Immigrant Inflows and Fertility Decisions of High-Skilled Native-Born Women*

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Abstract
While there is debate regarding the magnitude of the impact, immigrant inflows are generally understood to depress wages and increase employment in immigrant-intensive sectors. In light of the over-representation of the foreign-born in the childcare industry, this paper examines whether college-educated native women respond to immigrant-induced lower cost and potentially more convenient childcare options with increased fertility. An analysis of U.S. Census data between 1980 and 2000 suggests that immigrant inflows are indeed associated with increased likelihoods of having a baby, and responses are strongest among women who are most likely to use foreign-born nannies for childcare—namely, older, married women with a graduate degree. Given that high-skilled woman also respond to immigrant inflows by working long hours, the paper ends with an analysis of the types of women who are more likely to respond to better childcare options by having an additional child as opposed to increasing labor supply.

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1 Introduction

The foreign-born population of the United States has quadrupled since the passage of the Immigration and Nationality Act in 1965. Among politicians and academics, this has led to substantial interest in the socioeconomic consequences of the recent waves of immigration to the United States. Much of the existing research focuses on the potentially negative impact of immigration on the wages and employment rates of natives (Borjas 2003; Card 2001). Less attention has been paid to the potential benefits accruing to natives from immigration. This paper considers the impact of low-skilled immigrant inflows on childcare costs and how natives respond in terms of fertility decisions.

Decreases in the price and increases in the availability of childcare brought about by low-skilled immigration should imply reductions in the cost of childrearing. However, the theoretical impact of lower childrearing costs on childbearing is unclear given that women may respond to these lower costs by increasing labor supply (Blau and Robins 1989) instead of increasing fertility. Cortes and Tessada (2011) find that low-skilled immigration to large U.S. metropolitan areas led to increases in the number of hours worked of women at the top of the wage distribution. If these labor supply responses are sufficiently large, then immigrant-induced decreases in childcare costs may even decrease the likelihood of having a second or third child. Thus, the relationship between immigrant inflows and childbearing is an empirical question.

Any analysis of the impact of immigrant inflows must address the fact that immigrant location decisions are not exogenous. Estimates from our preferred city fixed effects specifications are biased upward if low-skilled immigrants are increasingly likely to settle in cities where high-skilled native-born women are developing stronger preferences for large families. On the other hand, if cities with booming economies are attracting more immigrants while at the same time providing better labor market opportunities for high-skilled women, then our ordinary least squares estimates will be biased downward. To address these potential concerns, I take an instrumental variables approach, common in the immigration literature, which relies on the propensity of new entrants to locate in areas with high historical concentrations of immigrants from the same country of origin (Bartel 1989; Card 2001).

Using data from the 1980 through 2000 U.S. Censuses on U.S.-born childbearing age women with college degrees, I find that increases in the number of low skilled immigrants in a city are associated with an increased probability that women in that city have given birth to a child within the previous year. Instrumental variables models suggest an even stronger impact implying that immigrants are less attracted to high fertility cities. I also show that immigrant inflows affect women of all ages and have the strongest impact on the decision to have higher order births. Estimates suggest an especially large impact on the decision to have a fourth child.

For evidence that immigrants are impacting native fertility decisions via childcare markets, I start by showing that metropolitan areas receiving more immigrants over time have larger decreases in the median wages of childcare workers. Pointing to a labor supply shock, a greater share of the labor force is working as childcare workers in these cities, although this latter effect is very small and not precisely estimated.

Next, I examine whether it is indeed the women that are most likely to use formal childcare options--as opposed to caring for their own children full time or using friends and family for childcare—who are most sensitive to immigrant inflows. Results suggest that women with graduate degrees are more sensitive to immigrant inflows than women with only college degrees. This points to a role played by childcare markets given that higher skilled women are less likely to live near family members and have higher opportunity costs of leaving the labor force. Interestingly, unmarried women do not at all respond to immigration to their cities by having additional children which makes sense if unmarried women are less likely to have carefully planned pregnancies.

As discussed above, this analysis complements a growing literature showing that women tend to work more hours in response to reduced childcare costs. While some women may respond to lower childcare costs by both increasing hours at work and having an additional child, it is probably more likely that some women respond to lower childcare costs by working longer hours while others respond by having an additional child. Because some policy-makers may be especially interested in increasing fertility rates while others may care more about labor market gender gaps, it may be useful to know how different types of women respond to lower childcare costs so that policies may be targeted appropriately.

To examine this issue, I start by reproducing the result in the literature that immigrant inflows tend to increase labor supply of high skilled women, especially at the top of the hours worked distribution (Cortes and Tessada 2011). I then examine the characteristics of women that tend respond to immigrant inflows by having an additional child as opposed to increasing the likelihood of working more than 50 hours a week. Some of the relationships depend on how the effects are measured, but it is clear that women with graduate degrees are relatively more likely than women with just college degrees to respond to immigrant inflows by having an additional child. Also, 27 to 31 year olds have the highest relative fertility responses.

The paper proceeds as follows. Section 2 places the analysis within the context of the literature on fertility, labor supply, and childrearing costs. A description of the data as well as the empirical model follows in Section 3. Section 4 presents baseline results while Section 5 explores the mechanisms through which immigrant inflows impact fertility decisions of natives. Section 6 examines the types of women who are relatively more likely to respond to immigrant inflows by changing fertility decisions as opposed to labor supply decisions. Finally, Section 7 provides additional discussion and concluding remarks.

2 Background

The relationships between childcare costs and fertility derived from even a simple economic model of simultaneous decision-making are fairly complicated (Blau and Robins 1989). A decrease in childrearing costs may increase desired fertility due to a standard price effect and increase desired labor supply by increasing the opportunity cost of time spent at home. Hasan and Zoabi (2011) present a model showing how high wage women might substitute housekeeping and babysitting services for their own time in household production thereby allowing them to increase fertility without sacrificing their careers. However, the time costs associated with childbearing, such as time spent on late night feedings, might offset the increase in desired labor supply, at least temporarily, for women who choose to have an additional child. It is also possible that the increase in desired labor supply is sufficient to induce a lower likelihood of childbearing if, for example, additional hours lead to promotions which make women rethink original plans to have a third or fourth child. Taking the opposite perspective, Lehrer and Kawasaki (1985) suggest that when adequate childcare is not affordable, women devote all of their energy into their domestic roles, thus increasing fertility. Hence, the net effect of changes in childrearing costs on fertility is an empirical question.

A number of studies have considered the relationship between childcare subsidies and fertility. For example, Mörk, Sjögren, and Svaleryd (2009) examined a Swedish childcare subsidy reform, finding that lower childcare costs led to higher fertility. Gonzalez (2011) also found a fertility response to an unanticipated universal child benefit in Spain. It is difficult to determine whether these results extend to a U.S. context where childcare subsidies are relatively small, at least for families in the middle and upper ends of the earnings distribution.

A handful of papers have considered the effects of childcare costs on both employment and fertility outcomes using U.S. data. Mason and Kuhlthau (1992) examined mothers' perceptions as to whether the availability of child care constrained their employment and fertility decisions. Blau and Robins (1989) analyzed transitions among employment and fertility states as related to geographic variation in weekly childcare expenditures. Modeling female labor supply and fertility jointly within a dynamic model, Moffitt (1984) found that higher wages are associated with shifts in lifetime profiles of fertility and employment. Taking a different approach, Stolzenberg and Waite (1984) examine how variation in the individual-level association between fertility and labor force participation is explained by conditions in the local childcare market. All of these studies provide results suggesting that lower childcare costs increase fertility but rely on potentially endogenous cost measures.

My analysis contributes to the childcare cost literature, but the main focus is on the effect of low-skilled immigration on fertility decisions of high-skilled native women. Despite large increases in the demand for child care in the United States over the years, there has been only a slow rise in its price, which Blau (2001) attributes to a large "unexplained" increase in the supply of labor to the childcare market. Blau and Curry (2006) suggest that the large numbers of low-skilled immigrants may have contributed to this phenomenon.[1] Cortes (2008) shows that low-skilled immigration has led to reductions in a pooled index of non-traded goods and services in major U.S. cities. Cortes and Tessada (2011) provide evidence that low-skilled immigration to the United States led to an increase in the hours worked among women at the top of the wage distribution. Similar conclusions have been reached for high skilled native females in Spain (Farré, Gonzalez, and Ortega 2011), Italy (Barone and Mocetti 2011), and Hong Kong (Cortes and Pan 2011). Furtado and Hock (2010) show that the correlation between fertility and labor force participation has become less negative in cities experiencing larger increases in their foreign-born populations. To my knowledge, no other paper directly examines the effect of immigrant inflows on fertility rates of high skilled native-born women.

3 Data and Empirical Specification

3.1 Data

The main sample was drawn from the U.S. Census Bureau's 1980, 1990, and 2000 public-use microdata sample (PUMS) files, while the 1970 census provided additional data used to construct the instrumental variable. All data were obtained from the Integrated Public Use Microdata Series (IPUMS, Ruggles et al. 2010).

The analysis focuses on low-skilled immigrants and high-skilled non-Hispanic native females of child-bearing age (age 22 to 39). Sharply differentiating immigrants and natives by skill minimizes the possibility of competition for jobs, which might directly affect female employment prospects. Analyzing non-Hispanic native females avoids non-market channels of influence, such as social norms and peer effects, which might arise from inflows of low-skilled immigrants to the United States, the bulk of whom are from Latin America and tend to have higher fertility rates. In the robustness check section, I examine

[1] Our calculations using data from the U.S. Census indicate that in 1970 roughly one quarter of both working-age immigrants and natives had advanced beyond high school. By 2006 over 60% of working-age natives had completed some post-secondary education, while the majority of working-age immigrants had a high school degree or less.

whether and how these restrictions matter for conclusions. Skill classes are based on education. "Low skilled" implies having, at most, a high school degree and never having attended college, while "high skilled" implies having completed a bachelor's degree. The native-born women who are still in school are dropped from the sample.

The underlying geographic sampling units defined by the Census Bureau have changed over time. The resulting inconsistencies in the degree to which the population of a metropolitan area is covered in the microdata files makes it difficult to construct metro-level variables that are comparable across years. To reduce the potential influence of these inconsistencies on the estimates, I include in the analysis only those MSAs that have consistent codes in the IPUMS between 1970 and 2000.

3.2 Empirical Specification

Consider a basic fixed-effects model of the impact of low-skilled immigration using pooled data from multiple Census years:

$$Y_{imt} = \beta_1 \log(LSI_{mt}) + \beta_2 \log(N_{mt}) + X_{imt}\beta_3 + \gamma_m + \gamma_t + e_{imt}$$

where Y_{imt} is equal to one if woman *i* living in MSA *m* in year *t* has a child who is less than a year of age in the household and zero otherwise.[2] The number of working age low-skilled immigrants is denoted *LSI* while *N* refers to the number of working age natives. MSA and year fixed effects are denoted γ_m and γ_t respectively while *e* is an error term. The vector of controls, *X,* includes a marriage dummy, a control for a graduate degree, and a full set of age dummies. To measure labor market opportunities for the high skilled women in the sample, I use the log of average yearly income among college-educated males living in the same MSA in the same year. To measure norms and preferences regarding family life, I use the proportion of the woman's age group living in her MSA in the same year that is married, the proportion black, and the proportion non-black and non-Hispanic. To minimize sampling error, I use only two age

[2] A mother who has given birth in the previous year but whose baby does not reside with her will not be counted in this fertility measure. Adoptive mothers, however, are treated as if they have given birth. Despite this, I use "having given birth" and "have a baby in the past year" interchangeably with "having a young child in the household" throughout the paper.

groups (age 22-30 and age 31 to 39), but results are robust to constructing three age groups and not separating into age groups at all.

Immigrant location decisions cannot be taken as exogenous even conditional on the controls used in the analysis. Immigrants may be drawn to areas with a booming labor market for low-skilled workers and shrinking market for high-skilled workers. The lower opportunity costs of time for high-skilled women may make childbearing more attractive. It is also possible that immigrants are attracted to cities with high demand for childcare workers—ie., cities with high birth rates. For both of these reasons, ordinary least squares estimates may yield upward biased estimates of the causal effect of immigration. Alternatively, immigrants may be attracted to cities with booming economies for both high skilled and low-skilled workers. If high skilled female workers are less likely to bear children when their opportunity costs are high, then the OLS estimate of the effect of immigration would be attenuated. To address all of these potential concerns, I rely on an instrumental variables (IV) approach to identify the causal impact of low-skilled immigration. Instrumental variables should also address attenuation bias in the estimated βs due to measurement error in the foreign born population variable.

The instrument is based on the propensity of new immigrants to locate in areas with a relatively large existing concentration of co-ethnics (e.g. Bartel 1989). Following a similar line of reasoning as Card (2001), Cortes (2008), and Cortes and Tessada (2011), the instrument uses historical enclaves to predict the flow of subsequent migrants across MSAs. More specifically, the instrument for the log of *LSI* is the log of

$$INST_{mt} = \sum_b \frac{N^b_{m,1970}}{N^b_{1970}} \times \left[NLS^b_t - NLS^b_{1970} \right]$$

For each country of birth, *b*, the first term in this equation represents the fraction of all immigrants from country *b* living in MSA *m* in 1970. The second term represents the net change in the number of low-skilled working age adults from country *b* between 1970 and time *t*. To the extent possible given how the IPUMS has changed country codes over the years, I use the original countries in Card (2001) to construct the instrument.

The necessary criteria for the exclusion restriction to be met are very similar to those outlined by Cortes (2008). These criteria are as follows: (a) the initial distribution of immigrants must be uncorrelated with differential changes in relative economic conditions affecting the fertility across MSAs 10 to 30 years later, and (b) differential economic changes among MSAs should not affect the overall inflow of low-skilled immigrants to the United States. Although it is impossible to test them directly, I conduct a series of robustness checks that support the assumptions underlying the exclusion restrictions.

4 Descriptive Statistics and Baseline Results

Table 1 provides descriptive statistics of the variables used in the analysis, both in total and separated by whether the percent immigrant in a person's MSA is above or below the mean in the sample. Recall that the sample consists of non-Hispanic native-born women between the ages of 22 and 39 with at least a college degree. Interestingly, the women in high immigrant cities are slightly less likely to have given birth in the previous year. However, these high immigrant areas also tend to be more populous, slightly richer, and have greater shares of non-whites. They also have a smaller proportion of married women potentially suggesting weaker family norms. The variables measured at the individual level follow similar patterns. Women in high immigrant MSAs are also more likely to have graduate degrees. These patterns point to the importance of regression analysis for interpreting the relationship between immigration and fertility.

Table 2 presents baseline empirical results. Standard errors are all clustered at the MSA-year level throughout. To provide a sense for the basic cross-sectional relationship between the number of immigrants in a city and fertility, column 1 provides estimates from an ordinary least squares model with the full set of controls but without including MSA fixed effects. Estimated coefficients on the control variables imply that married women with just a college degree are more likely to have an infant in the household. Black women are more likely than white women to have recently given birth, but Asian women are less likely. Women residing in richer cities, as measured by average yearly incomes of college educated males, are more likely to have recently had a baby. Not surprisingly, women living in areas where more women of their age group are married also have higher fertility rates.

The OLS estimate on the variable of interest suggest that, holding the number of natives in the MSA as well as the other control variables constant, a hundred percent increase in the number of low-skilled immigrants--note that the total number of immigrants in the US about doubled between 1980 and 2000--is associated with a 0.1 percentage point increase in the probability that a high skilled-native born woman has an infant in the household. Not much credence should be placed on these results given that there may be several unobserved city characteristics that are both attractive to immigrants and make high skilled women prefer larger families. To address these city-specific time-invariant unobservables, MSA fixed effects are added in column 2. The estimated immigration coefficient is larger in this model suggesting that in the cross-section, cities that tend to have large immigrant populations also tend to have lower fertility rates. This model suggests that a hundred percent increase in the number of low-skilled immigrants within the same MSA over time is associated with a 0.3 percentage point increase in the probability that high skilled women in that MSA give birth.

It is useful to think about timing in these specifications. All of the variables in the models are measured in the same year, and it is impossible that the foreign-born population in a given year has a causal impact on the probability that a woman gave birth the year before. However, the fixed effects specification exploits within MSA-between decade changes in the size of the foreign-born population. While this measure changes discretely from decade to decade, the actual foreign-born population is changing continuously between decades. Therefore, for example, the 2000 foreign born population is likely a fine measure of the foreign-born population around 1997 when women were making pregnancy decisions about children born in the year 1999. Surely, the 2000 measure is better than the 1990 measure.[3]

[3] It is possible to get yearly estimates of the foreign-born population from the Current Population Survey for years following 1994 but not before that.

Estimates from the MSA fixed effects models will also be biased if there are time-varying determinants of fertility that are correlated with the number of immigrants in a city. If, for example, low-skill industries are replacing high-skill industries in a city, we may observe increases in fertility rates among high skill women alongside large immigrant inflows not because immigrants are providing inexpensive childcare but because women face lower opportunity costs of leaving the labor force to raise children. Alternatively, if immigrants tend to move to cities with booming economies for both the low-skilled and high-skilled labor force, the MSA fixed effects models will yield underestimates of the true causal impact of immigrant inflows.

Results shown in column 3 of Table 2 suggest that the second scenario is more likely. Note that the F statistic of 30 reveals a strong first stage relationship. The second stage estimate suggests that, holding the size of the native population constant, a 100 percent increase in the number of low-skilled immigrants in a city yield a 2.2 percentage point increase in the likelihood that a high-skilled woman has a child of less than a year old in the household.

The measure of fertility used in this paper tells us whether immigrant inflows are associated with the probability of having a child at a particular time, but it is possible that large immigrant inflows change the timing of births without changing total fertility. Because my identification strategy relies on cross-decade changes, and a woman's births typically do not fall neatly towards the end of any particular decade, it would be difficult to interpret results of models with total number of children in the household as the dependent variable. To learn something about whether immigrant inflows are likely to impact completed fertility, I separate the sample by age. Panel A of Table 3 shows that while the effect of immigrant inflows appears to be slightly smaller for women in the oldest group, the estimates are not actually statistically different from each other. Given that the oldest women in the sample cannot decrease future fertility to compensate for increases in current fertility, it seems likely that when women face immigrant-induced lower childcare costs, they do increase completed fertility.

I also examine whether immigrant inflows have the greatest impact on the decision to have a first, second, or higher order child. The first column in Panel B of Table 3 shows results when the sample is limited to women with either zero or one child in the household, column 2 limits the sample to women with one or two children, column 3 two or three children, and column 4 three or four children. The estimates suggest that women are most responsive to immigrant inflows when deciding to have higher order births. In fact, the estimated immigration coefficient is quite large for the decision to have a fourth child, more than double that of the decision to have a third child and more than six times that of the decision to have a first child.

5 Mechanisms

5.1 An Analysis of Childcare Labor Markets

The baseline estimates show that high skilled women respond to immigrant inflows by increasing fertility. However, even if the estimates can be interpreted as causal, they do not guarantee that immigrants affect fertility outcomes through childcare markets. As a first step towards showing that immigrants are in fact affecting fertility through childcare costs, I examine whether immigrant inflows lead to decreases in childcare costs as measured by wages of childcare workers. The wage bill accounts for between 60% and 70% of the operating expenses at formal and home-based childcare centers (Blau and Mocan 2002; Helburn and Howes 1996), and likely represents an even higher share of the final costs of informal childcare providers. Thus, wages of workers are used as a measure of the price of the associated services.

Consider a basic fixed-effects model of the impact of low-skilled immigration again using pooled data from multiple Census years:

$$w_{mt} = \gamma_1 \log(LSI_{mt}) + \gamma_2 \log(N_{mt}) + \mu_m + \mu_t + \lambda IncControl_{mt} + \varepsilon_{mt}.$$

The dependent variable w_{mt} is the log of the median hourly wage childcare workers in metropolitan area *m* in year *t.* The variable $IncControl_{mt}$ denotes the log of income per capita among working-age male college graduates.[4] The other variables are defined as in equation (1). Regressions are estimated using the

[4] College graduates are likely to be high demanders of household services and, for the most part, will have incomes that are not directly tied to wages in low-skill services markets. Females are not included in the income measure since their labor supply and earnings are potentially endogenous with respect to changes in the cost of household

number of high-skilled women in the MSA-year weights. Again, I keep only MSAs that are consistently defined in the IPUMS between 1970 and 2000.

Table 4 compares the impact of low-skilled immigration using different specifications applied to our panel of MSA-level data. All estimates are constructed using the Card (2001) instrumental variables (IV) strategy described above. Again, the first-stage F statistic of 27 substantially exceeds the weak-instruments critical value given in Stock and Yogo (2002). The estimated coefficient of -0.136 represents the percentage change in the median wage of childcare workers caused by a one percent increase in the size of the low-skilled immigrant population. This estimate is considerably larger than most existing estimates of the wage effects low-skilled immigration (Friedberg and Hunt 1995; Card 2001). However, much of this research is based on examining broad skill classes, rather than specific occupations. Childcare is very labor intensive, as compared with the larger low-skilled labor market, providing little room for capital adjustments. Although statistically insignificant and very small in magnitude, the point estimate in the second column of Table 4 indicates that low-skilled immigration resulted in expansions in the share of the local workforce concentrated in the childcare occupation suggesting a labor supply shock.

Beyond effects on the childcare industry, low skilled immigrant inflows might impact other sectors that provide substitutes for maternal care. The remaining columns of Table 4 show the effects of low-skilled immigration on the wages and the share of the labor force working as housekeepers and food preparation workers. While estimates are negative, immigrant inflows do not appear to significantly affect wages in these sectors, although they are associated with increases in the share of the labor force working in food services. To summarize, the evidence suggests that immigrant inflows do represent supply shocks to the childcare sector. Wages of childcare workers decrease in response to more foreign born workers in a city implying that childcare costs faced by high skilled women who purchase childcare in the market are lower.

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services. To account for top-coding, which was only an issue in 1980, I impute values for individuals whose income had been top-coded using a region-specific Pareto extrapolation.

5.2 Heterogeneous Impacts of Immigrant Inflows on Fertility

For further evidence that immigrant inflows are impacting native fertility rates through childcare costs, I consider whether the types of women who are likely to be more sensitive to changes in childcare costs are in fact more responsive to immigrant inflows when making fertility decisions. The first two columns of Table 5 allow us to compare immigration impacts on women with a graduate degree to women with just a college degree. While the more highly educated will tend to have higher household incomes and so may be less sensitive to changes in childcare costs, they are also more likely to work long hours and less likely to live around family members making them more dependent on nannies and other non-family full-time childcare providers for the care of their children. If these high-skilled women are more likely to work in jobs that often require unplanned late nights in the office (and have husbands with similar types of jobs), they may be especially likely to use nannies, who are often foreign-born, as opposed to formal childcare centers. Results shown in the first two columns of Table 5 suggest that indeed fertility rates of women with graduate degrees are more responsive to immigrant inflows than fertility rates of women with just college degrees.[5]

The following two columns of Panel A in Table 5 present estimates of immigrant impacts on a sample of married women and unmarried women. Results suggest that the paper's main results are driven by married women; the point estimate in the unmarried sample is a fairly precise zero. If unmarried women are less likely to plan their pregnancies, it makes sense that they would be less sensitive to changes in childcare costs. Panel B of Table 5 presents estimates of immigrant impacts constructed from samples separated by race. Results suggest that it is only white women's fertility patterns that change in response to immigrant inflows.

[5] I only include women with a college degree in the main sample out of concern that immigrant inflows directly impact the wages and types of jobs available to low skilled native-born women. Since college educated women are not easily substituted with low skilled immigrant labor, I feel more comfortable in arguing that the main effect of immigration on these women operates through childcare markets. Nevertheless, in Appendix Table A1, I also compare impacts for women with less than a college degree. Notice that immigrant inflows impact women with at most some college completed. They have no impact on the fertility decisions of women with a high school degree or less.

6 Labor Supply Responses to Immigrant Inflows

While this paper presents evidence suggesting that high-skilled native born women respond to immigrant inflows by increasing fertility, there is also a growing literature showing that women respond to immigrant inflows by increasing labor supply (e.g. Cortes and Tessada 2011). It is possible that with lower childcare costs, women can both have more children and work long hours. In fact, Furtado and Hock (2009) show that immigration to an MSA results in a less negative correlation between fertility and labor force participation in that MSA. However, it also possible that some women respond to lower childcare costs by working more hours and not changing or even decreasing their desired number of children while other women respond with increases in fertility even if it comes at the expense of working long hours in the labor market, at least temporarily.

To examine this issue, I start by reproducing the general labor supply results from the literature using my data and basic empirical specification. The first column of Table 6 shows the impact of immigrant inflows on the probability of working more than zero hours in a typical week. Column 2 shows the impact on the probability of working more than 20 hours, column 3 the impact on 35 hours, and column 4 the impact on 50 hours. Consistent with the findings in Cortes and Tessada (2011), the largest effects are on labor supply at the high end of the hours of work distribution. Interestingly, immigrant inflows tend to decrease the probability of working more than zero hours in a typical week.[6] Although this pattern may appear odd, it is consistent with a story whereby mothers of very young children temporarily exit from the labor force to care for children but upon returning to the work force, work very long hours. For the remainder of the analysis, I focus my study of labor supply on the decision to work more than 50 hours in a typical week.

To learn more about the types of women that are relatively more likely to respond to changes in childcare costs by adjusting desired fertility as opposed to labor supply, I separate the sample by female characteristics and then compare the ratio of the estimated immigration coefficient in the fertility model to

[6] Cortes and Tessada (2011) estimate negative but statistically insignificant effects of immigrant induced increases in the low-skilled labor force on labor force participation.

the estimated immigration coefficient in the labor supply model across characteristics. I start by comparing women with graduate degrees to women with just a college degree. The first and third columns of Table 7 simply reproduce results from Table 5 showing that the more highly skilled women are more likely to give birth in response to immigrant inflows. The second and fourth columns show labor supply responses for these two groups. Again, when considering the probability of working more than 50 hours a week, women with graduate degrees are more sensitive to immigrant inflows than women with just a college degree.

While the increase in the probability of working long hours is larger than the increase in the probability of giving birth for both groups of women, if we consider the ratio of the estimated immigrant inflow coefficients and compare this ratio across the two groups, the relative fertility response is a bit stronger for women with graduate degrees (.55 > .51). It should be noted, however, that although both groups of women are about equally likely to have given birth in the previous year, Table 7 shows that women with graduate degrees are significantly more likely to work long hours in the labor market. If before taking the ratio of coefficients, we divide the fertility coefficient by the proportion of women with a small child in the home and divide the labor supply coefficient by the proportion of women who work more than 50 hours, the relative fertility response to immigrant inflows is significantly stronger for women with a graduate degree than women with just a college degree (1.04 > .72).

Next, I compare fertility relative to labor supply responses of married and unmarried women. A natural prediction is that married women are relatively more likely to respond to lower childcare costs by having a child. This is especially likely given the evidence that on average, unmarried women do not at all increase fertility as a result of immigrant inflows (Table 5). The findings presented in Table 8 show that while married women respond to immigrant inflows by increasing the likelihood of having a child and working more than 50 hours a week by about equal amounts, unmarried women have very strong labor supply impacts but no fertility impacts. The ratio of the immigration coefficients, therefore, clearly point to stronger fertility responses of unmarried women to immigrant inflows.

The story is more complicated, however, when estimated coefficients are weighted by the means of the dependent variables. Comparing the ratios shown in the last row of Table 8, we may conclude that the relative fertility responses of married women are not in fact stronger than those of unmarried women. Although there is reason to believe that coefficients should be weighted, I do not take the ratio constructed for unmarried women very seriously given that the fertility estimate is measured with a great deal of error and is not statistically different from zero. To further explore this issue, I redo the analysis after keeping only women with at least one child in the household in order to keep a sample that is likely to be more open to childbearing. As can be seen in Table 8, the sample size for the unmarried sample decreases a great deal, but the fertility response remains statistically insignificant and the labor supply response stays about the same. Taking the point estimates seriously, however, married women have stronger relative fertility responses to immigrant inflows than unmarried women regardless of whether estimated coefficients are weighted. Taken together, I view these results as suggestive that married women are more likely to respond immigrant inflows by increasing fertility than unmarried women, but large standard errors in the unmarried sample make it difficult to compare the coefficients with very much confidence.

Finally, I conduct a similar analysis with the sample separated by age. As can be seen in Table 9, 27 to 31 year olds have the strongest relative fertility responses to immigrant inflows regardless of whether estimated coefficients are weighted by the means of the dependent variables. The 37 to 39 year olds have the second highest relative fertility responses while the 22 to 26 and 23 to 36 year olds have the weakest responses. I do not have a clear explanation for this nonlinear pattern, but it may be related to the fact that career paths depend critically on whether people work long hours at the start of their careers. At the same time, if women do not achieve their desired fertility by the age of 40, they most likely never will. Together, these forces may yield the interesting life-cycle patterns shown in Table 9.

I also separated the sample by the number of children in the household, but again no clear patterns emerged from this analysis. In fact, the relationships depend critically on whether estimated coefficients are adjusted by the means of the dependent variables. I conclude therefore that the analysis by parity is inconclusive, and I have omitted it from the paper (results are, however, available upon request).

In conjunction, these results suggest that older women with graduate degrees have more constrained fertility choices than labor supply choices, at least when compared to other groups of women. If these women are also more likely to hit the so called glass ceiling in their career paths, then this analysis provides a potential explanation for women's continued under-representation in top positions in business and academia despite the many new family friendly policies over the years. While policies that make it easier to combine work and family (such as subsidized childcare) do tend to increase the amount of time women spend working in the labor market, they also tend to increase the likelihood of having more children. In fact, the analysis in this paper suggests that the very women who are most likely to break the glass ceiling are the ones whose fertility decisions are most likely to respond to changes in childcare costs, at least the changes induced by immigrant inflows.

7 Conclusion

This paper builds on a growing body of work highlighting the potentially beneficial effects that immigration has on natives (Cortes 2008; Cortes and Tessada 2011; Barone and Mocetti 2011; Farre et al. 2011). In order to isolate a causal impact of immigration, I relied on a common instrumental variables approach to account for the simultaneity of the location decisions of new migrants with respect to local labor market conditions. Using settlement patterns predicted from historical enclaves as instruments, it was found that low-skilled immigration to the United States between 1980 and 2000 led to substantial reductions in the cost of market-provided child care. I found that how high-skilled native-born women responded with increases in fertility.

One limitation of the current analysis is that, due to the exclusion restrictions required by the instrumental variables approach, I could not analyze the impact of low-skilled immigration on U.S.-born Hispanic college graduates. One might expect a particularly strong complementarity between high-skilled native Hispanics and low-skilled migrants from Latin America. Similarly, low-skilled natives were not included in the sample. The extent to which these groups have benefited from the increased availability and affordability of child care due to immigration remains a question for future research.

With respect to the highly-educated women that comprise our sample, the popular press has raised concerns about the so-called “Opt-out Revolution” (Belkin 2003; Wallis 2004) and women still being unable to “Have it All” (Slaughter 2012). These articles suggest that combining work and family responsibilities remains very difficult for women on the career track. By contrast, Goldin’s (2004) assessment of detailed cohort data showed that, relative to older cohorts, women graduating from college in the 1980s have been significantly better able to combine both career and family. This paper suggests that women are in fact facing smaller tradeoffs when making fertility and labor supply decisions, and that this has, in part, been driven by the continuing flow of low-skilled immigrant workers into the United States.

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Table 1: Descriptive Statistics

	Total		Low Percent Immigrant		High Percent Immigrant	
	Mean	SD	Mean	SD	Mean	SD
Child	0.081	0.272	0.084	0.278	0.075	0.263
Log Number of Working Age Low-Skilled Immigrants in MSA, Year	10.99	1.714	10.024	1.254	12.551	1.095
Log Number of Working Age Natives in MSA, Year	13.837	0.875	13.579	0.785	14.255	0.85
Log Mean Income of Males with College in MSA, Year	10.753	0.488	10.674	0.47	10.882	0.488
Proportion Black in Age Group, MSA, Year	0.09	0.061	0.089	0.069	0.091	0.045
Proportion Other Race in Age Group, MSA, Year	0.02	0.048	0.009	0.01	0.038	0.072
Proportion Married in Age Group, MSA, Year	0.585	0.143	0.616	0.127	0.535	0.153
Graduate Degree	0.271	0.445	0.263	0.44	0.285	0.451
Black	0.09	0.286	0.089	0.285	0.091	0.287
Other Race	0.02	0.14	0.009	0.093	0.038	0.191
Married	0.585	0.493	0.616	0.486	0.535	0.499
Age	30.977	4.85	30.91	4.853	31.087	4.844

Notes: The variable “child” takes the value one when a woman has a child with less than one year of age. The variable “Other Race” is equal to one if the person is non-white, non-black, and non-Hispanic. The low percent immigrant sample includes people residing in MSAs where the fraction foreign born is below the mean for the entire sample. The high percent immigrant sample includes people residing in MSAs where the fraction foreign born is at or above the mean for the entire sample.

Table 2: Baseline Regressions

DEPENDENT VARIABLE: CHILD	OLS	OLS	IV
	1	2	3
Log Number of Working Age Low-Skilled	0.001**	0.003**	0.022***
Immigrants in MSA, Year	(0.001)	(0.002)	(0.008)
Log Number of Working Age Natives	0.001	-0.028***	-0.054***
in MSA, Year	(0.001)	(0.005)	(0.014)
Log Mean Income of Males with College	0.011*	0.008	-0.013
in MSA, Year	(0.006)	(0.011)	(0.018)
Proportion Black in Age Group,	-0.033***	0.110***	0.064*
MSA, Year	(0.012)	(0.033)	(0.037)
Proportion Other Race in Age Group,	-0.011	-0.426***	-0.398***
MSA, Year	(0.010)	(0.092)	(0.096)
Proportion Married in Age Group,	0.083***	0.184***	0.195***
MSA, Year	(0.010)	(0.018)	(0.020)
Black	0.004***	0.004***	0.004**
	(0.001)	(0.001)	(0.001)
Other Race	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.002)
Graduate Degree	0.005***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)
Married	0.129***	0.129***	0.129***
	(0.001)	(0.001)	(0.002)
Age Fixed Effects,	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
MSA Fixed Effects	No	Yes	Yes
First Stage F (excluded instrument)			30.01
N	525,255	525,255	482,260

Notes: *** p<0.01, ** p<0.05, * p<0.10

Table 3: 2SLS Regressions by Age and Parity

Panel A: Heterogeneity by Age

DEPENDENT VARIABLE: CHILD	Age 22-27	Age 28-33	Age 34-39
Log Number of Working Age Low-Skilled Immigrants in MSA, Year	0.015*	0.015	0.013*
	(0.008)	(0.012)	(0.007)
N	131,076	182,234	168,950

Panel B: Heterogeneity by Parity

DEPENDENT VARIABLE: CHILD	0 vs 1 child	1 vs 2 children	2 vs 3 children	3 vs 4 children
Log Number of Working Age Low-Skilled Immigrants in MSA, Year	0.012**	0.020	0.031**	0.079***
	(0.005)	(0.016)	(0.015)	(0.028)
N	353,900	171,186	120,034	36,620

Notes: In Panel B, the first column shows results of regressions conducted on a sample with either zero or one child, the second column uses a sample of one or two children, the third column two or three children, and the last column three or four children. *** p<0.01, ** p<0.05, * p<0.10

Table 4: 2SLS Regressions on Household Services Markets

	Childcare		Private Households		Food Services	
	Median Wage	Proportion of Labor Force in Occupation	Median Wage	Proportion of Labor Force in Occupation	Median Wage	Proportion of Labor Force in Occupation
Log Number of Working Age Low-Skilled	-0.136**	0.000	-0.023	-0.001	-0.013	0.007**
Immigrants in MSA, Year	(0.060)	(0.001)	(0.052)	(0.001)	(0.031)	(0.003)
Log Number of Working Age Natives	0.257***	-0.002	0.044	-0.002	0.049	-0.015***
in MSA, Year	(0.099)	(0.001)	(0.084)	(0.002)	(0.051)	(0.005)
Log Mean Income of Males with College	0.591***	-0.005**	0.380***	-0.004	0.493***	-0.022***
in MSA, Year	(0.177)	(0.002)	(0.120)	(0.003)	(0.102)	(0.007)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
MSA Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
First Stage F (excluded instrument)	22.79	22.79	22.79	22.79	22.79	22.79
N	304	304	304	304	304	304

Notes: *** p<0.01, ** p<0.05, * p<0.10

Table 5: 2SLS Regressions by Education, Marital Status, and Race

Panel A: Heterogeneity by Education and Marital Status

DEPENDENT VARIABLE: CHILD	Graduate Degree	College	Married	Unmarried
Log Number of Working Age Low-Skilled Immigrants in MSA, Year	0.018**	0.030***	0.033**	0.002
	(0.008)	(0.011)	(0.013)	(0.002)
N	350,813	131,447	286,351	195,909

Panel B: Heterogeneity by Race

DEPENDENT VARIABLE: CHILD	White	Black	Other
Log Number of Working Age Low-Skilled Immigrants in MSA, Year	0.023**	-0.000	-0.289
	(0.009)	(0.021)	(1.528)
N	430,269	41,626	10,365

Notes: *** p<0.01, ** p<0.05, * p<0.10

Table 6: 2SLS Labor Supply Regressions

DEPENDENT VARIABLE: USUAL HOURS	More than 0	35 or more	40 or more	50 or more
PER WEEK ARE..	1	2	3	4
Log Number of Working Age Low-Skilled	-0.035	-0.014	-0.001	0.044***
Immigrants in MSA, Year	(0.007)	(0.010)	(0.016)	(0.012)
Log Number of Working Age Natives	0.035***	-0.026	-0.064**	-0.100***
in MSA, Year	(0.012)	(0.019)	(0.028)	(0.022)
Log Mean Income of Males with College	0.035***	-0.026	-0.064**	-0.100***
in MSA, Year	(0.012)	(0.019)	(0.028)	(0.022)
Proportion Black in Age Group,	0.193***	0.171**	0.207*	-0.046
MSA, Year	(0.059)	(0.085)	(0.111)	(0.069)
Proportion Other Race in Age Group,	-0.657	-1.114***	-1.024***	0.391***
MSA, Year	(0.138)	(0.220)	(0.209)	(0.102)
Proportion Married in Age Group,	-0.12	-0.217***	-0.204***	-0.076***
MSA, Year	(0.003)	(0.003)	(0.003)	(0.003)
Black	0.042***	0.082***	0.049***	-0.059***
	(0.003)	(0.004)	(0.008)	(0.004)
Other Race	0.005	0.035***	0.035***	-0.003
	(0.004)	(0.007)	(0.006)	(0.007)
Graduate Degree	0.060***	0.064***	0.058***	0.061***
	(0.002)	(0.003)	(0.003)	(0.003)
Married	-0.12	-0.217***	-0.204***	-0.076***
	(0.003)	(0.003)	(0.003)	(0.003)
Age Fixed Effects,	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
MSA Fixed Effects	Yes	Yes	Yes	Yes
Mean of Dependent Variable	0.881	0.707	0.628	0.127
First Stage F (excluded instrument)	30.01	30.01	30.01	30.01
N	482,260	482,260	482,260	482,260

Table 7: 2SLS Fertility and Labor Supply Regressions by Education

	Graduate Degree		College Only	
DEPENDENT VARIABLE:	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus
	1	2	3	4
Log Number of Working Age Low-Skilled	0.030***	0.055***	0.018**	0.035***
Immigrants in MSA, Year	(0.011)	(0.018)	(0.008)	(0.011)
N	131,447	131,447	350,813	350,813
Mean of Dependent Variable	0.086	0.164	0.0803	0.113
Ratio of Effect on Fertility to Effect on Work	0.55		0.51	
Ratio of Effect on Fertility to Effect on Work (adjusted by means of dependent variable)	1.04		0.72	

Notes: *** p<0.01, ** p<0.05, * p<0.10

Table 8: 2SLS Fertility and Labor Supply Regressions by Marital Status

					At Least One Child in the Household			
	Married		Unmarried		Married		Unmarried	
DEPENDENT VARIABLE:	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus
	1	2	3	4	5	6	7	8
Log Number of Working Age Low-Skilled	0.033**	0.030***	0.002	0.062***	0.028*	0.024***	0.019	0.050*
Immigrants in MSA, Year	(0.013)	(0.010)	(0.002)	(0.016)	(0.016)	(0.008)	(0.017)	(0.030)
N	286,351	286,351	195,909	195,909	187,209	187,209	22,383	22,383
Mean of Dependent Variable	0.134	0.101	0.006	0.165	0.0818	0.127	0.0818	0.127
Ratio of Effect on Fertility to Effect on Work	1.1		0.03		1.17		0.38	
Ratio of Effect on Fertility to Effect on Work (adjusted by means of dependent variable)	0.83		0.91		0.75		0.59	

Notes: *** p<0.01, ** p<0.05, * p<0.10

Table 9: 2SLS Fertility and Labor Supply Regressions by Age

	Age 22-26		Age 27-31		Age 32-36		Age 37-39	
DEPENDENT VARIABLE:	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus	Child	Usually work 50 hours plus
	1	2	3	4	5	6	7	8
Log Number of Working Age Low-Skilled	0.009	0.056***	0.027**	0.019*	0.004	0.048***	0.009	0.019
Immigrants in MSA, Year	(0.007)	(0.016)	(0.011)	(0.011)	(0.011)	(0.017)	(0.010)	(0.014)
N	103,348	103,348	149,551	149,551	146,228	146,228	83,133	83,133
Mean of Dependent Variable	0.0409	0.105	0.114	0.14	0.0982	0.128	0.0458	0.127
Ratio of Effect on Fertility to Effect on Work	0.16		1.42		0.08		0.47	
Ratio of Effect on Fertility to Effect on Work (adjusted by means of dependent variable)	0.41		1.75		0.11		1.31	

Notes: *** p<0.01, ** p<0.05, * p<0.10