



BANCA D'ITALIA  
EUROSISTEMA

## Temi di Discussione

(Working Papers)

With a little help from abroad: the effect of low-skilled immigration on the female labor supply

by Guglielmo Barone and Sauro Mocetti

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# WITH A LITTLE HELP FROM ABROAD: THE EFFECT OF LOW-SKILLED IMMIGRATION ON THE FEMALE LABOUR SUPPLY

by Guglielmo Barone\* and Sauro Mocetti\*

## Abstract

In this paper we examine whether and how the inflow of female immigrants who “specialize” in household production affects the labor supply of Italian women. To identify the causal effect, we exploit the family reunification motive and the network effects - i.e. the tendency of newly arriving female immigrants to settle in places where males of the same country already live - as an instrument for the geographical distribution of female foreign workers. We find that the higher the number of immigrants who provide household services the more time native Italian women spend at work (intensive margin) without affecting their labor force participation (extensive margin). The impact is concentrated on the highly skilled women whose time has a higher opportunity cost. These results also hold after a battery of robustness checks. Some further evidence confirms that the impact passes through the substitution in household work rather than complementarities in the production sector. Finally, we show that immigration arises as a substitute to publicly provided welfare services, although this raises concerns about the fairness and the sustainability of this private and informal welfare model.

**JEL Classification:** J22, J61.

**Keywords:** immigration, female labor supply, household production.

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## 1. INTRODUCTION\*

In developed countries, female immigrants largely provide household services, such as housekeeping and caring for children and the elderly. At the same time, household responsibilities constrain the female labor supply, especially in those countries where women are more engaged in these activities because of cultural models and/or the inadequacy of welfare policies. Despite this, the connection between immigration and the female labor supply has received little attention. In the literature on the female labor supply, the focus is on the lack of and costs of care services with almost no attention being given to the role of female immigrants who largely provide those services. On the other hand, studies analyzing the impact of immigration on the host country focus on the degree of substitutability in the production sector. The potential substitutability in household production, where most of the female immigrants are employed, is surprisingly under investigated. Moreover, the impact of immigration on the native labor supply is examined for the extensive margin (employment or labor force participation), never for the intensive margin (hours worked).

In this paper, we examine the link between immigration and the female labor supply in the Italian context. Italy is an interesting case as it has registered a recent and exceptional increase in low-skilled immigration. At the end of 2008, there were about 3.9 million resident foreigners (6.5 percent of the population), and it has become a prime destination of migration flows in the EU. At the same time, the proportion of low-skilled immigrants (and of those employed in domestic services) is much larger than in other European countries and in the U.S. The female component has gained increasing relevance and now exceeds that of men. Italy is peculiar also in terms of the female labor supply as it performs poorly in an international comparison concerning the extent of labor force participation and time use.<sup>1</sup> In 2008, the female activity rate was the second lowest in EU 27. In addition, among the employed women, how they use their time is markedly different because they spend more time performing household activities than their European counterparts (from a minimum of one and one-half hours to a maximum of nearly five hours per week). Alesina and Ichino (2009) document the large size of unpaid family work and its implications for female labor supply decisions.

To examine whether and how the inflow of female immigrants has affected the Italian women's labor supply, we combine microdata drawn from the 2006–2008 waves of the Labor Force Survey (LFS) with aggregate data on the presence of immigrants at the local labor market (LLM) level. LLMs are clusters of

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<sup>1</sup> Traditional explanations include cultural reasons and the inadequacy of child and elder care services (Chiuri, 2000; Bettio and Plantenga, 2004; Del Boca and Vuri, 2007). Tensions on the female labor supply are particularly strong for the current generation that is sandwiched between care for their aging parents and for their children (Marenzi and Pagani, 2008).

municipalities, which are grouped based on commuting patterns that can be interpreted as self-contained labor markets. In our opinion, they represent a more appropriate territorial configuration with respect to larger administrative areas (e.g., regions or provinces) to examine the interaction between natives and immigrants. The most important reason is that domestic services cannot be traded outside of a local market. In order to identify the household production substitution effect, we do not consider overall immigration but only female immigrants specialized in housekeeping, child care, and elder care (specialized immigrants, hereafter).

Estimating the impact of specialized immigration by standard OLS might lead to biased results for several reasons. Local omitted variables (e.g., local amenities) might affect both the immigrants' location choices and the native labor supply. Moreover, reverse causality might be at work if a higher intensity of work of native females leads to a higher demand of specialized immigrants. Finally, there might be some concerns about the measure of our key explanatory variable due to undocumented immigrants. To deal with these issues, we adopt an instrumental variable strategy that, in our opinion, represents a slight improvement with respect to the prevailing approach. We exploit the tendency of newly arriving *female* immigrants to settle in places where *males* of the same country already live to build an instrument for the current geographical distribution of female foreign workers. The use of previous settlements is widely accepted in the migration literature, and the exogeneity of the instrument relies on the fact that the *historical* distribution across geographical areas is unrelated to the *current* economic conditions of the same areas (Card, 2001). However, local shocks that are sufficiently persistent across time might threaten its validity. To strengthen the exogeneity of the instrument, we exploit the fact that pull (labor market) factors differ substantially between male and female foreign workers.

We find that a higher incidence of immigrants who provide household services has a positive and significant impact on hours worked by native women. On the other hand, the effect on the extensive margin (labor force participation) is not significantly different from zero. Our finding on the intensity of work is fully driven by highly skilled women, whereas a similar effect is not found for low-skilled women whose time has a lower opportunity cost. These results hold also after a battery of robustness checks. Some further pieces of evidence confirm that the impact passes through the substitution in household work rather than complementarities in the production sector. Indeed, specialized immigration is correlated with domestic service supply indicators. The impact of specialized immigration is also larger for women with more care responsibilities (i.e., with children under three or permanently disabled persons at home). Other groups of immigrants, not specialized in domestic services, do not exert a similar impact on hours worked by highly skilled Italian women; and, on the other hand, specialized immigrants do not affect hours worked by men who are much less engaged in domestic work. Finally, we find that immigration arises as a substitute for welfare services provided at the local level because its impact is stronger in those municipalities where social and family policies are less developed.

The rest of the paper is organized as follows. In section 2, we review the literature on immigration and female labor supply. The empirical approach, the



data, and the identification strategy are discussed in section 3, whereas in section 4 we present our main findings and provide some robustness checks. In section 5, we focus on hours worked by highly skilled natives, and we provide further evidence on the household production channel and the interaction between specialized immigration and the welfare services publicly provided at the local level. Section 6 presents some concluding remarks.

## 2. LITERATURE AND THEORETICAL BACKGROUND

This paper is at the crossing of two strands of the literature. The first is related to the impact of immigration on host countries. The second concerns the incentives and the constraints that affect the female labor supply.

The effects of immigration are traditionally viewed in terms of complementarity or substitutability with natives in the production sector (Card, 2001; Borjas, 2003; Ottaviano and Peri, 2006).<sup>2</sup> In addition, the empirical evidence on Italian data is mostly focused on these issues. Venturini and Villosio (2006) and D'Amuri and Pinotti (2010) examine the impact of immigration on labor market opportunities for natives. Accetturo et al. (2009) assess the impact of low-skilled immigration on firms' investment decisions.<sup>3</sup> However, another channel might be at work: immigrants may be substitute natives in the production of household services. This, in turn, may affect the native labor supply by removing a preexisting rationing and/or by reducing the market price of those services. Although female immigrants represent a significant fraction of the labor employed in household services, the effect of their inflows on the native labor supply through the household production channel is poorly investigated. Moreover, the studies on the impact of immigration on the native labor supply focus on the extensive margin (employment rate or labor force participation) and very seldom on the intensive margin (hours worked).

The second strand of the literature on which we draw deals with incentives and constraints on the female labor supply. Connelly (1992), Powell (1998), Anderson and Levine (1999), Gelbach (2002), and Baker et al. (2008), among others, have highlighted the importance of the supply and prices of child care and other family services. In addition, in this case, the role of the female immigrants who largely provide (informal) household services from housekeeping to child and elder care has been nearly ignored.

Recently, some papers have attempted to bridge the gap. Cortes and Tessada (2009) examine the impact of low-skilled immigration on the labor supply of highly skilled U.S. women. They find no effect on the extensive margin and significant effects on the intensive margin. Farrè et al. (2009) use a similar approach for Spain. They find no effect on the probability of being employed and a significant effect on hours worked. The latter is found for both low and highly skilled natives. Furtado and Hock (2008) use a slightly different perspective and examine how immigration affects the work-fertility trade-off in the U.S. They find that immigrant-led declines in child-care costs increase the joint likelihood of

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<sup>2</sup> See Okkerse (2008) and the works cited therein for a review of the literature.

<sup>3</sup> Brandolini et al. (2005) find that there is a statistically significant wage differential between natives and immigrants mostly because immigrants usually work in less-productive firms.

childbearing and employment, indicating a substantial reduction in role incompatibility between the two.

Italy certainly represents an interesting case study in this respect. As shown in Figure 1, the female activity rate is 51.6, more than 12 percentage points below the EU average. In terms of time use, Italian women devote considerably more time to domestic activities with respect to their European counterparts. In addition, among employed women, as reported in Figure 2, an Italian woman spends nearly four hours per day in domestic work, a figure much higher than the European average.<sup>4</sup> In terms of hours worked, the evidence is mixed, even though the fraction of women working 40 hours per week or more (41 percent) is below the U.S. and the OECD average.<sup>5</sup> The usual explanations for these figures are cultural motives that have shaped a model of a family where women are primarily responsible for unpaid work at home and men are the breadwinners and the inadequate welfare policies that have affected gender relations and constrained women's labor supply (Chiuri, 2000; Bettio and Plantenga, 2004; Del Boca and Vuri, 2007). In the welfare state literature, Italy is the archetype of the Mediterranean or Southern model (Ferrera, 1996), where the family plays a fundamental role, and, at the same time, family policies are extraordinarily underdeveloped. However, recent inflows of immigrants have represented a partial remedy to the inadequacy of welfare policies. As it is quite evident from Figure 3, a significant fraction of foreign-born employment is in private households (11.4).<sup>6</sup> Comparable figures are recorded in Spain, whereas the foreign workers employed in households are considerably lower in Germany, France, and the U.S., and they are almost negligible in the Scandinavian countries.

Therefore, it is likely that the increase of low-skilled immigration has led to a substitution of native women as producers and distributors of welfare within the family. This, in turn, might have increased the native women's labor supply. We expect that this effect is stronger for those women who have a higher opportunity cost of their time.<sup>7</sup> A concern with this interpretation is that low-skilled immigration might also affect the labor supply of native women through other channels, such as interactions in the production sector. To identify the household production channel, we focus on specialized immigrants and provide some further pieces of evidence supporting our interpretation. We also examine the interaction between care services provided by immigrants and those publicly provided by local municipalities.<sup>8</sup>

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<sup>4</sup> Domestic activities include, among others, cleaning a dwelling, food preparation, dishwashing, laundry and ironing, child care, and help to the elderly.

<sup>5</sup> See OECD, <http://www.oecd.org/dataoecd/1/33/43199420.xls>.

<sup>6</sup> See Bettio et al. (2006) for a discussion on the "care drain" phenomenon and the specificities of Italy.

<sup>7</sup> Mazzolari and Ragusa (2007) document that skilled workers demand more of market substitutes for home production activities.

<sup>8</sup> It is worth noting that substitution in domestic activities might also imply more leisure instead of more time spent at work. Unfortunately, we observe only hours worked. However, it is reasonable to expect that substitution in household production affects both hours worked and leisure time and that our findings underestimate the overall effect.

### 3. EMPIRICAL STRATEGY AND DATA

We exploit the geographical heterogeneity of the immigrant distribution as a main source of variability (so-called “area-approach”). We estimate a reduced form equation of the female labor supply explained by individual characteristics (age, education, number of children, marital status, etc.), local context variables (female unemployment rate, GDP per worker, population density), and by the incidence of female immigrants specialized in household production:

$$LS_{i,t} = const + IMMIGR_{i,t-1}\beta + X_i\gamma + Z_i\delta + FIXED\ EFFECTS + \varepsilon_{i,t}$$

where  $LS$  is the outcome variable, and  $i$  and  $t$  denote individuals and years, respectively. We consider two outcomes variables: labor force participation and weekly hours worked, conditional on working a positive number of hours.  $IMMIGR$  is the one-year lagged incidence of specialized immigrants in the LLM  $l$  where woman  $i$  resides.  $X$  is a matrix of individual-level controls;  $Z$  includes controls at the LLM level. We also add season and year dummies to take out the effects of seasonality and other economic-wide conditions that could shape the labor supply, regional fixed effects to capture unobserved variables at that territorial level, and dummies obtained interacting regions and year to capture the regional business cycles.

#### 3.1. Data and Variables

Information on the female labor supply is drawn from the LFS. The main objective of the survey is to supply accurate and official statistics regarding the employed and unemployed population in Italy; however, incomes are not available. The survey is conducted on a quarterly basis, and the representative sample is approximately 76.800 families per period. We pool data from the quarterly 2006, 2007, and 2008 waves. Our sample is restricted to the females in the age bracket 15–64 (working age population).

Table 1 shows the main descriptive statistics of our sample. As far as our outcome variables are concerned, one-half of the sample participates in the labor market with a huge heterogeneity across educational levels: the participation rate varies from about 36 percent for those with at most compulsory education to 83 percent for those with a university degree. When looking at the intensive margin, employed Italian women work on average nearly 33 hours per week. The number of hours is higher for those with at most compulsory education and for those with a post-graduate degree. Women with children under the age of three work two and one-fourth hours less than other women.

Individual data on the female labor supply are matched with aggregate data on the presence of immigrants at the local level. Our chosen territorial unit of analysis is the LLM, which is a cluster of municipalities representing a self-contained labor market, built by the Italian National Institute of Statistics (Istat) based on the degree of workday commuting by the residents. We think that the data represent the best territorial configuration in terms of labor market features and probably the most appropriate units to analyze externalities from immigration.

We also prefer to use LLMs instead of a larger partition of the territory because the supply of domestic services is intrinsically local and cannot be traded outside a small cluster of cities. It is worth noting that in our data one immigrant out of four works in a municipality that is different from that in which he resides, whereas almost everyone works in the same LLM in which he lives.

Immigration in Italy has increased significantly in recent years. At the end of 2008, there were about 3.9 million resident foreigners, 6.5 percent of the resident population against less than 1 percent in 1991. Immigration is mostly low skilled. According to the OECD (2009), in Italy, about 10 percent of the non-OECD immigrants have a tertiary degree against 23 percent in Spain and about 30 in France, Sweden, the UK, and the U.S. The female component has gained increasing relevance and now exceeds that of men, against about 40 percent at the beginning of the 1990s. The growth of female immigration has to be attributed to a considerable extent to reunification motives. In 2008, more than half of female residence permits were for family reasons.

Because we are interested in investigating the household production channel, our key explanatory variable is not immigration *tout court* but female immigration specialized in household services. Specialization is defined on a home-country basis. Using microdata from the LFS, we computed for each country the share employed in domestic services, which includes unqualified personnel assigned to cleaning services, toilets, laundry, sanitary, and other services to families. We define as specialized countries the first 10 countries in terms of these shares provided that the number of observations in the citizenship cell is greater than 200. In alphabetical order, the countries are: Ecuador, Moldavia, Morocco, Peru, Philippines, Poland, Romania, Russia, Sri Lanka, and Ukraine. Female immigrants from these 10 countries are characterized by high employment rates and the fact that they work disproportionately in household services (see Figure 4 for a comparison with other female immigrants).<sup>9</sup> Three out of five work in this sector (almost 90 percent for the Philippines and Sri Lanka, around 70 percent for Ecuador, Peru, and Ukraine); in contrast, among the other largest communities, the percentage diminishes to around one-third for female immigrants from Albania and to 3 percent for those from China. Whereas specialized immigrants represent less than 4 percent of the overall female employment, they account for nearly one-fourth of the employment in domestic services. Specialized immigrants have increased significantly in recent years: they represented about 23 percent of overall female immigrants in the mid 1990s versus more than 53 percent at the end of 2008.

We also consider a large number of other explanatory variables to control for additional individual and local determinants of labor supply. Descriptive statistics are reported in Table 1.

### **3.2. Instrumental Variable**

There are some threats to the validity of our empirical strategy. First,

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<sup>9</sup> See Bettio et al. (2006) for an analysis on immigrant care workers. See Accetturo and Infante (2009) for an analysis on variability across ethnic groups in terms of female immigrants' labor supply.

immigrants are not randomly distributed across labor markets, and this makes it difficult to isolate the effect of immigration on natives from other associated phenomena. Namely, there might be some local omitted variable (e.g., local amenities and/or the local degree of economic development) that might attract immigrants and, at the same time, affect the natives' labor supply decisions. Second, reverse causality might be at work: native females who work more intensively could attract a higher number of specialized immigrants. Third, there might be some concerns about the measure of our key variable due to undocumented immigrants.<sup>10</sup> To address these issues, we adopt an instrumental variable strategy.<sup>11</sup>

Our instrument is a modified version of the standard “shift-share methodology” (Card, 2001) that exploits the fact that immigrants tend to settle in places where immigrants from the same country already reside. In this approach, the predicted end-of-period composition of a region's immigrant population can be computed based on its beginning-of-period composition by country of origin and subsequent inflows. One potential criticism is that if local economic shocks that attracted immigrants at the beginning-of-period are persistent over time the instrument cannot credibly solve the endogeneity problem. We believe that our approach represents an improvement in this direction. In fact, we distinguish immigrants by gender, recognizing that pull (labor market) factors that attract *male* immigrants are significantly different from those that attract *female* immigrants. Figure 5 provides a graphical intuition for this: 55 percent of male immigrants are employed in the industrial and construction sectors against less than 10 percent of females. At the same time, about 65 percent of females work in public, social, and family services against 12 percent of males.<sup>12</sup>

The instrument is built as follows. First, we compute the fraction of *male* immigrants living in LLM  $l$  in 1995 by country-of-birth  $c$ ; the countries are those whose females we define as specialized in household production. Then, we apply the ratios obtained in the first step as weights to distribute across the LLMs the new waves of *female* immigrants from the same countries. Finally, we collapse the number of immigrants by country to obtain the total predicted immigrants by LLM-year. Formally:

$$\overline{IMM}_{lt} = \sum_{c=1}^{10} \delta_{cl} \cdot IMM_{ct}$$

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<sup>10</sup> Notice that our fixed effects control for the incidence of undocumented immigrants that varies by region, year, and interaction region per year.

<sup>11</sup> There can be a fourth possible source of bias. The implicit assumption of our empirical specification is that LLMs are closed, thus ignoring the in- and out-migration of natives in response to immigrant inflows (Borjas' critique). The IV strategy does not address this source of bias; therefore, in the empirical section, we check the robustness of our results taking into account this further issue.

<sup>12</sup> It is worth noting that the distribution by gender of immigrants from specialized countries is not homogenous across LLMs: in 1995, the percentage of females was 43, and it varied from a maximum of 72 to a minimum of 25; the interquartile range with respect to the median was 27 percent.

where  $\delta_{cl}$  measures the fraction of male immigrants from country  $c$  that are settled in LLM  $l$  in 1995, and  $IMM_{ct}$  represents the total number of female immigrants from the same country at time  $t$  in Italy.<sup>13</sup>

Concerning the relevance of our instrumental variable, in Table 2, we report the first-stage regression. According to these estimates, the predicted share of specialized immigrants is strongly correlated with the actual share. Moreover, an increase of 1 percent in the instrumental variable increases the share of specialized immigrants by 0.28 percent. The associated  $t$  and  $F$  statistics are, respectively, above 8 and 70, which allow us to clearly reject the null of weak instrument (see Stock and Yogo, 2005).

In summary, the exogeneity of our instrument relies on the fact that previous settlements are unrelated to current local economic conditions and that pull factors differ significantly between males and females. On the other hand, the correlation between the instrument and the (potentially) endogenous variable is guaranteed by the fact that the network effect and reunification motives play an important role for immigrants' location choices.<sup>14</sup> First-stage estimates support the relevance of our instrument.

## 4. RESULTS

In the following subsection, we report ML/OLS and IV estimates for both labor force participation and hours worked. We consider the overall sample of native women in the working age and two subsamples defined based on the educational level to account for (potential) differential effects. Namely, we define as low educated those with at most compulsory schooling and as highly educated those with a university degree. In subsection 4.2, we provide some robustness checks.

### 4.1. Baseline Results

Consider first the natives' labor force participation (see Table 3).<sup>15</sup> We present two empirical specifications. The more parsimonious one excludes variables referring to household structure that, in principle, might be influenced by immigration to identify its overall effect. For example, Furtado and Hock (2008) find that low-skilled immigration increases the joint likelihood of childbearing and employment. According to our estimates, in all the specifications, schooling is positively related to labor force participation. Looking at the household variables, the number of children is one of the most important

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<sup>13</sup> The distribution of immigrants by gender, countries, and LLMs in 1995 is obtained by combining two different data sources provided by Istat. Data for Moldavia are available starting from 1998.

<sup>14</sup> Bartel (1989) is the first to show that settlement patterns of previous immigrants are a main determinant of immigrants' location choices. Previous migrants might ease the arrival of newcomers by helping them in finding jobs and by providing an existing social network. In addition to network effects, our instrument exploits reunification motives: about one-half of female immigrants obtain a residence permit thanks to family reasons.

<sup>15</sup> In all regressions henceforth reported, standard errors are clustered at the LLM-level to meet the Moulton (1990) critique.

determinants of labor supply decisions. The impact is stronger for small children and lower for children of school age. On average, having a child under the age of three reduces by 40 percent the probability of being active in the labor force. If the child is of school age (six or older), the effect is much more limited: the probability of being active is reduced by 10 percent. The presence of elderly people (over 65) in the family has a negative effect on labor force participation. The effect of this variable is unclear on a priori ground. On one hand, some elderly people might need special care, thus inducing women to stay at home. On the other hand, they can take care of small children and thus, to the contrary, make it easier for young mothers to work more. The interpretation of the effect of persons permanently unable to work is unambiguous, and it corresponds to a reduction by 60 percent on the likelihood of being active. These findings are fairly similar across education groups and largely confirm the role of family responsibilities in affecting female labor supply decisions.<sup>16</sup> Turning to our key variable, probit estimates show that immigration does not affect the labor force participation of Italian woman. Splitting our sample according to the educational level, it turns out that immigrant inflow has a weakly positive effect on graduates' choices, although it remains not significantly different from zero in the case of a woman with at most compulsory education. When we enrich the model with household variables (last three columns), the coefficient of specialized immigrants is no more significant for highly educated natives. However, as stated before, there are many potential sources of bias, and we have to rely on an instrumental variable strategy. IV estimates are reported in Table 3, Panel B. According to these estimates, the impact of specialized immigrants on female labor force participation is not significantly different from zero in all specifications and for both the subsamples.

We now turn our attention to the intensive margin of the labor supply, the OLS estimates reported in Table 4, Panel A. The coefficients of our control variables have the same sign of those estimated in the labor-force-participation equation, except for elderly people. Again, the impact of children is sizeable and is stronger for children of the preschool age. Having a child under the age of three reduces by about two and one-half hours the number of weekly hours worked; the impact is 45 minutes for children aged six or more. The presence of specialized immigrants is now significantly and positively associated with hours worked by native females. The effect is driven by the highly educated subgroup. In Panel B, we report IV estimates that lead to an upward revision of the OLS ones because the effect on the intensity of work turns out to be stronger and more statistically significant. This would suggest the existence of unobservables that are positively correlated with immigration and negatively correlated with hours worked. According to these estimates, a 1 percent increase in the incidence of specialized immigrants leads to an increase in the hours worked of about 20 minutes per week; again, the effect is driven by highly educated natives for whom the estimated impact is around half an hour (corresponding to 1.6 percent of the weekly hours worked). For low-educated natives, the impact is not significantly

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<sup>16</sup> As mentioned above, we also include further variables at the individual and local level. For the sake of simplicity (and because they are relatively less important for our purposes), we do not comment on these additional estimates.

different from zero. Note also that the magnitude of the estimated parameters with and without household characteristics, which are potentially shaped by immigration, are not very different, signaling that the effect of immigration on hours worked is mainly a *direct* effect and that indirect effects through other channels (e.g., fertility decisions) are negligible in our data. Therefore, in what follows, we focus on the richer model that is our preferred specification.

Overall, our results highlight the fact that female immigrants change the time use of highly skilled natives without affecting their labor force participation.<sup>17</sup> Our interpretation is that immigrants replace household work and highly educated natives can supply a higher number of hours, specializing in the production of goods and services that better suit their competencies. The substitution effect in household production is arguably more important at the margin because employed women can decide to “buy” housekeeping activities for a limited number of hours per week or rely on informal and flexible child care arrangements (without being forced to work fewer hours). This result is also consistent with the existence of fixed costs that hamper female labor force participation and that are not removed by low-skilled immigration.

## 4.2. Robustness

A well-known drawback of the area approach is that native workers are mobile across local labor markets. Therefore, they might offset the supply shocks created by low-skilled immigration, thus undermining the identification of the true relationship between immigration and labor market outcomes. For example, adapting the argument by Borjas (2003), if the arrival of one low-skilled immigrant leads one low-skilled native to move to other LLMs, then low-skilled immigration would have no detectable impact on the supply of household services at the LLM level.<sup>18</sup> This mechanism would lead to an underestimation of the impact of low-skilled immigration. To control for this type of labor market adjustment, we exclude from our sample the observations in the LLMs belonging to the lower or the upper decile of the distribution of the low-educated native female net rate (normalized with respect to the overall female population). The results are substantially unaffected (see Table 5). Another potential source of bias is the selective self-assignment of individuals to LLMs in response to immigration. Therefore, we restrict our regressions to the subsample of “stayers” (those who have not changed their place of residence in the last years). Again, our results are unaffected. All in all, we recognize that these tests might not be fully conclusive; however, the available evidence suggests that native internal mobility in response to immigration is not an issue in our data.

As a further robustness check, we consider the subsample of married women to add comparability with the literature on the determinants of the female labor

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<sup>17</sup> D’Amuri and Pinotti (2010) find a positive and significant effect of immigration on female natives’ employment. However, we argue that our findings on the extensive margin are not in contrast with theirs because we focus on specialized immigration, whereas they consider overall immigration. When we modify our target regressor to include all nationalities, the effect on labor force participation turns out to be significantly greater than zero.

<sup>18</sup> Mocetti and Porello (2010) show that immigration in Italy has a displacement effect on low-educated natives (both for male and females).



supply.<sup>19</sup> Being married might affect the labor supply for several reasons. A husband's socioeconomic status affects the family income and, through this, the wife's labor supply. Moreover, having husbands who contribute to domestic activities makes it easier for women to reconcile work and family. Therefore, in Table 6, we consider only married women and introduce controls for the husband's schooling, employment status, professional qualification, and hours worked (if any). Our baseline results are substantially unaffected.

In the first three columns of Table 7, we consider as a dependent variable the discrete choice between part-time and full-time work in order to account for the non-normality of the distribution of hours worked.<sup>20</sup> The dependent variable takes the value of one if the woman is employed full time and zero otherwise. The incidence of specialized immigrants significantly and positively affects the probability of women to work full time. The impact is stronger for women with a university degree, but it is now extended also to those with a lower educational level. In the last three columns, we restrict the analysis to the subsample of full-time workers. Again, we find a positive relationship between specialized immigration and intensity of work, driven by the highly educated component.

Finally, we control the robustness of our results on the intensive margin using a different definition for skilled women. So far, we have adopted a partition of the population in skill groups according to the educational level. In Table 8, we consider a different partition relying on professional qualifications and the type of job. We find that the impact of specialized immigrants is higher and statistically significant for highly skilled professions (lawyers, executives, highly specialized professions, etc.). A 1 percent increase of the incidence of specialized immigration leads to an increase of 40 minutes per week of time devoted to work. The impact is positive and significant also for medium-high skilled women (technical profession employees), whereas it is null for the remaining working population. Therefore, our results are robust to different definitions of skill groups. However, it is worth noting that native occupation and the skill content of the job might itself be endogenous (Peri and Sparber, 2009). Therefore, a definition of the skill group in terms of educational level is arguably more appropriate.<sup>21</sup>

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<sup>19</sup> Connelly (1992), Ribar (1992), and Powell (1998), among the others, examine labor supply for married women only.

<sup>20</sup> Hours worked has a bimodal distribution with two peaks at around 20 and 40 hours.

<sup>21</sup> Our findings on the intensive margin might suffer from a selectivity bias arising from the fact that hours worked are observed only for employed women. To tackle this issue, we run two further empirical exercises. First, we consider a standard Heckman selection model. As there are unlikely to be any variables affecting the labor supply on the extensive margin that do not affect it on the intensive margin, the second-stage equation is identified by the nonlinearity of the functional form. In a further check, we use the labor-force-participation status in the previous year as an exclusion restriction. Though we recognize that these choices might be not fully satisfying, we did not find in the empirical literature an alternative and more convincing exclusion restriction. Second, we treat unemployed woman as zero-hour workers and estimate an IV tobit model. Both exercises confirm our baseline effects: specialized immigrants increase the hours worked by native females, and the effect is driven by the highly skill segment of the population. Estimates are available upon request.

## 5. REFINEMENTS

So far, we found that specialized immigration has a positive and significant impact on the number of hours worked by highly skilled Italian women. We interpreted this evidence as the effect of substitution in domestic activities. Notwithstanding, there might be competing stories explaining the same patterns of results without relying on the household production channel. The next subsection is dedicated to finding other pieces of evidence in support of our interpretation. Moreover, if the effect passes through the provision of care services, one might be interested in analyzing the interaction between specialized immigrants and the amount of welfare services publicly provided at the local level. This last point is addressed in subsection 5.2.

### 5.1. Is the Household Transmission Channel at Work?

Low-skilled immigrants might substitute native females in the domestic activities allowing them to spend more time at work. However, the impact of immigration on hours worked might also pass through other channels. The most obvious is via wages. Low-skilled immigrants might be complementary to highly skilled Italian women, thus increasing their productivity and their wages (and their incentive to spend more time at work). If so, the positive link between immigration and hours worked is not related to the household production transmission channel, but it is the result of the interaction in the production sector. As a second kind of mechanism, note that the increase in the number of immigrant workers in a firm might expand the need for coordination and management activities, thus increasing the number of hours worked by (native) managers and executives. If these alternative stories are correct, it is not clear what really drives the positive observed effect.

We believe that the way in which we construct our explanatory variable (specialized immigrants) reduces the scope for other interpretations. Still, there is room for them. In the following, we provide some further evidence suggesting that household production is the channel at work. First, we examine whether and how the inflows of these immigrants have affected prices and quantities of domestic services. Second, we verify whether our results are reinforced when we consider the subsample of women with more care responsibilities and confirmed when we change the explanatory variable (using female immigrants less specialized in domestic services and more specialized in the production sector) or the dependent variable (hours worked by native men who are clearly less engaged in domestic activities than native women).

The first test for the existence of the household production channel consists in verifying whether the inflow of specialized immigrants has produced some effects in terms of availability and the prices of domestic services. In Table 9, we provide some empirical evidence on it. Data on prices are collected by Istat, and they are available for only 35 provincial capitals out of 103 for years 2002–2008. An IV regression of domestic service price growth on specialized immigrants' growth shows that the latter variable has a negative but statistically weak effect on

price dynamics (first column).<sup>22</sup> As far as the quantity side is concerned, we find a positive and statistically significant relationship between the overall employment in domestic services, and our key left-hand-side variable (second column). Even though a complete analysis of these effects is beyond the scope of the paper, these simple evidences show that specialized immigration has affected domestic service supply by increasing quantity and slightly reducing prices.

In Table 10, we report our baseline estimate in the first column that is contrasted with those obtained when (i) considering the subsample of women with more care responsibilities, (ii) changing the definition of the dependent variable, and (iii) changing the definition of the independent variable. Let us discuss them in turn. If household production is the channel at work, the impact of a specialized immigrant would be stronger for women who have more care responsibilities.<sup>23</sup> According to Del Boca and Vuri (2007), in Italy, coverage rates for children under the age of three is very low (6 percent) from an international perspective; therefore, women with children under the age of three are expected to be more sensitive to alternative and informal supplies of child services (nannies). A similar reasoning can be applied in the case of cohabiting individuals who are permanently unable to work. In fact, we find that the estimated coefficient is higher for women with children under the age of three and/or with permanently disabled persons at home (second column). In the third column, we replace the first 10 countries specialized in domestic activities with the first 10 among the remaining countries in terms of size.<sup>24</sup> The instrument is modified accordingly. Female foreign workers in this second group of countries are much less involved in domestic activities (the proportion is one-half that of specialized immigrants) and are more represented in the industry and in commercial activities. Therefore, if the impact of low-skilled immigration passes through the interactions in the production sector, we would expect a stronger relationship with hours worked by highly skilled women; contrarily, if the impact passes through the household production channel, we would expect, if any, a weaker relationship. According to our estimates, the coefficient is not statistically different from zero thus reinforcing our interpretation on the importance of the household production channel. Finally, in the fourth column, we consider men's hours worked in place of women's. The argument is similar as above. If the impact of specialized immigration passes through the interactions in the production sector, we would expect a positive relationship with men's hours worked; in contrast, if the impact passes through the household production channel, we would expect, if any, a weaker relationship because Italian males are much less involved in domestic activities than females.<sup>25</sup> We find a positive but not statistically significant

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<sup>22</sup> We consider price growth because a price index is the only available variable.

<sup>23</sup> We rank family responsibilities in terms of children, the age of children, and the presence at home of persons permanently unable to work. As far as elderly people are concerned, not knowing their health makes it difficult to contemplate whether this represents a burden or an asset for the family.

<sup>24</sup> They are, in alphabetical order, Albania, Brazil, China, Egypt, Ghana, India, Macedonia, Nigeria, Serbia, and Tunisia.

<sup>25</sup> In Italy, there is a very unequal distribution of domestic activities between males and females. According to the Harmonised European Time Use Survey, the time spent in household activities by Italian employed women is 3.3 times higher than that by employed men, whereas the

relationship. In summary, the evidence reported in Table 10 supports the idea that the impact is a result of the outsourcing of household production.<sup>26</sup>

## 5.2. Does Female Immigration Substitute for Welfare Policies?

Our last question concerns whether and how specialized immigration interacts with publicly provided welfare services. To address this issue, we collect data on the welfare services at the municipal level.

We consider municipalities because entitlements for the welfare services are residence based. Moreover, in Italy, a significant amount of those services are provided at that level. The number of spaces in the child-care structures (*asili nido*) and their costs are set by local governments, and they vary significantly from one municipality to another (Del Boca and Vuri, 2007; Zollino, 2008). Similarly, municipalities differ substantially in their assistance to elderly people.

From the 2001 Census, we draw information on the number of employees in child-care institutions, preschools, elder care, and other forms of social assistance. This figure has been normalized with respect to the population under six and over 65. Moreover, from the balance sheets of Italian municipalities, we collect data on local public spending for welfare services.<sup>27</sup> Namely, we refer to child care, elder care, and other social care spending. Again, we normalize these figures to obtain per capita measures.

We add these further controls and their interaction with the incidence of specialized immigration, and, consistently, we focus on hours worked by women with children under the age of six, elderly people, or persons permanently unable to work at home. In all the specifications, we find that specialized immigrants continue to have a sizeable and statistically significant impact on the intensity of work of highly educated natives (Table 11). Moreover, as expected, the number employed in social care and the amount of welfare spending have a positive and significant impact. However, the most interesting result is the negative and significant relationship between specialized immigration and publicly provided welfare service indicators. That is, the (positive) impact of specialized immigration is stronger in those municipalities where welfare policies are less developed. According to these estimates, the impact of specialized immigration on the weekly hours worked by highly educated women is 40 minutes for those living in municipalities at the 25th percentile in terms of employees in welfare services, and diminishes to 20 minutes for those living in municipalities at the 75th percentile. Similarly, the impact of specialized immigration diminishes from 60 to 35 minutes when passing from municipalities at the 25th percentile to those

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corresponding figure is 2.6 for Spain and less than 2 for the other main European countries (Istat, 2008).

<sup>26</sup> A further potential explanation of our results passes through gender reallocation of labor in response to immigration: if foreign workers displace native males, native females might be induced to increase their labor supply. However, D'Amuri and Pinotti (2010) and Mocetti and Porello (2010) do not find evidence of a displacement effect on Italian males; if any, immigrants turn out to be complements of highly skilled natives.

<sup>27</sup> These data include detailed measures of revenues and expenditures as gathered by the Ministry of Internal Affairs. They are electronically available for the period 2001–2005. We consider the average of the period in order to smooth imputation errors and other sources of noise.

at the 75th percentile in terms of social public spending per capita.

These findings confirm once again that household production is the channel at work, and they also show that specialized immigrants arise as substitutes for welfare policies.

## **6. CONCLUDING REMARKS**

In this paper, we examined the impact of immigration on the female labor supply. To identify a causal link, we adopt an instrumental variable strategy. Our instrument is intended to isolate the “exogenous” component of immigrant distribution across LLMs using the existence of previous enclaves of males as a determinant of the current distribution of females. The validity of the instrument relies on the fact that previous settlements are reasonably unrelated to current economic conditions and that pull factors for males differ significantly from those of females.

We find that a higher incidence of immigrants who supply household services enables native women to spend more time at work without affecting their labor force participation. The impact is concentrated on highly skilled women who have a higher opportunity cost of their time. These results hold also after a battery of robustness checks, including those related to Borjas’ critique. Some further pieces of evidence confirm that the impact passes through substitution in household work rather than complementarities in the production sector. First, the inflows of specialized immigrants have affected prices and quantities of domestic services. Second, we find that the impact of specialized immigration is larger for those women who have more care responsibilities. Third, the impact on hours worked is not found when we change the explanatory variable (using female immigrants who are less specialized in domestic services and more specialized in the production sector) or the dependent variable (using hours worked by native men who are clearly less engaged in domestic activities than native women). Finally, we find that immigration arises as a substitute for child care and social spending at the municipal level.

From a policy maker’s point of view, it is debatable whether this model of welfare is a proper one. The choice to use the services of migrant women has ensured the continuity of a model of assistance originally based on the family (familism). Wives have been substituted, to some extent, by nannies and housekeepers in household production activities. However, this private welfare model raises complex issues in terms of equity and sustainability. Equity relates to the fact that these services, though cheaper, might still continue to be unaffordable for less advantaged families. Sustainability, in turn, depends on the maintenance of this large supply of low-skilled immigrants. Indeed, better economic prospects in the countries of origin or in different destination countries might narrow the immigrant inflows.

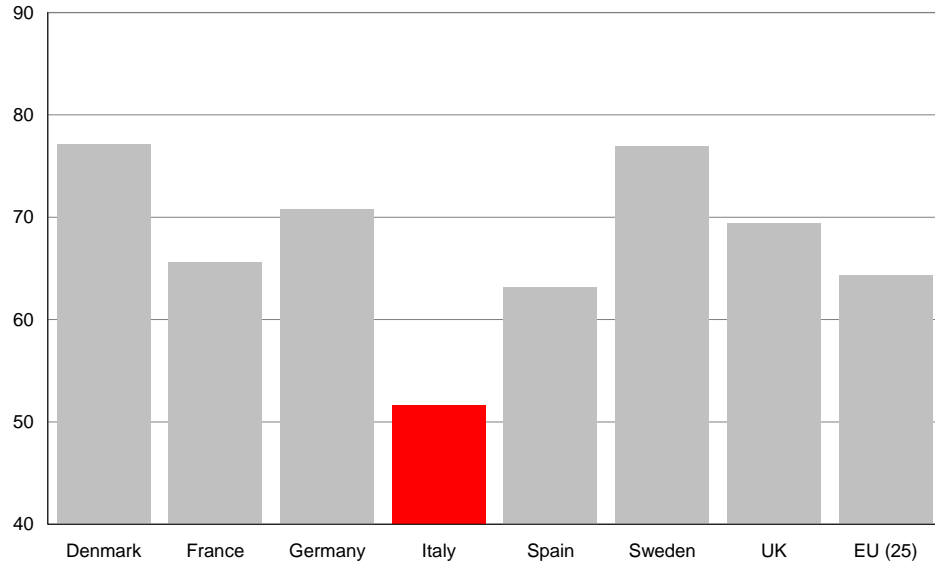
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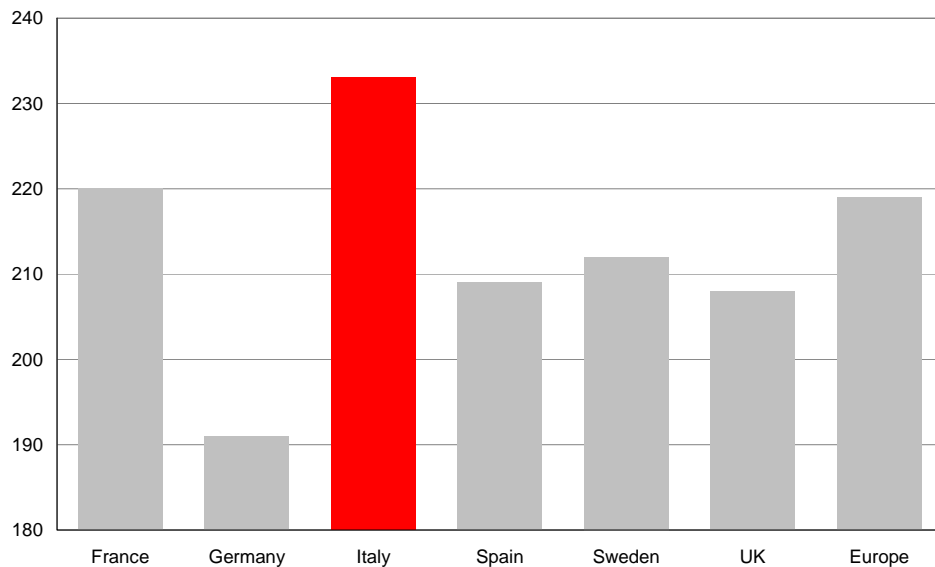
## Figures

**Figure 1: Female Labor Force Participation**



Figures refer to 2008. Source: Eurostat ([http://nui.epp.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi\\_act\\_a&lang=en](http://nui.epp.eurostat.ec.europa.eu/nui/show.do?dataset=lfsi_act_a&lang=en)).

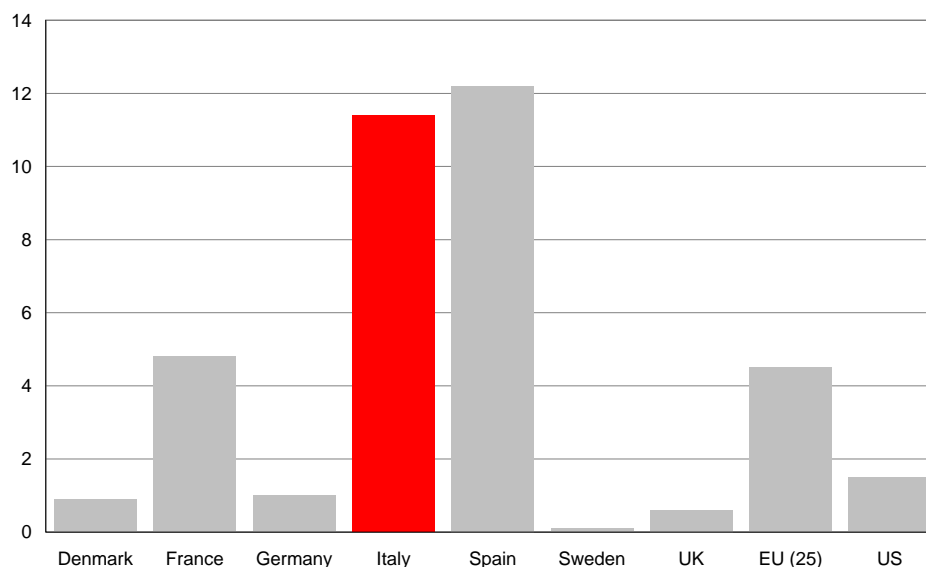
**Figure 2: Number of Minutes per Day Devoted to Domestic Activities**



Minutes per day devoted to domestic work by employed females. The domestic work indeed includes all the activities relative to meal preparation, house cleaning, household members' care, plant and animal care, goods and household maintenance, shopping, and various other tasks. The figure for Europe is obtained as a simple average of the 15 countries contained in the database of the *Harmonised European Time Use Survey*. Source: Istat (2008).

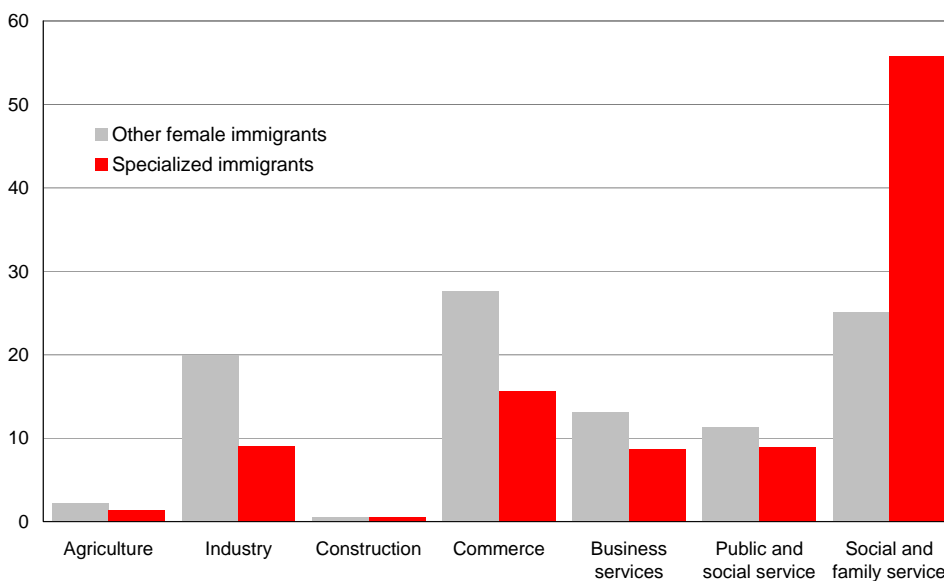


**Figure 3: Fraction of Foreign-born Employment in Private Households**



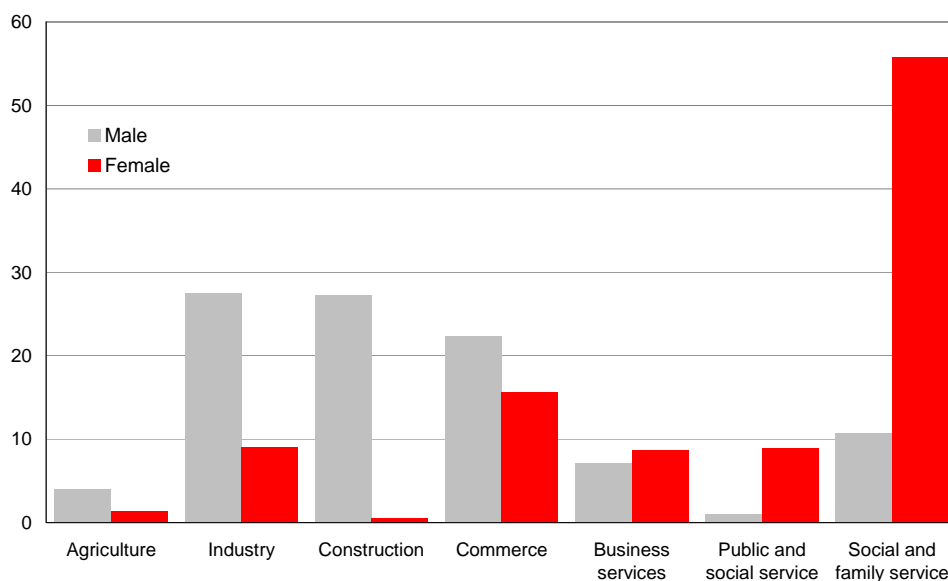
Figures refer to 2007 (for EU25 refer to 2005–2006 average). Source: OECD (2009).

**Figure 4: Sectoral Distribution of Specialized vs. Other Female Immigrants**



Sectoral distribution by country of female foreign workers. Specialized immigrants come from Ecuador, Moldavia, Morocco, Peru, Philippines, Poland, Romania, Russia, Sri Lanka, and Ukraine; other female immigrants come from the remaining countries. Commerce includes commerce, hotel, restaurants, transport and communications; business services include financial intermediation and business and professional services; public and social services include public administration, health, education, and other social services. The figures are averages for years 2006–2008. Source: LFS.

**Figure 5: Sectoral Distribution of Specialized Immigrants by Gender**



Sectoral distribution by gender of foreign workers from Ecuador, Moldavia, Morocco, Peru, Philippines, Poland, Romania, Russia, Sri Lanka, and Ukraine. Commerce include commerce, hotel, restaurants, transport and communications; business services include financial intermediation and business and professional services; public and social services include public administration, health, education, and other social services. The figures are averages for years 2006–2008. Source: LFS.

## Tables

**Table 1: Descriptive Statistics**

	Mean	St. dev.	Min.	Max.
Labor force participation	0.507	0.500	0.000	1.000
Weekly hours worked	32.895	11.539	1.000	129.000
Specialized immigrants	2.132	1.353	0.000	7.310
Age	47.338	10.428	15.000	65.000
Schooling	9.920	4.179	0.000	21.000
Married	0.791	0.407	0.000	1.000
# children under 3	0.097	0.317	0.000	4.000
# children aged 3–5	0.108	0.332	0.000	4.000
# children aged 6 or more	0.977	0.964	0.000	11.000
# elderly people (aged 65 or more)	0.146	0.384	0.000	6.000
# (persons permanently) unable to work	0.017	0.134	0.000	5.000
Temporary contract	0.098	0.298	0.000	1.000
Log Tenure	4.527	1.286	0.000	6.475
Stayer	0.975	0.157	0.000	1.000
Female unemployment rate	16.785	12.412	1.955	51.025
Density	0.485	0.736	0.012	3.989
Log GDP per worker	10.792	0.174	10.085	11.195

Further controls at the individual level include dummies for sector of activity (2 digits), professional qualification (2 digits) and commuting behavior. All the variables at the individual level are drawn from LFS; all variables at the local level are taken from Istat.

**Table 2: First-stage Regression**

	(1)	(2)
Instrument	0.347*** (0.040)	0.350*** (0.042)
FE	YES	YES
Local controls		YES
First stage F-statistics	73.6	70.7
Observations	1,424	1,424

The dependent variable is the incidence of specialized immigrants over the total female population at the LLM level. The instrumental variable is the incidence of specialized immigrants built using previous settlements of males from the same countries. Fixed effects (FE) include year and regional dummies. Local controls include the female unemployment rate, GDP per worker, and population density at the LLM level. The dataset is obtained by pooling data at the LLM level for the period 2006–2008. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 3: Specialized Immigrants and Labor Force Participation**

	Panel A – Probit estimates					
	Parsimonious specification			Baseline specification		
	All sample	Low-educated	Highly educated	All sample	Low-educated	Highly educated
Specialized immigrants	-0.007 (0.009)	-0.008 (0.013)	0.027* (0.014)	-0.007 (0.009)	-0.008 (0.013)	0.023 (0.014)
Age	0.230*** (0.005)	0.201*** (0.007)	0.378*** (0.010)	0.247*** (0.006)	0.212*** (0.007)	0.381*** (0.011)
Age squared	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.005*** (0.000)
Years of schooling	0.109*** (0.003)	0.083*** (0.004)	0.025*** (0.009)	0.108*** (0.003)	0.081*** (0.004)	0.028*** (0.009)
Married				-0.383*** (0.010)	-0.429*** (0.013)	-0.194*** (0.029)
# children under 3				-0.290*** (0.014)	-0.274*** (0.018)	-0.346*** (0.029)
# children aged 3–5				-0.208*** (0.010)	-0.230*** (0.015)	-0.219*** (0.024)
# children aged 6 or more				-0.074*** (0.006)	-0.071*** (0.007)	-0.015 (0.016)
# elderly people				-0.049*** (0.011)	-0.017 (0.013)	-0.200*** (0.033)
# unable to work				-0.462*** (0.030)	-0.424*** (0.034)	-0.441*** (0.126)
FE	YES	YES	YES	YES	YES	YES
Local controls	YES	YES	YES	YES	YES	YES
Observations	469,435	252,106	51,616	469,435	252,106	51,616

	Panel B – IV probit estimates					
	Parsimonious specification			Baseline specification		
	All sample	Low-educated	Highly-educated	All sample	Low-educated	Highly-educated
Specialized immigrants	0.015 (0.016)	0.021 (0.024)	0.031 (0.030)	0.011 (0.016)	0.019 (0.025)	0.024 (0.030)
Age	0.230*** (0.005)	0.201*** (0.007)	0.378*** (0.010)	0.247*** (0.006)	0.212*** (0.007)	0.381*** (0.011)
Age squared	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.005*** (0.000)
Years of schooling	0.109*** (0.003)	0.083*** (0.004)	0.025*** (0.009)	0.108*** (0.003)	0.081*** (0.004)	0.028*** (0.009)
Married				-0.383*** (0.010)	-0.429*** (0.013)	-0.194*** (0.029)
# children under 3				-0.290*** (0.014)	-0.274*** (0.018)	-0.346*** (0.029)
# children aged 3-5				-0.208*** (0.010)	-0.230*** (0.015)	-0.219*** (0.024)
# children aged 6 or more				-0.074*** (0.006)	-0.071*** (0.007)	-0.015 (0.016)
# elderly people				-0.049*** (0.011)	-0.017 (0.013)	-0.200*** (0.033)
# unable to work				-0.462*** (0.030)	-0.424*** (0.034)	-0.441*** (0.126)
FE	YES	YES	YES	YES	YES	YES
Local controls	YES	YES	YES	YES	YES	YES
Observations	469,435	252,106	51,616	469,435	252,106	51,616

The dependent variable is labor force participation, which is a dummy equal to 1 if a native woman participates in the labor market and 0 otherwise. Panel A shows probit estimates, panel B shows IV probit estimates (specialized immigrants are instrumented with previous settlements of males from the same countries). Fixed effects (FE) include season, year, region, and region × year dummies. Local controls include female unemployment rate, GDP per worker, and population density at the LLM level. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 4: Specialized Immigrants and Hours Worked**

	Panel A – OLS estimates					
	Parsimonious specification			Baseline specification		
	All sample	Low-educated	Highly educated	All sample	Low-educated	Highly educated
Specialized immigrants	0.162** (0.078)	0.131 (0.110)	0.249** (0.121)	0.159** (0.076)	0.137 (0.112)	0.197* (0.112)
Age	-0.298*** (0.040)	0.018 (0.060)	-0.563*** (0.100)	-0.077** (0.036)	0.095 (0.063)	-0.273*** (0.098)
Age squared	0.003*** (0.000)	-0.000 (0.001)	0.006*** (0.001)	0.000 (0.000)	-0.001* (0.001)	0.002** (0.001)
Years of schooling	0.068*** (0.015)	0.052 (0.051)	0.431*** (0.094)	0.072*** (0.014)	0.047 (0.051)	0.447*** (0.089)
Married				-1.879*** (0.096)	-1.811*** (0.159)	-1.536*** (0.188)
# children under 3				-2.619*** (0.133)	-2.357*** (0.281)	-3.212*** (0.196)
# children aged 3–5				-2.392*** (0.121)	-1.715*** (0.221)	-2.239*** (0.194)
# children aged 6 or more				-0.768*** (0.064)	-0.508*** (0.084)	-0.722*** (0.095)
# elderly people				0.254** (0.114)	0.250 (0.185)	-0.041 (0.255)
# unable to work				-0.590* (0.334)	-0.906* (0.479)	0.862 (0.922)
Job characteristics	YES	YES	YES	YES	YES	YES
FE	YES	YES	YES	YES	YES	YES
Local controls	YES	YES	YES	YES	YES	YES
Observations	183,653	64,899	32,162	183,653	64,899	32,162
	Panel B – IV estimates					
	Parsimonious specification			Baseline specification		
	All sample	Low-educated	Highly educated	All sample	Low-educated	Highly educated
Specialized immigrants	0.425*** (0.152)	0.353 (0.215)	0.589*** (0.209)	0.382*** (0.141)	0.341 (0.212)	0.495** (0.193)
Age	-0.298*** (0.040)	0.018 (0.059)	-0.563*** (0.100)	-0.077** (0.036)	0.094 (0.063)	-0.274*** (0.097)
Age squared	0.003*** (0.000)	-0.000 (0.001)	0.006*** (0.001)	0.000 (0.000)	-0.001* (0.001)	0.002** (0.001)
Years of schooling	0.066*** (0.015)	0.050 (0.051)	0.423*** (0.094)	0.071*** (0.014)	0.046 (0.051)	0.440*** (0.089)
Married				-1.883*** (0.096)	-1.816*** (0.159)	-1.532*** (0.187)
# children under 3				-2.616*** (0.133)	-2.354*** (0.280)	-3.207*** (0.195)
# children aged 3–5				-2.392*** (0.120)	-1.717*** (0.221)	-2.232*** (0.193)
# children aged 6 or more				-0.765*** (0.064)	-0.505*** (0.084)	-0.720*** (0.095)
# elderly people				0.260** (0.114)	0.255 (0.185)	-0.020 (0.252)
# unable to work				-0.578* (0.333)	-0.888* (0.479)	0.857 (0.915)
Job characteristics	YES	YES	YES	YES	YES	YES
FE	YES	YES	YES	YES	YES	YES
Local controls	YES	YES	YES	YES	YES	YES
Observations	183,653	64,899	32,162	183,653	64,899	32,162

The dependent variable is the number of weekly hours worked by native woman. Panel A shows OLS estimates, panel B shows IV estimates (specialized immigrants are instrumented with previous settlements of males from the same countries). Job characteristics include controls for temporary contracts, tenure, sector of activities, professional qualification and commuting behavior. Fixed effects (FE) include season, year, region and region × year dummies. Local controls include female unemployment rate, GDP per worker and population density at the LLM level. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 5: Robustness for Native Internal Mobility**

	Labor force participation					
	Controlling for native internal mobility			Subsample of stayers		
	All sample	Low- educated	Highly educated	All sample	Low- educated	Highly educated
Specialized immigrants	0.004 (0.020)	-0.009 (0.028)	0.040 (0.036)	0.008 (0.016)	0.016 (0.025)	0.019 (0.032)
Full set of controls	YES	YES	YES	YES	YES	YES
Observations	374,672	198,389	42,077	457,526	249,136	48,061
	Hours worked					
	Controlling for native internal mobility			Subsample of stayers		
	All sample	Low- educated	Highly educated	All sample	Low- educated	Highly educated
Specialized immigrants	0.314 (0.195)	0.185 (0.289)	0.613** (0.257)	0.403*** (0.143)	0.320 (0.227)	0.492*** (0.178)
Full set of controls	YES	YES	YES	YES	YES	YES
Observations	148,696	52,234	26,210	175,486	63,084	29,634

The dependent variables are labor force participation (dummy equal to 1 if native woman participates to labor market and 0 otherwise) and weekly hours worked. Specialized immigrants are instrumented with previous settlements of males from the same countries. We run an IV probit in the first panel and a regression with instrumental variable in the second one. When controlling for native internal mobility, we exclude observation belonging to the LLMs whose low-educated native female net rate is below the lower decile or above the upper decile; the net rate is calculated at the provincial level for reasons of data availability; stayers are those who have not changed their place of residence in the last years. Full set of controls include all the explanatory variables considered in Table 3 for labor force participation and in Table 4 for hours worked. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 6: Only Married**

	Labor force participation			Hours worked		
	All sample	Low- educated	Highly educated	All sample	Low- educated	Highly educated
Specialized immigrants	0.001 (0.020)	0.012 (0.030)	0.009 (0.032)	0.376** (0.164)	0.410 (0.251)	0.462** (0.209)
Full set of controls	YES	YES	YES	YES	YES	YES
Controls for the husband	YES	YES	YES	YES	YES	YES
Observations	371,167	202,818	38,403	137,628	48,893	23,583

The dependent variables are labor force participation (dummy equal to 1 if native woman participates to labor market and 0 otherwise) and hours worked. Specialized immigrants are instrumented with previous settlements of males from the same countries. We run an IVPROBIT in columns 1 to 3 and a regression with instrumental variable in columns 4 to 6. Full set of controls include all the explanatory variables considered in Table 3 for labor force participation and in Table 4 for hours worked; all the specifications include also controls for education, employment status, professional qualification, and hours worked of the husband. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 7: Further Results on Time Use**

	Full time vs. part time			Hours worked by full-time workers		
	All sample	Low-educated	Highly educated	All sample	Low-educated	Highly educated
Specialized immigrants	0.043** (0.019)	0.048* (0.027)	0.056** (0.027)	0.193** (0.094)	-0.014 (0.206)	0.351** (0.166)
Full set of controls	YES	YES	YES	YES	YES	YES
Observations	183,653	64,899	32,162	134,583	44,520	26,631

The dependent variable is a dummy variable (taking the value of 1 for full-time workers and 0 otherwise) in the first three columns, weekly hours worked in the last three columns. Specialized immigrants are instrumented with previous settlements of males from the same countries. We run an IV probit in columns 1 to 3 and a regression with instrumental variable in columns 4 to 6. Full set of controls include all the explanatory variables considered in Table 4. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 8: Skill Group by Profession**

	High skilled	Medium-high skilled	Medium-low skilled	Low skilled
Specialized immigrants	0.678** (0.297)	0.289** (0.127)	0.130 (0.246)	0.251 (0.275)
Full set of controls	YES	YES	YES	YES
Observations	28,363	77,417	52,892	24,929

The dependent variable is weekly hours worked. High-skilled professions include legislators, lawyers, executives, highly specialized professions, and entrepreneurs; middle-high skilled professions include technical professions and employees; middle-low skilled professions include artisans, workers in the commerce, specialized blue-collars; low skilled professions include low qualified jobs in industry and in the services. Specialized immigrants are instrumented with previous settlements of males from the same countries. Full set of controls include all the explanatory variables considered in Table 4. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 9: Specialized Immigrants and Price and Quantities of Domestic Services**

	Effects on prices	Effects on quantities
Specialized immigrants	-0.229 (0.249)	0.141*** (0.050)
Observations	246	721

The dependent variable is annual price growth rate in domestic services in the first column and log of employees in domestic services in the second column. The explanatory variable is specialized immigrant annual growth rate in the first column and the log of specialized immigrants in the second column. Both variables are instrumented with previous settlements of males from the same countries. The dataset is obtained by pooling data for the period 2002–2008; information are collected at the provincial level; price indexes are available only for a subsample of provincial capitals. Both specifications include controls for population and GDP per capita, and year and regional fixed effects. Standard errors are adjusted for clustering at the province level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 10: Further Evidence on the Household Production Channel**

	Hours worked by highly educated women	Hours worked by highly educated women with care responsibilities	Hours worked by highly educated women	Hours worked by highly educated men
Specialized immigrants	0.495** (0.193)	0.908** (0.435)		0.272 (0.195)
Not specialized immigrants			0.322 (0.517)	
Full set of controls	YES	YES	YES	YES
Observations	32,162	3,835	32,162	41,707

The dependent variable is weekly hours worked. Women with care responsibilities are those with children under three and/or people permanently unable to work at home. Countries with specialized immigrants are Ecuador, Moldavia, Morocco, Peru, Philippines, Poland, Romania, Russia, Sri Lanka, and Ukraine; countries with not specialized immigrants are the first 10, among the remaining countries, in terms of numerosity: Albania, Brazil, China, Egypt, Ghana, India, Macedonia, Nigeria, Serbia, and Tunisia. Both specialized immigrants and not specialized immigrants are instrumented with previous settlements of males from the corresponding countries. Full set of controls include all explanatory variables reported in Table 4. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 11: Interaction between Specialized Immigrants and Local Welfare Services**

	Interaction with employees in social services	Interaction with social public spending
Specialized immigrants	0.922** (0.415)	1.064** (0.461)
Employees in social services [ESS]	0.423** (0.202)	
Specialized immigrants × ESS	-0.120* (0.062)	
Social public spending [SPS]		5.977*** (2.039)
Specialized immigrants × SPS		-1.621*** (0.613)
Full set of controls	YES	YES
Observations	9,005	9,005

The dependent variable is weekly hours worked. Specialized immigrants are instrumented with previous settlements of males from the same countries. The analysis is restricted to highly educated women. In addition to the full set of controls (all explanatory variables reported in Table 4), we add employees in social care (employees in child care, maternal school, elderly care, and other social services at the municipal level normalized with respect to the population under six and over 65), social public spending (municipal spending in child, elderly, and social care normalized with respect to the population under 6 and over 65) and their interaction with specialized immigrants. The selected sample is native women with children under six persons over 65, or persons unable to work. Standard errors are adjusted for clustering at the LLM level. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.



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