Through these mechanisms therefore immigration can have an impact on both native female fertility and labour supply decisions, and in particular on their correlation, by easing the trade-off between the two choices.

Furtado (2014) is the only existing study we are aware of looking at the relationship between immigration and fertility decisions at the individual level. However, the sample, the empirical strategy and the country analysed all differ from ours. The author analyses only high skilled women and, due to data limitation, models the fertility decision by an indicator of having a child less than one year old in the household, and then link this indicator to the current immigration. In addition both the child care sector and institutional factors, such as

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[5]In a BHPS module each couple is interviewed about which member of the couple is in charge of several family commitments. It turns out that, among working people, women are responsible for 64 percent of all cleaning activities, 72 percent of washing duties, and 58 percent of child-care activities.

[6]Cortès and Tessada (2011) set a theoretical framework showing how the women reacting more in terms of labour supply to the reduction in the cost of household services are those with higher wages.

[7]The higher flexibility provided by immigrants is evident comparing the difference in weekly working hours between immigrants and natives working in the household services sector. Immigrants work 4.23 hours per week more than natives (QLFS), also controlling for education (+4.42 hrs), whereas the gap in other sectors is much lower (+1.32 hrs).

coverage and duration of paid parental leave differ between the two countries.[8] Our strategy considers the entire female labour force in reproductive age, and, thanks to the longitudinal dimension of the data, we can define an appropriate measure of fertility, isolating the timing of the decision, in addition to controlling for individual fixed effects. In order to identify the effect of immigrants on labour supply and fertility, we use both individual fixed effects and an instrumental variable strategy based on the past local distribution of immigrants.

The rest of the paper is laid out as follows: Section 2 puts the paper in context of the related literature, Section 3 presents the empirical strategy adopted, Section 4 describes the data. The main results are commented in Section 5, whereas some robustness checks are described in Section 6. Section 7 closes with a few conclusive remarks.

2   Background

This paper crosses two broad strands of literature: on the one hand it is very close to the literature on the impact of immigration on the host country labour market, on the other hand it is related to the literature on the impact of household services on female labour supply and fertility decisions. The analysis of the impact of immigration on the host country shows a strong consensus on the evidence that immigrants do not harm the native labour market either in terms of employment or in terms of wages.[9] At the same time, and closer to this paper, there is already a broad evidence that immigrants affect positively the labour supply of native females. Different studies show that (low-skilled)

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[8]For instance, since April 2004 all Local Education Authority in the UK have been mandated to provide free nursery places for all 3- and 4-years old children for 12.5 hours a week and for 33 weeks per year. In the US, on the contrary, no free child care provision exists.

[9]With the only exception of Borjas (2003) and Borjas et al. (2008), the evidence is strongly in favour of a non-negative, non-significant or slightly positive effect of immigration on natives' wages and employment. See, among others, Card (2001, 2009); Ottaviano and Peri (2012); Manacorda et al. (2012). The evidence for the UK confirms the non negative effect of immigration on natives labour market outcomes, due to the small degree of complementarity in production between immigrants and natives (Manacorda et al., 2012). In addition, the effect of immigration differs along the native wage distribution. Natives at the bottom of the wage distribution lose from immigration, whereas those at the top gain (Dustmann et al., 2005, 2012).

immigration contributes to the household production by either increasing the availability of household services or reducing their market cost (Barone and Mocetti, 2011; Cortès and Tessada, 2011; Farrè et al., 2011; Cortès and Pan, 2013). This channel of causation has been shown to bring about a positive impact on high skilled native female labour supply mainly at the intensive margin (Barone and Mocetti, 2011; Cortès and Tessada, 2011), only Farrè et al. (2011) finds the results driven by the extensive margin.[10] Cortès and Tessada (2011) represent the first study analyzing this question with US data: according to their findings, low-skilled immigrants affect native women at the top quartile of the wage distribution, by increasing the intensive margin of their labour supply, at the same time reducing the time spent on housework and increasing the expenditures on housekeeping services. Barone and Mocetti (2011), Farrè et al. (2011), and Cortès and Pan (2013) confirm similar results for other countries. Furtado and Hock (2010) is also a closely related paper to ours. Using a grouped bi-variate probit they show that low-skilled immigration, by reducing the market cost of childcare, has a positive impact on the probability of childbearing, a negative impact on the extensive margin of the labour supply, and reduces the negative correlation between fertility and labour supply for high-skilled US women.[11] The other strand of the literature which is relevant for this paper looks at the relationship between the household services, in particular childcare, and labour supply and fertility decisions. As for the relationship between childcare availability and fertility decisions, the evidence is in favour of a positive impact of the former on the latter (Del Boca, 2002; Hank and Kreyenfeld, 2003; Rindfuss et al., 2007, 2010). In particular, Del Boca (2002) estimates two conditional logit models and find that the availability of childcare locally measured exerts a positive impact both on fertility and labour supply decisions of Italian women. The positive impact of childcare

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[10]The only exception in favour of a negative impact on the extensive margin of the labour supply is represented by Furtado and Hock (2010).

[11]Related to this study is also Amuedo-Dorantes and Sevilla (2014), which looks at the effect of low skilled immigration on parental time use of US high skilled women.

availability on fertility decisions has been also found by Rindfuss et al. (2007, 2010). To date only Hank and Kreyenfeld (2003) do not confirm the positive relationship between childcare availability and fertility decisions, since they find that only the informal childcare provided by relatives exerts a positive impact, whereas the impact of the publicly provided childcare is not significant. In addition, by exploiting different source of exogenous variation, many studies report the positive effect of lower child care cost on labour supply (Bailey, 2006; Baker et al., 2008; Cascio, 2009).

So far the existing literature has looked only at the impact of child-care on fertility and labour supply, rather than considering the household services sector more broadly. Nevertheless household services, through the effect of migration, have been shown affecting female labour supply. Despite the evidence in favour of a decrease in the cross-country negative correlation between fertility and labour supply, the individual correlation, though lower in magnitude, is still negative (Angrist and Evans, 1998; Francesconi, 2002; Kögel, 2004). Therefore, the intertwined nature of labour supply and fertility via time constraint raises the question of whether the observed effect of immigration in fostering labour supply might have indirectly affected fertility as well, even with no direct effect of immigration on fertility through changes in child care services.

3   Empirical strategy

The empirical analysis follows two steps. First, we estimate the effect of the share of immigrants in the labour force of local areas on the market structure of household services. We look at the effect on both employment and average wages in each local labour market, which is defined at the local authority district (hereafter district)-year level.[12] Second, we analyse the effect of the same share of immigrants on individual labour supply and fertility.

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[12]The definition of the local area will be defined in the Data section.

In order to identify the impact of immigration in both steps of our analysis, we need to isolate the exogenous component of the stock of immigrants in local areas, and control for the endogeneity of the immigrants' location. Immigrants likely settle in areas characterized by favourable labour demand conditions, in turn correlated to each of the dependent variables we consider. Therefore we adopt an instrumental variable strategy predicting the current local share of immigrants by using the past local immigrants distribution (see Altonji and Card, 1991, and Card, 2001). In addition, in the second step of the analysis, where we estimate individual regressions, we also use individual fixed effects. The rationale behind the instrument rests on the use of the historical country-specific settlement of immigrants in local areas as an exogenous determinant of the current local country-specific distribution. The current total country-specific stock of immigrants is then distributed into local areas according to this past distribution.

The instrument for the term representing the immigration rate in district a at time t, Im_{at} is computed according to the following formula:

$$Im_{at} = \frac{\Sigma_c \left(\frac{Im_{cat_0}}{Im_{ct_0}} \right) Im_{ct}}{Pop_{at_1}} \qquad (1)$$

where Im_{cat_0} represents the stock of immigrants from country c residing in district a at time $t = t_0$. The selected past distribution is relevant to the year t_0=1991 and it is computed from the 1991 Census data.[13] Im_{ct} is the stock of immigrants from country c at time t (with t=2003,..,2007). Pop_{at_1} is the sample labour force corresponding to the first year of the analysis (2003).

The validity of this strategy relies upon two main requirements: the past local distribution must be unrelated to current local pulling factors, and the total country-specific stock of

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[13]In Section 4, we describe in greater depth the data used for the implementation of the instrument.

immigrants should be unrelated to any area-specific pulling factors. We deal with the first issue by controlling for local unemployment rate in the main specification, and by additionally including district fixed effects, to control for demand-driven potential omitted factors. We also run a series of additional robustness checks and falsification exercises in order to rule out that our results are driven by complementarity in production (see Section 6). As for the second issue, as a robustness check when computing the instrument for Im_{at} we exclude the immigrants from area a from the computation of the term Im_{ct}. The results are robust to all these controls. The second requirement for the instrument validity is that past and current local distributions are correlated. This requirement is strongly supported by the broad empirical evidence regarding the tendency of newly-arrived immigrants to cluster in areas highly populated by immigrants from the same country to take advantage of the pre-established networks.[14] There is evidence that the composition of immigrants in the UK has changed in terms of country of origin over the period of our analysis, mainly due to the access of the A8 countries (see Jaitman and Machin, 2013). Therefore we try to assess the relevance of the instrument by running a series of regressions relating past and current shares of immigrants at local level. For this purpose we construct an index meant to measure the existence of enclaves, and we compute the latter both for the period we consider as the reference past distribution for the instrument (1991) and for the period of the analysis. The index is computed according to the following formula:

$$I_{at}^c = \frac{\frac{Im_{cat}}{Im_{ct}}}{\frac{Im_{at}}{Im_t}}$$

and denotes the fraction of immigrants from country c residing in district a, $\frac{Im_{cat}}{Im_{ct}}$ divided by the fraction of the total immigrant population living in the same district, a, $\frac{Im_{at}}{Im_t}$. A

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[14]Cutler and Glaeser (1997) provide evidence for the US, whereas Aslund (2005) and Damm (2009) provide two more recent examples for Sweden.

value of this index equal to 1 suggests that immigrants from country c are just as likely to live in district a as the average immigrant population, values bigger than one suggest the presence of an enclave. Figure 1 reports on the horizontal axis the values of this index computed for the past (1991) using Census data, whereas the vertical axis shows the values of the index computed for the period of the analysis (2003-2007). Each panel represents a different group of countries (West Europe, East Europe, North America, Africa, Asia, Central South America, Asia and Middle East, and Other countries.), the same gouping will be used in the empirical analysis. Each point represents a district and the line represents the regression line. Two main results emerge from this figure. First of all, it is clear how many groups of countries tend to settle into enclaves since the values are mostly higher than 1. In addition there is a clear tendency for immigrants to form a cluster where there was an enclave settled in the past, and this is evident from the regression coefficient which is always positive and significant. The only exception being the case of Central South America and Asia-Middle East. The results of this exercise supports then the validity of the network hypothesis. First, immigrants tend to cluster in small areas with other immigrants from the same group and second, areas where an enclave settled in the past disproportionally attract future immigrants from the same country.[15]

3.1   The Impact of Immigration on the Market Structure of Household Services

As previously mentioned there might be two channels by which immigration can have an impact on household services; they can have an impact on their availability or on their market cost. Immigrants can enlarge the size of the household services sector at the same time

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[15]In the empirical analysis we use all groups for the computation of the instrument. In a series of robustness checks we exclude the two groups for which this correlation is not significant (Central-South America, and Asia-Middle East), and the results are invariant to this exclusion.

providing more flexible services in terms of opening hours compared to services provided by natives. This would allow women to conciliate the time devoted to work and to perform housework. Ultimately this effect would represent itself an indirect reduction in cost, assuming that more flexible services turn into lower search costs. In addition, immigration can have a direct impact on the prices of these services. Typically if immigrants push down the wages of those working in this sector, also the market cost of these services should go down since other fixed costs can be considered negligible for these occupations. We estimate separately the effect of immigrants on the size and the market cost of household services using the following two estimating equations

$$emplhs_{at} = \phi Im_{at} + \mu_1 X_{at} + D_a + D_t + \eta_{at} \tag{2}$$

$$logwhs_{at} = \alpha Im_{at} + \mu_2 X_{at} + D_a + D_t + \epsilon_{at} \tag{3}$$

$emplhs_{at}$ is the share of the labour force in district a at time t employed in household services, whereas $lnwhs_{at}$ represents the (log) average real hourly wages[16] of those employed in the household services. X_{at} represents a vector of additional controls capturing omitted time varying factors: the log of median high skilled male income, the share of high skilled women, the share of households with young children (0-2 years old). These controls should account for higher demand of household services in each local labour market. D_a, and D_t are district and time fixed effects, respectively and ϵ_{at} (analogously η_{at}) is a standard zero mean error term.[17] The coefficients of interest are ϕ, and α. If the share of immigrants in local areas reduces (both indirectly, by reducing search cost, and directly) the market cost of household services, we expect $\phi > 0$ and $\alpha < 0$.

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[16]Nominal wages are deflated by using the CPI-based deflator (base=2005).

[17]Due to the fact that the dependent variables represent aggregates and averages, we allow and control for heteroskedasticity by weighting each observation with the respective cell size.

3.2 The Impact of Immigration on labour Supply and Fertility

In the second step of our analysis we try to detect how immigration affects fertility and labour

supply decisions of British women, and estimate the following two separate regressions:

$$work_{iat} = c_i + \beta_0 X_{iat} + \beta_1 Im_{at} + \beta_2 Im_{at} hs_{iat} + D_t + \eta_{iat} \tag{4}$$

$$birth_{iat+1} = d_i + \gamma_0 X_{iat} + \gamma_1 Im_{at} + \gamma_2 Im_{at} hs_{iat} + D_t + \epsilon_{iat} \tag{5}$$

Equation (4) refers to the labour supply decision and equation (5) refers to the fertility

decision of individual i residing in district a at time t. The dependent variable $work_{iat}$ de-

notes the labour supply. We use three different measures of labour supply: an indicator for

work/not work, and two indicators for the intensive margin, (log) weekly hours worked, and

an indicator for working full-time versus part-time. c_i (and d_i) are individual fixed effects,

X_{iat} represents a vector of individual characteristics which will be described in details in

the next section, and D_t are time fixed effects. $birth_{iat+1}$ denotes the birth spell, corre-

sponding to having a child of zero age one year after year t. Similar definitions are quite

standard in the fertility - related literature, which motivates this choice in order to take into

account for the 9-months gestation period, and the average birth occurring in the middle

of the calendar year (Del Boca, 2002; Rindfuss et al., 2007, 2010). Im_{at} denotes the share

of immigrants at the district level in the labour force, and η_{iat} (and analogously ϵ_{iat}) is a

standard zero mean error term. We try to detect whether the impact of immigration differs

by female educational level, because we expect the effect to be driven by those with a higher

opportunity cost of time and higher labour market attachment (see Cortès and Tessada,

2011). Therefore the interaction between immigrants and an indicator for higher education

are also included in the analysis. In the baseline specification hs_{iat} denotes people with a

tertiary education, including also vocational education. In some alternative specifications we exclude vocational tertiary education, and we consider an indicator for being in the upper part of the wage distribution. Our coefficients of interest are therefore: β_1 and β_2, γ_1 and γ_2. In case immigrants bring about a reduction in the negative correlation between fertility and labour supply, we would expect that one of the following cases occur: $\beta_1 + \beta_2 > 0$ and $\gamma_1 + \gamma_2 >= 0$ (or not significant), or, alternatively, $\gamma_1 + \gamma_2 > 0$ and $\beta_1 + \beta_2 >= 0$ (or not significant). Despite the dependent variables relevant to the fertility decision and two out of the three measures of the labour supply decision are binary, we adopt a fixed effect linear model for all the specifications. The fact that the decisions related to fertility and labour supply are correlated would suggest a simultaneous equation framework as the preferred estimation strategy. However there are a number of concerns preventing the joint estimation of the system of equations.[18] First of all, it is not clear the real advantage of a joint estimation with respect to a single equation estimation strategy when we work with finite samples. Comparing the single equation 2SLS approach with the 3SLS strategy allowing for the correlation in the error terms (Mikhail, 1975, Belsley, 1988) the relative advantage of the joint estimation holds true only when the cross-equation correlation is sufficiently high, especially in a two-equation system. In our case, the cross-equation correlation between labour supply and fertility, estimated as residual from equation (4) and (5), is rather low (-0.01), thus not justifying the use of a joint estimation. On top of that, 3SLS techniques that account for the panel dimension of the data (EC3SLS) are random effect estimators which assume the individual fixed effects uncorrelated to the other regressors, unlikely to be a realistic assumption. The alternative estimation strategy would be a Full Information Maximum Likelihood estimator, which has the drawback of not accounting for the endogeneity of our main variable of interest unless you rely on a control function approach and

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[18]Other studies using a simultaneous estimation strategy are: Francesconi, 2002, and Del Boca et al., 2009.

include the first stage residuals. Therefore we decide to use a single equation estimation strategy.[19] With our strategy we first evaluate the total effect on each decision and then we try to infer the effect on their correlation.

4 Data

In order to implement the empirical analysis we make use of three different data sources: the QLFS (Quarterly Labour Force Survey), the BHPS (British Household Panel Survey), and the 1991 UK Census data. From the QLFS we compute the measure of immigration rate at district level. The QLFS is a quarterly survey conducted in UK throughout the years since 1992, in which each sampled address is called on five times at quarterly intervals, and yields about 60,000 responding households per each quarter. We pool together all quarters relevant to the period between 2003 and 2007.

The BHPS is an annual longitudinal survey, and it consists of a nationally representative sample of about 5,500 households recruited in 1991. All individuals living at the sampled address are interviewed each year, if the individual split-offs from the original family, he/she is followed and re-interviewed at the new address. Since 2001 the sample is representative of the UK and each year around 10,000 households are interviewed. The survey has been run for 18 years until 2008. All members of the household aged 16 or over are interviewed and the survey covers a broad range of topics, among which: household composition, education, health, employment status, income from employment. The BHPS is used in order to run the empirical analysis at the individual level, and we import from the QLFS all information about immigration. In addition, we also use the QLFS for the aggregate regressions (2 and

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[19]As a further support of the validity of this strategy, we run a series of robustness checks in order to quantify the potential effect of the cross equation correlation on our results - by controlling for fertility in the labour supply equation and vice-versa. Ideally we would like to include these regressors and instrument for them. However, it is difficult to find an instrument providing exogenous variation for fertility (labour supply) and not being correlated with labour supply (fertility).

3) at district-year level to evaluate the effect of immigration on the labour market structure of the household services sector. The third data source consists in the 1991 UK Census data, used to compute the past local distribution of immigrants by macro-areas of origin (see equation 1).

The selection of the period between 2003 and 2007 is due primarily to data restrictions. First of all, we need to exclude the last year available from the BHPS (2008) because the definition of the birth spell is based on the 1 year lead of the variable about children age. In addition, the first year available for the QLFS with the district identifier is 2003. The immigrants-related variables are constructed using the QLFS. Immigrants are defined as non British: those who were born outside the UK and Ireland. This choice is motivated by the fact that English and Irish people are a fairly homogeneous group, both in terms of their language and the proximity of their culture. In order to implement the instrument immigrants are categorised according to 8 macro-areas of origin, which we consider might represent enclaves, in terms of sharing similar cultures (Figure 1 supports this assumption): Western Europe, Eastern Europe, North America and Canada, Centre-South America, Middle East, Rest of Asia, Africa, and others. As for their skills, immigrants seem to experience a substantial downgrading once in the host country (Dustmann et al., 2005), their actual skill is not valued as if it was acquired in the UK. Despite this, immigrants are still higher educated than natives, and this holds true also among immigrants working in the household services sector.[20] 41 percent of immigrants has left full time education at age 21 or older, as opposed to only 18 percent of natives. Within the household services sector, even if the percentage of high skilled immigrants is lower than in the full sample, the gap with natives is much higher (24% versus 5%). Therefore we decide not to restrict the analysis only to low

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[20]The definition of low-skill for immigrants is based on the age when the respondent has left full-time education. By doing so we follow Manacorda et al. (2012) because the definition of the educational level based on the highest qualification attained according to the UK system is misleading. Most of the immigrants in fact tend to answer "other qualifications" when asked about their highest educational level.

skilled immigrants, since a substantial share of the immigrants' sample would be excluded.[21]

The measure of immigration is defined at the district (LAD) level. A Local Authority District represents one of the smallest administrative units in Great Britain. Over the period of our analysis, after harmonising the districts that changed over time after the 1991 Census, the number of these local units was 376. In our identification strategy we exploit the within-district variation in the share of immigrants, since for a very high share of the sample (91 percent) the individual fixed effects coincides with the district fixed effects. We also control for the robustness of this assumption, by additionally adding district fixed effects and the results are unchanged.

The final sample, after excluding all observations with missing information about the variables included in the empirical analysis, consist in 2,830 British women with age between 20 and 44, corresponding to 11,320 person-year observations. These are women in the labour force. The definition of employment is based on having worked the week previous to the interview or having not worked but having a job that they were away from. The following regressors are also included in the empirical analysis: age, age squared, an indicator for higher education,[22] an indicator for couples, four variables denoting the number of dependent children in different age brackets (0-2, 3-4, 5-15, and 16 or over), two indicators for having a co-resident father, or a co-resident mother, total household income minus total individual income (in log) and its squared value, and an indicator for the intensity of care activities towards people inside or outside the family (set equal to one if the weekly hours are higher than 20.). Table 1 reports the summary statistics of the sample. The percentage of employed women is relatively high (79%), and, among those working, the average number

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[21]Among the more recent immigrants, the share of high skilled working in the domestic sector is even higher (33%).

[22]Since we are considering the sample of British women, the definition of their education is based on the English educational system. High skilled women are those with the highest educational qualification corresponding to the National Vocational Qualification level 4 or higher. This is equivalent to the ISCED code equal or higher than 5.

of working hours per week is 32.7, whereas 65 percent of them work full time. Their average educational level is also high (40% of them has a tertiary education).

From Table 2 we can see the variation in labour supply over time by education and birth spell, where a birth spell denotes if the woman has a child of zero age. The probability of working increases for women regardless of their employment condition, but in particular it increases for women with a recently born child, regardless of their education. On the other hand, working hours are constant for all women, the exception being for high skilled women with a new born baby who experience an increase. The same rising trend applies to the probability of working full time for high skilled women with a new born child, whereas, if anything, the rest experiences a declining trend. This evidence is in line with a reduction in the negative correlation between fertility and labour supply, driven by highly educated women. In addition, from Table 3 it emerges that this declining trend is also driven by areas highly populated by immigrants. The Table reports the correlation coefficient broken down by the share of immigrants at district-year level, for values of the share higher than the mean (first column), or lower (second column). Panel A reports the correlation coefficient between an indicator for working and an indicator for having a new born child. Instead Panel B reports the correlation coefficient between average weekly working hours and an indicator for having a new born child. The overall reduction in the magnitude of the coefficient over time (third column) is clearly driven by areas with high density of immigrants (first column). As for the trend in fertility rate (not shown but available), the average number of children per woman has remained constant over the period 2003-2007, even controlling for education and employment status. The probability of giving birth has slightly decreased for the low skilled and remained constant for the high skilled.[23] Overall this first descriptive evidence suggests a reduction in the trade-off between working and child rearing, in particu-

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[23]Tables not shown but available upon request.

lar for high educated women and for areas with high density of immigrants, over the period 2003-2007. Of course this evidence may be driven by spurious correlation linked to labour market conditions and other unobserved pulling factors for immigrants. Therefore, in order to isolate the causal effect brought about by immigration, we need to rely on the results of the empirical analysis.

5   Main results

In this section we try first to analyse the effect brought about by immigrants on the market structure of the household services sector. The household services consists in the following occupations according to the 2000 Standard Occupational Classification (SOC): housekeeping occupations, food preparation (bar staff, waiters/waitress, backers, and butchers), childcare occupations, gardeners, and other personal services occupations. From Table A.1 in the Appendix it is evident how immigrants are concentrated in this sector representing the first category where they work (16.45%). Dis-aggregating further immigrants working in the household services sector, it emerges that 48 percent of immigrants works in food-preparation-related occupations, 28 percent in housekeeping activities, and a smaller share (17%) works in childcare and related occupations.

Starting from the results of the regressions (2) and (3), Table 4 reports the OLS and 2SLS estimates (the top panel refers to equation 2, whereas the bottom panel refers to equation 3). The first four columns represent the regressions pooling together all occupations of the household services sector. Columns (5) and (6) consider only all household services excluding childcare. Columns (7)-(8) consider only the child care sector, and columns (9) and (10) consider all other low skilled occupations excluding household services. Starting from the results on employment (top panel), the first two columns report the simple corre-

lation, whereas the third and fourth columns include all controls. According to the 2SLS estimates in the fourth column, it is clear how rising immigrants as a share of the local labour force has a positive impact on the size of the household services sector. A rise in the share of immigrants in the local labour force by one percentage point increases employment in this sector by 0.4 percentage point corresponding to a 32 percent rise in the mean value of the dependent variable. This effect is consistent for both OLS and 2SLS estimates, even if higher for the 2SLS estimates. In addition, the first stage statistics suggests that the instrument is not weak. This is evident from the F-stats at the bottom of the Table as well as from the first stage coefficients in Table A.2 in the Appendix, obtained from different specifications. Column (1) reports the simple correlation, column (2) includes district and time fixed effects, column (3) adds the average district-year values of the first stage regressors from equations 4 and 5 (with clustering at district level in column 5), and column (4) adds the unemployment rate at district-year level (with clustering at district level in column 6). Once we break down the household services into child care versus all other occupations, it is evident that the main results are not driven by the child care sector. Despite the sign being positive, the effect of immigration on the size of the household services is much lower in magnitude for the child care sector and not significant. The last two columns report the results for all low skilled occupations (mainly construction, and manufacturing). By doing so we try to analyse whether the results are driven by general demand effects common to low-skilled occupations. This does not seem to be the case, since the effect on low skilled occupation is much lower and not significant. Table 4 (bottom panel) reports the corresponding results for the wage equation (3). Despite the effect of immigrants being always negative, it is never significant. The only exception are the 2SLS estimates for the domestic services occupations (column 6). Rising the local share of immigrants in the labour force by one percentage point reduces the wage of those employed in the domestic sector by 1.7

percent. In addition, as for the employment result, the effect of immigration is driven by services such as food preparation, housekeeping and cleaning, whereas there is no effect on the child care sector. These results are in contrast with what has been found in the US, where low-skilled immigrants reduce the market cost of child care services (Cortès and Tessada, 2011; Furtado, 2014; Amuedo-Dorantes and Sevilla, 2014). One interpretation could be that child care services demand higher quality than other household services, such as cleaning. Parents can be more demanding in terms of child care and immigrants can be considered as less substitutes for child care provided by natives, especially if they don't speak well English.[24] The results in column (9)-(10) report no effect of immigration on the average wages of other low-skilled occupation, thus supporting the interpretation that the effect of immigration is not simply driven by a general shift in the labour demand curve for low skilled jobs, but it is specific to the domestic services.

Moving to describing the results of regressions (4) and (5), we focus on the preferred estimation, the 2SLS. Given that the main regressor has variation at the aggregate district level and we have the same individual observed over time, we use a double clustering, with the two clusters defined both at the district and individual level, allowing for any kind of correlation between individuals belonging to the same district, in addition to any serial correlation within individual. We start from commenting the results relevant to the impact of immigration on the three different measures of labour supply (equation 4, Table 5).[25] Both OLS and 2SLS estimates report no effect of immigrants on the probability of working for British women, regardless of their education. On the contrary, a higher share of immigrants

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[24]Unfortunately this interpretation cannot be tested, since the dataset does not contain information on language proficiency.

[25]As for the impact of the other regressors (not shown but available upon request.), as expected having children exerts a negative effect on the labour supply decision, a signal of the role incompatibility between labour force participation and fertility. This is true in particular for the intensive margin. The highest negative effect on hours worked comes from having children in the age bracket between 0 and 2. This effect is much lower and not significant for the men sample, suggesting that the burden of childcare is lower for them.

at the local level exerts a positive effect on both the weekly working hours and the probability of switching from a part time to a full time job for working women. An increase of 1 percentage point in the local share of immigrants brings about an increase in weekly working hours of high skilled women by 0.74 percent. This translates into a 25 minutes increase per week. On the other hand, the corresponding increase in the probability of switching to a full time job is equivalent to 0.8 percentage points. These results are broadly in line with the other studies looking at a similar question (Barone and Mocetti, 2011; Cortès and Tessada, 2011), with the only exception of Farrè et al. (2011) who find instead a positive effect on the labour supply of highly educated women in Spain, but mostly at the extensive margin. The results are robust to controlling for district fixed effects, in such a case the effects are higher, because the negative effect on the low skilled women disappears, whereas the effect on the high skilled women is stable across specifications.

Moving to the results on fertility (Table 6), immigration does not seem to have any impact on the decision of giving birth. Regardless of the definition of the fertility spell, either as an indicator of having a child of zero age the subsequent year (columns 1-3), or distinguishing between the parity of the fertility spell (columns 4-5).[26] Only when we consider the cumulated fertility, and restrict the sample to more mature women (older than 30 years old) we find a positive effect of immigration on fertility (columns 7-9). Our dependent variable represents the current total number of children augmented by the indicator of having a child of zero age the subsequent year. According to this specification, we find a significant positive effect of immigration on the (expected) number of children for high educated women (corresponding to a 7 percentage points rise in the dependent variable).

The effect of immigration could be interpreted as operating by easing the trade-off between child-rearing and labour supply if the positive effect on labour supply is higher for women

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[26]Breaking down the sample by couple vs single, the results on labour supply are driven by singles, whereas the effect on fertility is still null.

with high demand for childcare. Table A.3 in the Appendix reports the results for the effects of immigration on labour supply, selecting first women without young children (0-2 aged), women with young children, and women with young children but without parents co-residing in the same household. The interaction term for high skilled here select the women with higher tertiary education, excluding vocational tertiary education, in order to identify the sample with the highest opportunity cost of time. Columns (1)-(3) report the probability of working, columns (4)-(6) report the working hours, and columns (7)-(9) the probability of working full time. Immigrants do not affect the probability of working of women with no young children, whereas they rise the former for those with young children and even more if without parents co-residing with them. Despite this effect being only weakly significant, the trend is also confirmed by the results on the intensive margin of the labour supply. The drastic reduction in the sample size brings about an increase in the standard errors as well as in the predictive power of the instrument, however the trend in the coefficients support the interpretation of the role of immigration in reducing the trade-off between child-rearing and labour supply for high educated women.[27] Given that the group reacting more to the change in the cost of household services are high wage women (Cortès and Tessada (2011)), we replicate the analysis only on working women. We replace the indicator for high education with an indicator for having wage in the top part of the distribution (specifically above the 85th percentile. Results for the top quartile are qualitatively similar.), and we run the analysis first on the full sample (columns 1-3, Table 7), then selecting only couples (columns 4-9). In this specification we find no effect on the full sample, whereas for couples immigration rises both the probability of switching to a full time job and the probability of planning a birth. In particular once we control for district effects (column 9), the negative effect of immigration on low wage women disappears, maybe due to unobserved correlation

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[27]The results considering the standard definition of high education used in the rest of the analysis are consistent, though the coefficients lower in magnitude.

at district level, not fully accounted for by the individual fixed effects. As a results an increase of 1 percentage point in the local share of immigrants brings about an increase in the probability of giving birth for high wage women by 3 percentage points, with no reduction in the labour supply.

6   Robustness

The above results point to the evidence that immigration increases (the intensive margin of) the labour supply for high skilled women without reducing their fertility. At the same time immigration fosters fertility without reducing the hours worked by high wage women in couples, in addition rising the likelihood that they switch to full time jobs. Overall, we argue that this evidence can be interpreted as a positive effect of immigration on reducing the trade-off between fertility and labour supply. Despite our identification being based on a 2SLS strategy that should exploit the exogenous variation in immigration, potential unobserved factors could still linger and drive part of our results. Therefore in this section[28] we try to verify how our effects hold to a series of robustness checks. First, we start by considering the sample of men as a control group. If the mechanism driving our results is due to the contribution of immigrants to household production, we expect men to be, if anything, much less responsive in their labour supply, given their lower contribution to the household production relatively to women. In addition, omitted demand conditions varying over time could be correlated to both the presence of immigrants in a local area and labour supply decision of natives. In such a case the effect that we find would be rather due to complementarity effects in production. The supply shift brought about by immigration would shift the labour demand curve for natives, and we should find similar positive effects also on the labour supply of men. The results on the sample of men (columns 1-3, Table A.4)

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[28]All the relevant results are reported in the Appendix.

are reassuringly in contrast to the presence of complementarity effects. There is no effect on men throughout all measures of labour supply. However, given that the elasticity of labour supply is very small for men, often not different from zero and lower than the one for women (Blundell and MaCurdy, 1999), we might also fail to detect any reaction of labour supply of men - despite their complementarity with immigrants (Manacorda et al., 2012)- because their labour supply function is extremely rigid. In such a case, the results on wages would unveil if this complementarity effects is at work. However, the results (columns 4-5, Table A.4) confirm that there are no effects on wages for either gender, thus complementarity effects do not seem to play any role.

As an additional robustness check, we run a falsification exercise selecting only older women still in the labour force, between 45 and 65 age. Again, if the mechanism driving the increase in labour supply without any reduction in fertility operates through a reduction in the trade-off between fertility and labour supply, we should not find the same results on older women, as in fact Table A.5 shows. An additional concern would be due to the endogenous moving of women. Women willing to work longer hours can move to areas characterized by higher job opportunities and favourable demand conditions. At the same time these areas can also attract immigrants moving towards thriving labour markets. In such a case we would observe a spurious positive correlation between immigration and labour supply. In order to control for such a mechanism we replicate the main analysis excluding people self-reporting they ever moved because of job opportunities/job-related reasons in any of the years considered. The results are almost unchanged (Table A.6). Our estimates provide per each regression, the total effect of immigration on labour supply and fertility, without taking into account the correlation in the cross-equation error terms, given the extremely low conditional correlation found. However, the results are unaffected by the correlation in the cross-equation error terms. This is evident from Table A.7, where we additionally

control for the fertility spell in the labour supply equations (columns 1-4), and for current labour supply in the regressions on fertility (columns 5-6).

7   Conclusion

The impact of immigration on the host country's labour market has been largely investigated. Immigrants can be thought as substitutes for time intensive tasks of the household production such as housekeeping, food preparation, and care activities. In turn the market structure of household services can affect both fertility and child care decisions. If immigrants replace natives in household production, ultimately we expect them to have an impact on labour supply and fertility decisions of women, in particular women in their reproductive age. Given the reversal in the negative relationship between fertility and labour force participation observed in many developed countries as well as in the UK, this paper tries to investigate which role immigration plays in explaining this pattern, in addition to the role attributed to more institutional factors, such as flexibility of working time, availability of part time jobs, and parental leaves, and child care opportunities.

Despite other studies have already provided robust evidence that immigrants foster female native labour supply, in particular for the high-skilled component, the evidence on the impact on fertility is largely unexplored, in particular at the individual level.

This paper tries to fill this gap looking at the role played by immigration on individual decisions of fertility and labour supply for young native women, controlling for unobserved individual heterogeneity, and endogeneity of immigrants location. Analyzing the case of Britain, our results first show that immigration affects the market structure of household services, in particular domestic services such as housekeeping, and food preparation, by increasing their size and reducing their market cost. In contrast no effect has been found on

the child care sector. In addition, we confirm previous findings about the positive impact of immigration on the labour supply of highly educated women. Immigrants rise the working hours of highly educated young women and the probability of shifting from a part time to a full time job without reducing their fertility. Despite not having effect on total fertility, immigration rises the cumulative fertility for high educated mature women, as well as for high wage women in couples. Our results are robust to potential omitted factors which can be linked to the production side of the economy, such as complementarity effects as well as to endogenous moving of natives. We argue that our findings might operate through the contribution of immigrants to household services, given the effects of immigration on the market structure of these services. Immigrants therefore may represent one additional factor responsible for the observed reduction in the negative correlation between fertility and labour supply in Britain, similarly as for the US (Furtado and Hock, 2010).

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Table 1: Summary statistics

Variable	Mean	Std. Dev.	N
Work	0.788	0.409	11,320
Weekly Working Hours	32.705	12.424	8,801
Full time	0.646	0.478	8,846
Share Immigrants	0.07	0.077	11,320
High edu-College+	0.399	0.49	11,320
Age	33.113	6.993	11,320
Care (more than 20hrs)	0.025	0.157	11,320
Numb Children 0-2	0.14	0.369	11,320
Numb Children 3-4	0.14	0.364	11,320
Numb Children 5-15	0.747	0.942	11,320
Numb Children 16-18	0.056	0.244	11,320
Couple	0.736	0.441	11,320
Father in Household	0.069	0.254	11,320
Mother in Household	0.101	0.301	11,320

Source: BHPS. 2003-2007

Table 2: labour Supply by Fertility Spell and Education

	Low Skilled		High Skilled	
	W/o Birth	**With Birth**	**W/o Birth**	**With Birth**
	Panel A. Probability of Working			
2003	0.75	0.46	0.87	0.74
2007	0.75	0.62	0.89	0.81
Change (pp)	0	+18	+2	+7
	Panel B. Weekly Working hours			
2003	31.40	26.25	34.78	28.64
2007	31.99	26.54	34.43	31.67
Change (%)	0	+2	-1	+10
	Panel C. Full Time			
2003	0.60	0.50	0.71	0.50
2007	0.64	0.41	0.69	0.62
Change (pp)	+4	-9	-2	+12

Source: BHPS, 2003-2007. The heading "With Birth" refers to people with a fertility spell, defined as an indicator of having a child aged less than one year old. "Low Skilled" refers to less than college education as defined in the text. Sample: British women, 20-44 year old.

Table 3: Correlation between Fertility and labour Supply by local Share of Immigrants

	High Share Imm	Low Share Imm	Total
	Panel A. Work-Birth Spell		
2003	-0.16	-0.09	-0.12
2007	-0.06	-0.08	-0.07
	Panel B. Weekly Working Hours-Birth Spell		
2003	-0.14	-0.04	-0.09
2007	-0.07	-0.10	-0.08

Source: BHPS. 2003-2007. Each entry represents the correlation coefficient between an indicator for working and a fertility spell (Panel A); weekly working hours and a fertility spell (Panel B). A fertility spell is defined as an indicator for having a child aged less than one year old. Sample: British women, 20-44 year old.

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Table 4: The Effect of Immigration on Household Services

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	Base				Hous Serv		Child Care		Low Skilled Occ	
	Employment									
Share Im	0.06**	0.29**	0.06**	0.38**	0.07***	0.27**	-0.02	0.11	0.00	0.18
	(0.03)	(0.14)	(0.03)	(0.15)	(0.03)	(0.11)	(0.01)	(0.09)	(0.03)	(0.17)
Mean Dep.var.	0.12				0.10		0.02		0.20	
F-stats		10.47		11.17		11.17		11.17		11.17
N	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706	1,706
	Hourly wage (log)									
Share Im	-0.09	-1.05	-0.08	-1.15	0.06	-1.75**	-0.32	0.93	-0.09	0.26
	(0.13)	(0.76)	(0.13)	(0.76)	(0.15)	(0.89)	(0.27)	(1.68)	(0.10)	(0.54)
Mean Dep.var.	1.83				1.80		1.89		1.96	
F-stats		13.16		13.87		13.87		9.34		19.89
N	1,705	1,705	1,705	1,705	1,704	1,704	1,575	1,575	1,706	1,706
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Mean Share Imm	0.08									

Source: QLFS. 2003-2007. Common controls: district and time fixed effects. The dependent variables are: the share of employed in household services in the labour force by district-year cell (heading Employment), and the (log) average hourly wage of workers in the household services by district-year cell (heading Hourly wage (log)). The method of estimation is reported in the heading. Additional controls: (log) median high skilled male income, share of high skilled women, share of families with children 0-2 aged. All regressions are weighted using the cell size of the dependent variable. Robust standard errors in parenthesis, significance: * p<.1, ** p<.05, *** p<.01.

Table 5: The Effect of Immigration on Labour Supply

	(1)	(2)	(3)	(4)	(5)	(6)
	Work/not Work		**Week Hours (log)**		**Full time**	
	OLS					
Share Im	0.07	0.07	-0.37*	-0.09	-0.01	0.20
	(0.16)	(0.18)	(0.21)	(0.24)	(0.18)	(0.24)
Share Imxhs	0.13	0.22	1.00***	0.77**	0.63***	0.33
	(0.21)	(0.26)	(0.27)	(0.35)	(0.22)	(0.31)
	2SLS					
Share Im	0.19	0.65	-0.80**	1.17	-0.30	0.64
	(0.30)	(1.33)	(0.38)	(2.61)	(0.33)	(1.85)
Share Imxhs	-0.08	0.19	1.54***	1.48***	1.08***	1.24**
	(0.33)	(0.41)	(0.40)	(0.47)	(0.34)	(0.50)
Mean Dep. var	0.78		3.39		0.65	
Mean Dep. varxhs	0.87		3.48		0.69	
Mean Share Imm	0.08					
LAD-FE	yes		yes		yes	
N	11,320	11,320	8,624	8,624	8,679	8,679

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is: OLS or 2SLS, according to the heading, including individual fixed effects. The dependent variables reported in the heading, are: an indicator for working/not working, (log) of week working hours, and an indicator for working full time. Additional controls: (log) household income (- individual income), high education, age (and its sq.), 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table 6: The Effect of Immigration on Fertility

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	**2SLS**				**OLS**	**2SLS**	
		Birth$_{t+1}$		**1st Child**	**2nd Child**	**Cumulative Fertility**		
Share Im	-0.09	-0.11	0.55	-0.11	0.00	-0.85**	-1.49*	5.84*
	(0.12)	(0.17)	(0.95)	(0.13)	(0.09)	(0.40)	(0.85)	(3.28)
Share Imxhs	0.01	-0.09	-0.09	-0.03	-0.06	1.09**	1.69*	4.74**
	(0.14)	(0.18)	(0.20)	(0.15)	(0.09)	(0.53)	(0.99)	(2.05)
Mean Dep. var		0.06		0.02	0.04		1.37	
Mean Dep. varxhs		0.07		0.03	0.04		1.25	
Mean Share Imm	0.08							
LAD-FE			yes					yes
F-stats		113.71	5.52	113.71	113.71		39.74	3.72
N	11,320	11,320	11,320	11,320	11,320	7,023	7,023	7,023

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is: OLS or 2SLS, according to the heading, including individual fixed effects. The dependent variables reported in the heading, are: and indicator of a fertility spell occurring the subsequent year (columns 1-3), and indicator for a fertility spell occurring the subsequent year in case of the first child (column 4), in case of a second child (column 5), and the current number of children augmented by an indicator of a fertility spell occurring the subsequent year (columns 6-8). Additional controls: (log) household income (- individual income), high education, age (and its sq.), 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table 7: The Effect of Immigration on labour Supply and Fertility by Wage Percentile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full Sample			**Couples**					
Dep. var.	Week Hours (log)	Full time	Birth$_{t+1}$	Week Hours (log)	Full time	Birth$_{t+1}$	Week Hours (log)	Full time	Birth$_{t+1}$
Share Im	0.08	0.21	-0.26*	-0.09	0.31	-0.29	-0.75	0.87	2.33*
	(0.30)	(0.20)	(0.14)	(0.22)	(0.28)	(0.24)	(1.26)	(1.76)	(1.29)
Share ImxWage85	0.27	0.34	0.32*	0.33	0.55**	0.54**	0.23	0.52*	0.65**
	(0.23)	(0.23)	(0.18)	(0.22)	(0.22)	(0.26)	(0.30)	(0.27)	(0.28)
Mean Dep.var	3.40	0.66	0.06	3.36	0.62	0.07			
Mean Dep.varxWage85	3.44	0.72	0.08	3.41	0.67	0.10			
Mean Share Imm	0.08								
LAD-FE							yes	yes	yes
F-stats	101.35	101.37	101.35	62.88	62.88	62.88	6.55	6.52	6.55
N	8,105	8,068	8,105	5,827	5,806	5,827	5,827	5,806	5,827

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls: (log) household income (- individual income), indicator for wage above the 85 percentiles, age (and its sq.), indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Figure 1: Enclaves
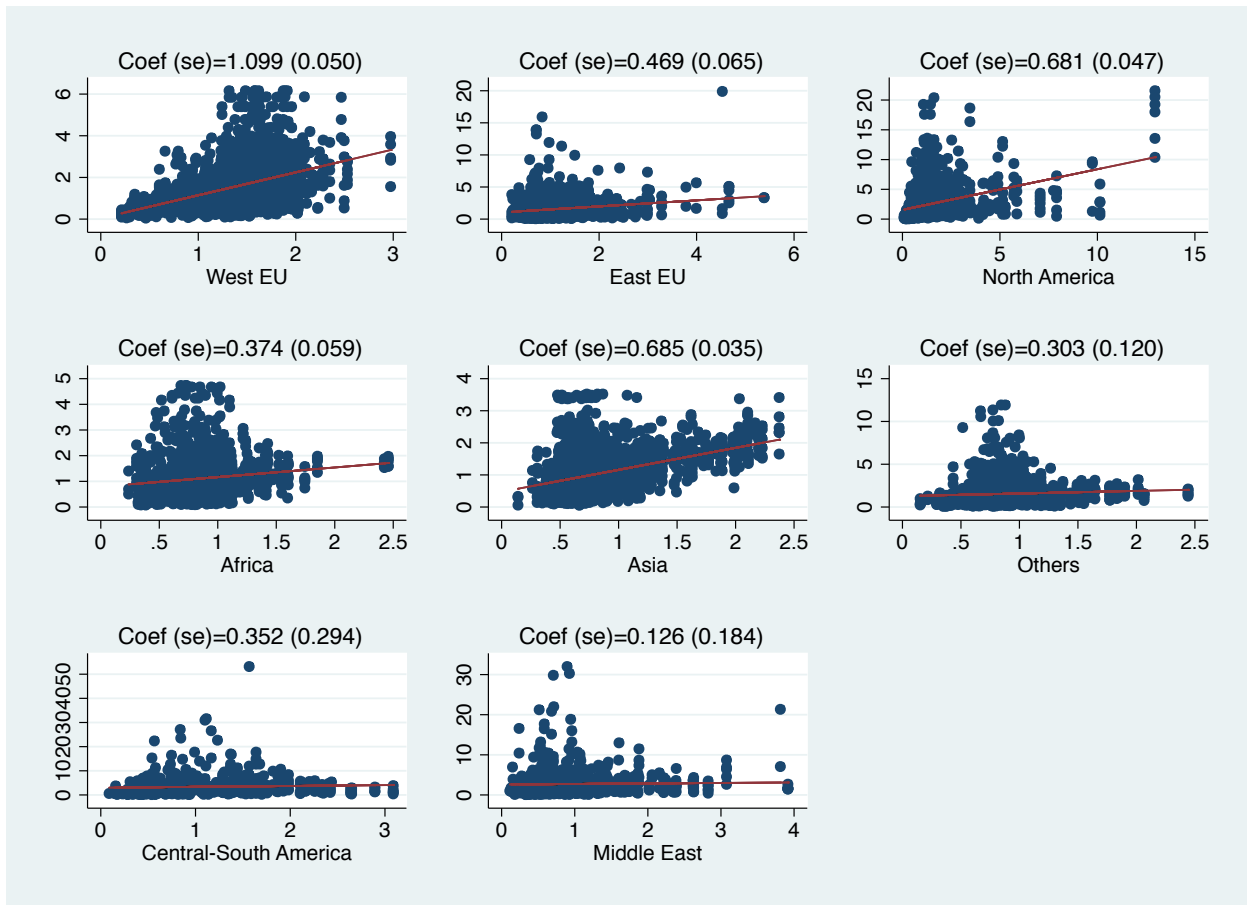
Source: 1991 UK Census and QLFS (2003-2007). Each point represents the aggregation index as described in the text, computed at the district level. The horizontal axis represents values of the aggregation index computed from Census data for 1991, the vertical axis represents values of the aggregation index computed using the QLFS for the period 2003-2007. The line represents the regression coefficient from regressing y-values on x-values.

Appendix

Table A.1: Distribution of Immigrants by Occupation (%)

Household Service	16.45
Professional	16.34
Manager	14.75
Associate Professional	14.58
Administrative	9.31
Process, Plants and Machine Operatives	7.98
Elementary Occupations	7.15
Sales and Costumer Services	6.53
Skilled Trades	5.04
Other Personal Service	1.89

Source: QLFS. 2003-2007

Table A.2: First Stage

	(1)	(2)	(3)	(4)	(5)	(6)
IV	0.35***	0.34***	0.34***	0.35***	0.34***	0.34***
	(0.10)	(0.10)	(0.10)	(0.12)	(0.12)	(0.12)
N	1,706	1,706	1,706	1,706	1,706	1,706
Cluster-LAD					yes	yes
FE		yes	yes	yes	yes	yes
Unempl Rate				yes		yes
First stage regressors			yes	yes	yes	yes

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. FE: district and time fixed effects. First Stage Regressors (district-year average values): higher education, age, (log) household income (- individual income), indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for intensity of care duties. Robust standard errors in parenthesis, significance: *p<.1, ** p<.05, *** p<.01.

Table A.3: The Effect of Immigration on Labour Supply by Presence of Young Children

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Work/not Work			Week Hours (log)			Full time		
Share Im	0.12	-2.26**	-2.40**	-0.28	-1.82	-2.78**	0.21	-2.13	-3.71*
	(0.25)	(1.08)	(1.10)	(0.44)	(1.43)	(1.31)	(0.33)	(2.06)	(2.18)
Share Imxhs	-0.00	3.45*	3.58*	1.12**	7.92*	8.19	0.42	8.99	9.21
	(0.34)	(1.81)	(1.85)	(0.49)	(4.75)	(4.98)	(0.38)	(7.54)	(7.95)
0-2 Age Child	no	yes	yes	no	yes	yes	no	yes	yes
Co-Resident Par			no			no			no
F-stats	154.10	21.56	23.67	101.76	0.94	0.90	104.25	0.76	0.72
N	9,646	1,221	1,159	7,626	672	641	7,664	688	658
Mean Dep. var	0.81	0.62	0.63	3.42	3.15	3.15	0.68	0.40	0.40
Mean Dep. varxhs	0.89	0.75	0.75	3.50	3.19	3.19	0.73	0.44	0.44
Mean Share Imm	0.08								

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls: (log) household income (- individual income), high education (no vocational training), age (and its sq.), indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table A.4: Robustness check. The Effect of Immigration on Labour Supply and Wage by Gender

	(1)	(2)	(3)	(4)	(5)
	Males			Females	Males
	Work	Week Hours (log)	Full Time	Hourly Wages	
Share Im	-0.13	0.23	-0.10	0.05	-0.18
	(0.36)	(0.31)	(0.30)	(0.33)	(0.41)
Share Imxhs	0.14	-0.06	0.13	0.60	0.53
	(0.29)	(0.39)	(0.35)	(0.37)	(0.42)
N	10,315	8,888	8,982	8,105	7,704

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls for labour supply regressions: (log) household income (- individual income), high education, age (and its sq.), 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Additional controls for wage regressions: high education, age (and its sq.), industry, and time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table A.5: Falsification Exercise. The Effect of Immigration on Labour Supply and Fertility. Older Women (45-65 Age)

	(1)	(2)	(3)	(4)
Dep. var.	Work/No Work	Week Hrs (log)	Full time	$Birth_{t+1}$
Share Im	0.50	0.68	0.62	-0.09
	(0.45)	(0.54)	(0.52)	(0.08)
Share Imxhs	1.04	1.55	1.65	0.21
	(0.66)	(1.19)	(1.66)	(0.21)
N	9,039	5,196	5,237	9,039

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls: (log) household income (- individual income), high education, age (and its sq.), indicator for children (4 age brackets), couple, 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table A.6: Endogenous Moving. The Effect of Immigration on Labour Supply and Fertility.

Dep. var.	(1) Work/No Work	(2) Week Hrs (log)	(3) Full time	(4) Birth$_{t+1}$
		Full Sample		
Share Im	0.19	-0.80**	-0.30	-0.11
	(0.30)	(0.38)	(0.33)	(0.17)
Share Imxhs	-0.08	1.54***	1.08***	-0.09
	(0.33)	(0.40)	(0.34)	(0.18)
N	11,320	8,624	8,679	11,320
		Exclude Movers for Employment/Job Opportunities		
Share Imm	0.05	-0.79**	-0.27	-0.05
	(0.24)	(0.35)	(0.26)	(0.20)
Share Immxhs	0.19	1.60***	1.09***	-0.04
	(0.31)	(0.39)	(0.31)	(0.20)
N	10,513	7,979	8,028	10,513

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls: (log) household income (- individual income), high education, age (and its sq.), 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.

Table A.7: Control for cross-equation Correlation. The Effect of Immigration on Labour Supply and Fertility

	(1)	(2)	(3)	(4)	(5)	(6)
	Work		**Week hours**		**Birth$_{t+1}$**	
Share Im	0.19	0.21	-0.80**	-0.77**	-0.11	-0.11
	(0.30)	(0.30)	(0.38)	(0.38)	(0.17)	(0.17)
ShareImxhs	-0.08	-0.09	1.54***	1.54***	-0.09	-0.09
	(0.33)	(0.33)	(0.40)	(0.40)	(0.18)	(0.18)
Birth$_t$		-0.04***		-0.03*		
		(0.01)		(0.02)		
Work$_t$						-0.01
						(0.01)
F-stats	113.71	113.68	78.68	78.57	113.71	113.67
N	11,320	11,320	8,624	8,624	11,320	11,320

Source: BHPS and QLFS (2003-2007), 1991 Census data for the computation of the instrument. The method of estimation is 2SLS including individual fixed effects. The dependent variables are reported in the heading. Additional controls: (log) household income (- individual income), high education, age (and its sq.), occupation (only for week hours), 4 indicators for number of children (4 age brackets), couple, co-resident father, co-resident mother, indicator for the intensity of care duties, unemployment rate, time fixed effects. Standard errors clustered at individual and district level, significance: *p<.1, ** p<.05, *** p<.01.