Identifying the Impacts of International Migration on Women's Contraceptive Use in Mexico

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Abstract

We estimate the impacts of international migration on the contraceptive choice of women in Mexico. We find that women belonging to migrant families and having past migration experience have higher propensity to use contraceptive pills and condoms. For instance, migrant family women are 75% more likely to use contraceptive pills and 37% more likely to use condoms with their partners. We obtain these effects after controlling for traditional economic variables such as income and access. To establish a causal effect, we use historic municipality level migration and return migration as instruments for the current decision to migrate, correcting for the potential self-selection involved in international migration. We argue that these results are robust to different specifications and estimation strategies and are not driven by individual or spatial omitted variables.

Keywords: International Migration, Women, Contraceptive Use, Development
JEL Codes: F22, J13, O15

1 Introduction

In this paper we study the contraceptive use behavior among women in Mexico, a subset of whom belong to families with international migration experience to the United States. We investigate whether the experience of exposure to a foreign culture and its reproductive practices affects migrant family women's contraceptive choice behavior. Contraceptive use of women is an important behavior to study, as it affects important economic variables directly and indirectly. Apart from the direct impact on fertility (hence helping in demographic transition), contraceptive use influences timing of the child birth and increases workforce participation and personal income. There is already some evidence that contraceptive choice is governed by social norms (Munshi and Myaux, 2006). International migration exposes migrants from developing countries to different social norms in the developed world. However, these aspects of international migration and globalization are rarely discussed in the economic literature. We attempt to fill a dual gap in the migration and health literature by analyzing the potential impacts of international migration on the reproductive practices of women.

Studying women's behavior is important, as economic implications for cross-country differences in the pattern of knowledge, belief and behavior are more pronounced for women. Gender biases in economic opportunity, access and outcomes vary largely across countries, even after controlling for the relevant economic indicators such as income. Examples of economic variables for which, a priori, one may believe that differences in gender norms will matter are labor force participation, fertility and bargaining power within household decision-making. These variables do show large variations across countries. For example, there are big differences in the magnitudes of variations in the male and female labor force participation rates between countries and regions. As Tzannatos (1999) reports, while the male labor force participation rate has been more than 90 percent across the world with very little variance, female labor force participation varies largely across countries and regions. For instance, while these rates are 14.1 percent in North Africa and 22.8 per cent in the Middle-East respectively, they are 76 percent in Eastern and Central Europe. Among other comparable income groups, West Africa's female labor force participation rate is 57.1 percent, while for South Asia, is only 29.2 percent. As far as fertility behavior is concerned, Bongarts and Watkins (1996) show that countries at similar levels of economic development often show very different fertility patterns.

Differences in behavior between migrant women and non-migrant women would help us isolate the impacts of international migration. It is well known by now that international migration gen-

erates both pecuniary and non-pecuniary benefits for migrants and their families. While economic gains, such as higher wages, more employment potential and remittances sent home by migrants are tangible and easy to identify, non-economic gains in terms of knowledge accumulation and dissemination are harder to identify and estimate. From a sending country's point of view, knowledge accumulation and dissemination by the return migrants have far reaching development implications.[1] However, while the impact of remittances on various measures of household and individual welfare has been carefully documented in the literature, impact of non-pecuniary benefits such as exposure to advanced practices and different norms of the international migrants living in advanced countries has been a less researched area.[2]

We find that belonging to a migrant family increases likelihood of using contraceptive pills and condoms significantly and by a large magnitude. For instance, migrant family women are 75 percent more likely to use contraceptive pills and 37 percent more likely to use condoms. We find these results after controlling for traditional economic variables such as income and access. We also find that both personal migration experience and partner's migration experience have positive impacts on contraceptive use.

One important caveat in this analysis is that in our data, we cannot identify if an individual woman has used a contraceptive by her own volition or has been dictated by her partner. Since we focus solely on women's use and there is no data on men's use, we cannot compare differences in behavior between men and women with respect to two modern contraceptive technologies that are meant to be primarily targeted to specific sexes - pills for women and condoms for men. In other words, the precise mechanism of intra-couple bargaining behavior cannot be seen in the data and only the end results for women are observed. However, since we find such positive impacts of migration on the probability of contraceptive use for both personal and the partner's migration experience, we can conclude that the impacts of migration are identifiable at least at the level of couples' behavior.

Contraceptive use behavior has important economic and policy implications. For example, recent research demonstrates that birth-control pills can potentially generate large economic benefits for women. There is a growing literature on the relation between women's economic empowerment and pill use. Goldin and Katz (2002) found general evidence that availability of "the pill" lowered cost of education for college going women and raised the age of first child birth. Examining the

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[1]This has been documented in various contexts. Saxenian and Hsu (2001) and Saxenian(2002) discuss benefits that return migrants working in the IT sector brought to Taiwan. Potter and Conway (2006) discuss how second generation Caribbean return migrants have been political agents of change

[2]See, for example, Cox and Ureta (2003) Yang (2007), and Woodruff and Zenteno (2004))

impact of variations in legal availability of the first birth-control pill Envoid, Bailey (2006) found that legal access to pill at younger ages significantly reduced the probability of a first birth before age 22, increased the number of women in the paid labor-force, and raised the number of annual hours worked. Finally, in a recent paper, Ananat and Hungerman (2007) find that pill use is also positively correlated with children's welfare. This general line of research shows that the contraceptive revolution had a positive impact on women's economic decisions, in general, and labor force participation in particular. Women's labor force participation is also crucial from the point of view of a developing society. Apart from the fact that equal opportunity and participation of women has been a central tenet of poverty reduction programs, women's wage income may also be crucial for many purely positive reasons. For instance, Mammen and Paxson (2000) argue that in non-unitary, household bargaining model, women's work force participation and wage income can improve her bargaining power within the household, not to mention the most obvious effect of increase in family income in a unitary family model.

Even though use of contraceptives can entirely be an individual's decision and may not be an effect of social norm and practices, in our data, there is some evidence that there is a higher scope of using contraceptives. The survey (to be discussed in detail in section 4) asks every woman if her last pregnancy was desired and more than 50 per cent of them answered in the negative.[3] This suggests that there was scope for more planned pregnancy by using contraceptives more and/or more effectively.

Sociologists have long been documenting the empowerment effects of international migration for migrant women. Hircsh (1999) studied 13 Mexican women living in Atlanta, US and their sisters or sister-in-laws in Western Mexico and found that there was a shift in ideas among the migrant women. They commanded more respect, participated more in decision making, had better protection from domestic violence and more economic empowerment. Our study gives a more systematic look at the issue as we can compare cohorts within Mexico so that they operate under the same institutional setting. Empirical studies on the effects of migration on health outcomes are rather limited. Kanaiaupuni and Donato (1999) find a non-linear effect of migration on infant mortality in the sense that infant mortality increases in the early stages of the migration process before later declining. Frank and Hummer (2002) found that migrant children to be less likely to be underweight using the same dataset as this study uses. However, most of the studies mentioned so far are either case studies or are descriptive in nature or do not attempt to deal with the difficulty of

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[3]To be precise, every woman with some pregnancy history was asked 'Did you desire your last pregnancy?' and the answer was coded as a 'yes' or 'no'

establishing a causal relation. Establishing a clean causal relation between migration and various welfare measures is a challenge, because migrants are potentially self-selected. Hildebrandt and McKenzie (2005) is an exception and we build further on their results by using an instrumental variable strategy to correct for potential endogeneity and establish a causal impact of international migration. Using a different IV strategy, they show that children belonging to a migrant family have lower mortality and higher birth weights. Our study uses the same ENADID dataset as they did, but differs in focus, purpose and methodology. We try to explain a different phenomenon, women's contraceptive choice, to trace different channels though which the migration experience may matter (social norm as opposed to health knowledge) and a different instrumental variable strategy (to be discussed in details below).

This paper is organized in nine sections: the next section discusses the theoretical basis for the potential positive impacts of international migration on contraceptive choice behavior. We discuss our identification strategy in section 3. Section 4 and 5 discuss properties of the dataset used in this paper and some stylized facts respectively. In section 6 we present the empirical analysis. In that section we discuss results with and without instrumental variable. In section 7 we discuss the empirical validity of our instrument. Section 8 contains various sensitivity analyses to see if our basic results are robust. We present a brief conclusion along with policy discussion in the final section of the paper.

2   Why Should Migration Experience Matter?

One of the salient features of international migration is that the migrants are exposed to a different culture, loosely defined as a mass of knowledge, practice and understanding. Until recently, culture has not played an important role in economic models in explaining economic outcomes. It is neither theoretically palatable to endogenize beliefs and preferences nor quantify and identify culture empirically. However, recent literature, (notably Fernandez, 2007), demonstrates that differences in culture lead to differences in behavior that lead to differences in economic outcomes.

Intuitively, exposure to an alien culture can bring both benefits and tension for international migrants. On the one hand, there is a tendency for preference transmission within family - immigrants try to retain the same culture and values in the foreign soil. On the other hand, migrants learn different practices, norms and values and tend to adapt to them. In a nutshell, the pattern of learning and dissemination process is an open empirical question. For example, Fargues (2007) claims that most of recent migration has been from high to low fertility-rate countries, and

since migrants tend to adopt and send back ideas that prevail in host countries, they are potential agents of the diffusion of contraception use and birth control to their country of origin. Fernandez (2007) argues that migrants tend to carry on their indigenous culture with them, even along generations. In studying labor market decisions of American women, she found that ancestral culture plays an important role in forming beliefs about benefits of women's labor force participation and subsequently differences in ancestral culture explain variation in work outcome among the second-generation American women. However, these two theses are consistent if returnees bring back some of the knowledge, understanding and practices with them, while permanent immigrants retain some of their native cultural practices. Empirical evidence seems to justify this, as it supports both types of behavior.

In a more specific context, the impact of migration on contraceptive use has been documented by sociologists, though mainly through case studies. Using the same dataset described in the introduction, Hirsch and Nathanson (2001) compared contraceptive use of two groups of Mexican women living in Mexico and in Atlanta, US and found that none of the women living in Mexico uses either pills or condoms, while almost 50 percent of the women living in the US use either of them. Since each pair belonged to the same family (related as either sister or sister-in-law) and hence shared the same familial and cultural background, the effect of geographical separation and foreign culture was evident. The inescapable conclusion is that international migration exposes women to new culture and institutional practices and when they return, they tend to carry some of those values along with them.

In theory, exposure to a different culture can change an individual's taste and preferences and hence the utility function. Consequently, her optimal choice will be different even if she faces the same outside constraints in terms of income and prices. International migration can also alter the information set an individual faces while making a choice. Empirically, it will be hard to estimate such parameters without longitudinal data.[4] In this paper we estimate a reduced form relationship between migration experience and contraceptive choice. We think it is still a useful contribution to the understanding of the impacts of international migration.

One of the major corridors of international migration is between the United States and Mexico. Geographical proximity, differences in opportunity, historical legacy of guest-worker program and porous border all contributed to a regular flow of both legal and illegal migration from Mexico into

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[4]It seems that the knowledge effect is less in our data as more than 90% of the women interviewed said that they have "heard" about either pills or condoms. However, this is not enough as mere knowledge about existence of some technology is not enough information for someone to adopt it

the United States. This corridor is particularly suitable for our study for two reasons. First, there are large differences in health and contraceptive use outcomes between Mexico and the United States.

Table 1 reports a comparison of some relevant health indicators between Mexico and US. On an average, poorer countries tend to have worse health outcomes. Mexico-US is not an exception.

Insert Table 1

We can see from the table that along almost all the health indicators, US performs better. For instance, US has lower fertility rate, more hospital beds per person, lower mortality rate and higher life expectancy. Further, US has higher incidence of contraceptive use, both for pills and condoms. Therefore, one can generally argue that exposure to US health practices will generally improve the health knowledge of a typical Mexican migrant woman. Second, Mexican migrants come in and out of the United States quite frequently. This is likely to result in a higher cultural transmission.

3 Identification Strategy

To correctly assess the causal impact of migration, one needs an experiment where people are randomly assigned to migration so that one can compare treatment group (migrants) outcomes with control group (non-migrant) outcomes. The advantage of using this dataset is that it is a representative survey carried out in Mexico. Therefore, the return migrants are 'similar' to non-migrants in all respects, except for the migration experience. This is not the case for the other two types of studies that compare migrant population with the others. One set of studies estimates the impact of international migration based on surveys carried out in the destination country. This is problematic because the treatment group (the migrants) and the control group (other residents) are not comparable with respect to many demographic and cultural aspects. Another set of studies compares migrants with their cohorts residing in their home country. These two groups are also not comparable as they operate under different institutional settings. However, even though our treatment and control groups are comparable, we are still constrained with an observational dataset, where these groups are not randomly selected.

Migration literature lists a number of channels through which migrants tend to select themselves. They include, but are not limited to skills, education and wealth. For example, is it the case that migrants from Mexico on average are more skillful than their cohorts who remain in Mexico? This is an important question as policy-makers worry that more migration will drain the sending

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economy of skills.[5] In fact, whether migrants are positively or negatively self-selected remains a moot point in the migration literature. Theoretically, Borjas (1987) argued that since reward to skills or earnings inequality in Mexico is higher than the reward to skill or earnings inequality in the United States, low-skilled workers have a higher tendency to migrate. Empirical results have been mixed. While, Chiquiar and Hanson (2005) found evidence of positive selection in the sense that Mexican immigrants to the United States originated in the medium-high range of the Mexican wage distribution, Jesus-Fernandez (2006) argues that there was actually a negative selection as the former study undercounted the unskilled migrants in US and ignored some unobservables. For our purposes, whichever way the migrants select themselves, self-selection poses a problem for identification of causal effects as some factors such as individual or family preferences and goals may affect both contraceptive use and health choices and migration decisions. These factors are, however, unobservable to the researcher and hence cannot be directly controlled for in a regression framework. Another potential source of endogeneity is a possible reverse causation from contraceptive use to migration. For example, women using contraceptives and hence not getting pregnant may have a higher probability to migrate. However, since most of our analysis is centered around family migration experience rather than personal migration experience, this is of lesser concern to us. Moreover, if one can find an instrumental variable that explains variation in migration decision and that is independent of the omitted variables that explain outcomes for the agent, both of these endogeneity concerns are mitigated and one can get unbiased and consistent estimates of the effects of migration. This will be the mainstay of our identification strategy.

Our instrumental variable strategy is based on the observation that an individual belonging to areas with higher historical migration has a higher probability to migrate. Importance of migrant networks in facilitating migration has been subject to extensive research in economics and sociology. Theoretically, networks solve at least two informational costs. It can either solve the adverse selection problem that the employing firm in US faces in hiring new workers, or it can reduce cost of search for potential migrants in the sending community. In one of the earliest empirical studies, Munshi (2003) does find evidence that individuals belonging to the communities with larger networks are more likely to be employed and have higher paid non-agricultural jobs. Apart from solving informational costs, it also creates aspiration for a better life for the younger cohorts. Therefore, non-market institutions of culture and social norms of migration create further incentives for migration to the younger cohorts.

We have used municipality-level historic migration as an instrument for current migration. The

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[5]For a recent survey, see Beine et al. (2001).

1990 Mexican census carried out by INEGI contains return migration figures for each municipality. In that census, each respondent was asked where her residence was 5 years ago. Then the number of people who reported that residence to be outside Mexico were aggregated at the municipality level. Since most of the migration from Mexico happens with the USA, we have used these numbers as proxies for US-migration. The ENADID uses the same codes for the municipalities. This enabled us to merge these historic migration figures with the ENADID dataset. Therefore, while the all the *current* variables correspond to 1997 survey, the *historical* variables correspond to 1985.

There are several threats to this identification strategy. The biggest problem with using municipality-level historic migration numbers as instruments, as Antman (2006) notes, is that these numbers may proxy for municipality-level features that directly affect the outcome variables. Hence they cannot be *excluded* from the structural equation. We deal with this concern in several ways. Since it is impossible to control for all the unobserved characteristics of the municipalities, we control for several relevant observable characteristics such as education level, employment level and availability of doctors. There is no systematic pattern in which the municipality-level factors explain individual behavior. Moreover, our main results do not change even after controlling for such factors. To ensure that our results are not driven by specific choice of outcome and control variables, we use related, but slightly different outcome variables (such as lifetime use of condoms as opposed to current use). Use of these outcome variables changes the sample size as women who are not using contraceptives currently, but have used before, enter our sample. This provides another robustness test for our basic results. International migration experience to the US in the family still remains a significant explanatory variable for contraceptive choice. Finally, this approach is potentially problematic if people migrate from one municipality to other. Fortunately, inter-municipality migration is very limited in our data and our results do not change qualitatively even when we exclude households who have moved to a different municipality.

4   Data

Most of the data for our study is drawn from the 1997 ENADID (Encuesta Nacional de Dinámica Demográfica or National Survey of Demographic Dynamics) survey, which was carried out by INEGI (Instituto Nacional de Estadística, Geografía e Informática), Mexico's national statistical agency. The general purpose of the survey was to know the levels and trends of the main components of the demographic dynamics. The initial survey was carried out in 1992 and ENADID 1992 produced information about the levels and structure of fertility, mortality and migration, as well as about the

factors related to them, producing indicators at a national level (rural-urban) and for each state. ENADID 1997 updated the data provided in the 1992 survey.[6] The target population was the usual residents, international migrant population for the last five years, and deceased people in the last five years who were residents of the household. Finally, the survey contains information on a wide range of topics including individual and family background.

For our purposes, this survey collects information in a meaningful way. First, it interviews all the women in the relevant age group within a family, hence mitigating the problems of misreporting by third party for the female health-related questions. Among the reproductive preferences, it contains information on knowledge and use of contraceptive methods, condition of usage, type of method, where to get it, reason to use it, or quitting contraceptive use. Second, ENADID 1997 also contains detail data on both domestic and international migration. For example, it contains information on condition of municipal migration, as it tracks the place of former and current residence with respect to municipality. For international migration, it records destination country and number of trips to the United States. Finally, the survey also reports general demographics such as sex, age, parental identification, and educational characteristics such as literacy, school attendance, level of education and other studies and economic characteristics such as activity condition, main occupation, job condition, job income and other income.

We have used one other source of data to complement the ENADID survey data. We have used Mexican 1990 Census to collect various municipality-level information, apart from the municipality level return migration figures that we use as an instrument for current migration. These municipality-level data include total population, employment level, number of doctors and nurses and various measures of education and skill level. Therefore, we use data from three vintages. For all the individual and family level variables, we use data from 1997 ENADID survey, for our instruments, we use municipality-level historic migration circa 1985 and for municipality-level control variables, we use data from 1990 Mexican census.

5 Stylized Facts

We define a family to be a migrant family if any member of that family has visited the United States between 1987 and 1997. Though we will use an alternative definition of a migrant family and also personal and partner's migration experience for robustness tests, this definition is used

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[6]However, as Hildebrandt and McKenzie (2005) note, ENADID 1992 has been incomplete in many respects and we use ENADID 1997 only.

for all our main results. There are two reasons for doing this, one technical and the other more substantial. The technical reason for not choosing individual migration experience is that a very low proportion of women have gone to the US and come back.

Insert Table 2

As Table 2 shows, only about 0.1 percent women have been return migrants. Any meaningful analysis with so little variation in the binary variable is difficult. However, there is a more substantial reason for using family migration experience instead of individual migration experience. Migration has been viewed as a family phenomenon in most of the migration literature in general, and in the New Economics of labor migration (NELM) literature in particular, pioneered by the work of Stark (1978). Apart from the fact that this strand of literature views migration as an inter-temporal decision for a household, it is intuitive that a return migrant would discuss health norms and knowledge with the other family members. Since we are dealing with women health issues, it could be intuitive that only the female migrants share such health practices. To see if this is the case and also as an additional robustness test, we have used an alternative measure of a migrant household. According to this measure, a household is a migrant household only if a female member (as opposed to any member) has been to the US between 1987 and 1997. We also estimate the effects of personal migration. Finally, in one specification, we have treated a woman to have migration experience if either she or her husband has been to the US between 1987 and 1997. Table 2 shows that the proportion of women with effective migration experience is the highest according to the broadest household measure (where *any* member visiting the US makes it a migrant household) and the lowest with the personal migration experience measure. Proportionally less women belong to families from which a female member had migrated than women whose partners have had migration experience. However, since it is hard to identify which members share information, we use the broadest definition for all our main results. As we will see in section 7, our results are qualitatively similar for alternative migrant household definition and also for personal and partner migration experience.[7]

Table 3 presents definitions and summary statistics for some of the important variables we have

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[7]We stick to the family definition for the main results as the personal migration experience is problematic in many ways. For instance, the survey asks contraceptive choice question to every woman in the family. Hence if a woman has migrated, but has not come back, she is not in the sample. However, it is legitimate to treat that household as a migrant household as she may share information with the other female members in the family. This is closer to what we are trying to identify.

used in our study.[8]

The first panel describes the broad characteristics of the sample including the demographics. We can see that the average age in the migrant families is less than the average age in the non-migrant families. This probably reflects the fact the younger people tend to migrate more. Even though Mexico is predominantly a Catholic country, there exists a significant non-Catholic minority. This allows us later to see if religion plays any important role in contraceptive use choice. Migrant households are practically non-distinguishable with respect to education and marital status. Two important differences are noteworthy. First, most of the migrants are from rural areas. Second, proportionally more migrant families do not have health insurance. Though this effect goes away once we control for the rural area. Finally, there is no significant difference in average income between migrant and non-migrant families. Panel B shows that compared to non-migrant family members, migrant family women have a higher tendency to use contraceptives – both pills and condoms. This is true for both current and lifetime use.

6 Empirical Analysis

In this section, we extend the analysis by examining the women's decision to use contraceptives estimating a set of Probit models with or without instrumental variables.

6.1 Single Equation Probit Models

Let the indicator variable $Y = 1$ if a woman is currently using contraceptive, and $Y = 0$ otherwise. The choice problem is described by the latent variable model

$$Y_i^* = X_i\beta + M_i\gamma + \epsilon_i \tag{1}$$

Where Y_i^* is the net benefit an individual obtains from using contraceptive, X_i is a vector of individual characteristics, M_i is a migration dummy variable and ε_i is a normally distributed random error with zero mean and unit variance. [9]

In all the models of contraceptive choice, we use the variables listed in Panel A of Table 3, a dummy variable for rural area and an income variable as control variables. The income variable

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[8]Please see the Appendix Table for detailed definitions of the variables used

[9](M_i=1 if the woman belongs to a family at least one of whose members visited the US between 1987 and 1997, or if the woman belongs to a family one of whose FEMALE members visited the US between 1987 and 1997 or she herself visited the US between 1987 and 1997 depending on the specification)

requires some discussion. The ENADID survey divided the sample into six socio-economic strata depending on a number of socio-economic variables. For our main results we use this classification. We will also use this variable later to perform a robustness test to weed out the impacts of income factors.

As far as the outcome variables are concerned, we report three measures of contraceptive use - current use of contraceptive pills, current use of condoms and current use of either or both. Since these two contraceptive technologies are different, individuals may substitute one for the other. For our purpose, it is useful to look at both individual and joint behavior. Maximum likelihood estimates of these three outcome variables are reported in columns 1, 2 and 3 of Table 4 respectively. We use robust standard errors and also cluster the standard errors around municipalities, controlling for the fact that errors may be correlated within municipalities.[10]

6.2   The Impact on Contraceptive Use - Probit Results

The results in Table 4 show that migrant family members have a higher probability of using both pills and condoms than do the non-migrant family members, though this effect is not significant for either use of pills or condoms individually, but weakly significant for using one or both of them. Our instrumental variable estimates below suggest that these are likely to be underestimates of the actual effect due to the presence of potential endogeneity arising out of migrant selection and reverse causation.

Insert Table 4

The other results in Table 3 are intuitive and consistent with the related literature. For instance, older women tend to use contraceptives less. Similarly, being married reduces one's probability of using contraceptives. There is a positive correlation between workforce participation and contraceptive use. In fact, the upshot of the pill-empowerment literature is that legal availability of pills enhances the chances for women to participate in the labor market. Rich people tend to use contraceptives more and belonging to rural areas also affects condom use negatively and significantly (though this effect for pill use is not significant). Belonging to a Catholic family also does not seem to affect contraceptive decision in any systematic way. Finally, lack of health insurance, not surprisingly, is associated with less contraception – it reduces the probability of using pills, condoms or both of them, and the effect is very significant across all specifications.

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[10]This is somewhat arbitrary, and to test how sensitive our results are, we also cluster the errors around household and communities. The main results remain the same qualitatively.

6.3 Results using Instrumental Variables

All the single-equation models we presented in this section treat the decision to migrate as exogenous. As Hildebrandt and McKenzie (2005) argue, selectivity bias is one of the most serious problems in estimating the effects of migration. Therefore, the coefficients in Table 4 are vulnerable to being inconsistent and biased. Our primary concern here is that we have omitted important (measurable) characteristics of a migrant that are correlated with the migration variable, and that, as a consequence, our point estimates of migration are either under or over estimates of the benefits of migration. To correct for potential endogeneity, we use municipality-level historic migration as an instrument for recent migration status. The construction of instruments has been discussed in detail in section 3.

Theoretically, now M_i is not exogenous and determined within the system. Let us write

$$M_i^* = X_i \delta_1 + Z_i \delta_2 + u_i \qquad (2)$$

where Z_i is represents our instrument, historical migrant proportions at the municipality level; X_i represents exogenous variables, and δ_1 and δ_2 represent reduced-form parameters. Intuitively, a family decides to send a migrant when $M_i^* > 0$. The system consisting of (1) and (2) is identified as one of the variables in (2) is not in (1). By assumption $(\varepsilon_i, u_i) \sim N(0, \Sigma)$ where σ_{11} is normalized to one to identify the model.[11]

6.4 Instrumental variable Estimates of Contraceptive Choice

Table 5 and 5a report the instrumental variable estimates of determinants of reproductive health behavior. Table 5 reports the instrumental variable probit coefficients and Table 5a reports the relevant marginal effects evaluated at the average.[12] The standard errors are heteroscedasticity-robust and clustered around municipalities.

Insert Table 5

Our instrumental variable results show that the women belonging to the migrant households have higher current contraceptive usage. The magnitude and significance of the coefficients also suggest that our uninstrumented probit results were downward biased. It appears that unobserved

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[11]Our model is essentially similar to the one estimated by Evans and Schwab (1995) in measuring the impact of Catholic school on finishing high school and starting college.

[12]Marginal effects correspond to the change in the probability for an infinitesimal change in each independent, continuous variable and discrete change in the probability for dummy variables.

factors that are likely to affect the health outcome negatively (less access, such as poor and people in rural areas) may also have a positive impact on the probability to migrate, though in principle migration may also be proxying for omitted variables that have positive impacts on contraceptive use.

Insert Table 5a

Our IV results also suggest that belonging to a migrant family can have very large influence on the probability of contraceptive use. For instance, an "average" member of a migrant family is 75% more likely to use contraceptive pills and 36% more likely to use condoms. To place these result is perspective, the impact of belonging to a migrant family is higher in magnitude than being a member of the labor force or residing in an urban area. Effect on condom use is quantitatively smaller, but also significant. In general, association patterns of the control variables with respect to use of condoms and pills are qualitatively similar, except for education and religion. While experience of some schooling and being Catholic seem to have a negative and a positive impact on pill use respectively, they affect condom use in the other direction. One reason could be that educated women substitute pill for condom (or their choice is less dictated by her partner). Even though our caveats about pills being an imperfect measure of women empowerment are true, the different results for pill and condom use is appealing. For a woman, contraceptives pills are easier to adopt and control than condoms due to its inherent technology.

Being a member of the workforce affects the use of both types of contraceptives positively and significantly. Not having health insurance seems to have a strong negative effect on condom use or pill use or both. [13] Rural areas seem to affect condom use negatively, but not use of pills. Therefore, migration experience remains a significant variable to explain contraceptive use behavior even after controlling for competing hypotheses such as income, education and access.

7   Validity of the Instruments

7.1   Testing for Weak Instruments

In this section, we examine the validity of our instruments quantitatively. For an instrument to be valid, it has to be "relevant" in the sense that it should be able to explain variations in the endogenous variable. It should also be "exogenous" in the sense that variations in the instrumental variable should be independent of the variations in the omitted variables that explain the outcome

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[13]Health insurance is a good proxy for access, as pills and condoms are available easily and almost for free for most part of the Mexico. In our sample, almost all women obtain such contraceptives from public sources.

directly. In other words, the instrumental variable should be "excluded" from the structural equation that models the outcome variable. A related problem is susceptibility of the instrument of being a "weak instrument". In linear instrumental variable (IV) regression, an instrument is weak if it is weakly correlated with the included endogenous variables. In a more general setting, weak instruments correspond to weak identification of some or all of the unknown parameters. Weak identification leads to GMM statistics with non-normal distributions, even in large samples, so that conventional IV or GMM inferences are misleading (see Stock et al., 2002). We will perform three empirical procedures to check the validity of our instruments. First, we will graphically show that historic migration pattern is correlated with current migration pattern prima facie. Second, we shall look at the coefficients of the instrumental variable in the first stage regression to see if it has significant impact on the endogenous variable after partialling out the effects of other exogenous variables. Finally, since the weak identification problem in the non-linear models is still an active area of theoretical research, we will test weakness of our instrument in the linear models. We can use the Craig-Donald statistic in the first stage to check for the weakness in the instrument.

Figure 1 plots proportions of return migrants in the population older than five years old in 1985 against proportions of individuals belonging to a migrant family in 1997 aggregated at the municipality-level. There is a strong positive association between them suggesting that current and historic migration are strongly correlated with each other positively (numerically, the correlation coefficient is equal to 0.49).

Insert Figure 1

As an additional check, we have estimated the simplest probit model where we regress current migration probability on historic migration proportions and predict fitted values for current migration probabilities. Figure 2 plots these fitted values against the migration proportions by a median spline graph.[14] Advantage of this procedure is that it generates a non-linear plot allowing for illustration of a non-linear relationship. The pattern of relationship between the historic migrant proportion and predicted probabilities in figure 2 confirms that they are almost positively linearly related.

Insert Figure 2

---

[14]Advantage of a spline regression, which fits polynomial models to estimate relationship between two variables, is that it can illustrate any potential non-linear relationship that may exist betwen two variables

Table 6 reports the first stage regression results from two models: current use of contraceptive choice and lifetime use of contraceptive choice. The reason is that they represent two different samples. Women for whom current contraception use is not relevant do not enter into the current contraceptive use sample, but respond to questions such as "Have you ever used contraceptive pills" (we shall use these variables as additional robustness tests later). The first row reports the coefficients corresponding to our instrumental variable. As we can see, in both the cases, historic migrant proportion is highly significant in explaining the endogenous variable, even after controlling for all other exogenous variables.

Insert Table 6

The last row reports the relevant F-statistics and corresponding p-values from relevant models. These are generated from the first stage of the GMM estimation of the same models as Table 5. [15]As we can see from Table 6, all the F-stat values are high with the corresponding p-values being low. Therefore, we can safely conclude that our instruments alone or together are free from weak instruments problem.

7.2   Results with Municipality-level Controls

Since one of the biggest threats to our instrumental variable strategy is the possibility that historic migration networks are just proxying for some unobservable municipality-level characteristics, we deal with this problem at two levels. In this section we discuss the effects of migration on the outcome variables *after* controlling for several municipality-level factors that are *observable.* We have collected data on several municipality-level variables from the 1990 Census such as proportion of population with secondary education, proportion of female doctors, proportion of employed people and so forth. The idea is to control for a range of economic and health factors at an aggregate level to see if these factors are the one that drive the individual decision rather than the idiosyncratic factors.[16] These results are presented in Table 7.

Insert Table 7

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[15]By construction, the maximum likelihood estimation procedure in the instrumental variable probit estimation does not report first stage F-stat.

[16]Note that these are also lagged values as the ENADID survey took place in 1997 and these variables come from 1990 census. If historical factors are directly affecting the outcome variables, we should see such effect in this regression.

Results in Table 7 show two important facts relevant for our identification. First, there is no systematic pattern in which the municipality-level factors affect the individual outcomes. Only high employment rates and high proportions of skilled workers seem to affect contraceptive choice positively. This variable is likely to be highly correlated with income, hence on an average rich municipalities have higher contraceptive use. However, this does not affect the condom use. Education seems to be either not important (for condom use), or is negatively correlated with contraceptive use. Therefore, it is unlikely that municipality-level factors systematically explain contraceptive choices. The second important message is that migrant family experience continues to be significant even after controlling for municipality-level factors. Comparing the results with Table 5, we see that the pattern of significance for the other control variables is also roughly the same. Together, we can conclude that individual and family characteristics are more important in explaining the contraceptive choice than the municipality-level factors and such factors can be excluded from the structural equation.

8   Robustness Checks

8.1   Results with alternative Definition of Migrant Family

In this section, we examine whether our results are driven by the specific way we have constructed the migrant family. Here we define a family to be a migrant family if a *female* member of the family has migrated to the United States in the last 10 years. The rationale is that since we are dealing with women's contraceptive choices, it is likely that information will be shared by a female member only.

Table 8 reports results from this alternative definition of migrant family using the same specification as Table 5.

Insert Table 8

We can see that belonging to a migrant family increases the probability of using either pill or condoms positively and significantly indicating that our basic results are robust to alternative definition of migrant family. The overall pattern of relationship of the other variables with contraceptive use are similar to that of Table 5.[17]

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[17]One problem with this definition of migrant family is that according to this definition, we treat a family as a non-migrant family even if some male members have migrated. Since we cannot identify from the data how information is shared (for example, whether male members introduce contraceptive use or not), we use the broader definition of migrant family to derive our main result.

8.2 Personal and Partner's Migration Experience

Even if most of the migration literature treats migration as a family decision, the question lingers if the personal migration is important to change women's behavior. This is more important in our context as we are dealing with women's contraceptive choices, which is a (albeit imperfect) measure of economic empowerment.

Insert Table 9

Table 9 summarizes the estimated effects of personal migration experience on contraceptive choice of women in columns 1-3. As discussed earlier, lack of women return migrants create difficulties to estimate this relation. In this case we have used GMM methods to estimate this relationship. This provides an additional sensitivity test to see if our results are robust to alternative methods of estimation. However, migration experience does continue to be significant, although at a somewhat lower level. However, the overall pattern of association is similar to those in the models of family migration experience - older women, women having no insurance and married women are less likely to use contraceptives.

We also examine if the partner's migration experience has similar effects on the contraceptive decisions of a woman. In this case, we treat a woman as having migration experience if *she or her partner* have been to the US between 1987 and 1997. Columns 4-6 in Table 9 contains results using this definition and the second row shows that even when we take only individual and partner's migration into account, such experience still has a positive and significant impact on the probability of using modern contraceptives.

8.3 Controlling for the Effects of Income

We did not include a direct measure of household income in our basic specification, instead used socio-economic strata to which individual belongs to as a measure of income. Yet this variable turns out to be a significant factor in explaining contraceptive choice decision. Since income is a big concern for endogeneity issues (for example, individuals may migrate to earn more and hence use more contraceptives), we perform an additional test to isolate the effect of income from other control variables.

Insert Table 10

Table 10 summarizes these results. In this table, we use the same specification as in Table 5, except that we estimate this model for each *social strata* separately. Column 1-5 report results for the social strata 1-5 (the lowest income group was dropped as there was not much variation in the

outcome variable). Advantage of this approach is that within each strata the variation in income is much less and by estimating the relation between contraceptive use and other control variables except income, we can see if income was playing the main role in explaining the contraceptive decision. As we can see from the first row, belonging to a migrant family is positive and significant for all social strata and the effect is significant for all social strata at 1% or 5% level of significance. Therefore, within the a socio-economic class where members have similar income and social status, international migration experience plays an important positive role and it is unlikely to be the case that income was solely driving the results in the other specifications. These results, however, come with the caveat that any specification with income will potentially suffer from being misspecified as income is likely to be endogenous and it contaminates the other estimates also. It is hard to find an instrument for income in the absence of possible random shocks to income. On the other hand, omitting income from the specification potentially brings in omitted variable bias. We have included income in our main specification (of Table 5) to see if migration has any impact after controlling for income and reported in Table 10 results without income to see if our model retains explanatory power even after excluding income.

8.4   Additional Outcome Variables

As an additional sensitivity test in this section, we asked whether our results are robust to an alternative specification of the dependent variables. We have re-estimated our model using somewhat different contraceptive use behavior. ENADID survey collects information on previous contraceptive use also. To know as to what extent our results are affected by the current status of contraceptive use, we also test the hypothesis that migration experience generally improves contraceptive use. Table 11 reports results for two additional contraceptive use variables such as lifetime use of condom and pills. Again, we do not report the ordinary least square estimates to avoid clutter.

Insert Table 11

The first row in Table 11 reports the effects of international migration, and we can see that the effects are significant at 5% or 1% level. The impact of rural areas is even stronger in case of lifetime contraceptive use, and age, education and marital status are also highly significant with expected signs. Comparing these results with the other outcome variable results discussed throughout the paper, we can conclude that the positive impact of migration experience is not limited to specific choices of variables, but may be more general as far as women's reproductive choice is concerned.

9　Conclusion

International migration often leads to an increase in domestic knowledge base when migrants return to their home country bringing back the know-how and values acquired abroad. In this paper, we have looked at contraceptive choice of women as part of the reproductive health behavior in Mexico and found that women from migrant families or women having personal migration experience have higher propensity to use modern contraceptives - both pills and condoms. This effect remains after controlling for several other explanations such as higher income, education, access to health care and rural locations. The effect becomes stronger when we correct for the potential endogeneity arising out of the migrants' self selection into migration.

Our finding has important implications for formulating optimal migration and health policy. On lines of Hildebrandt and McKenzie (2005), our results concluded that migration has an important positive effect on health outcomes. Moreover, this simple epidemiological test, where agents are otherwise similar except their exposure to a different culture, has implications for optimal health policy. If income and access are not enough to explain use of contraceptive use, policy makers should aim at spreading the awareness about potential benefits of contraceptive use. Therefore, this line of research documents that benefits of both migration and return migration go well beyond remittance income, asset building or entrepreneurial activities and can have positive impacts on a wider set of welfare measures through changes in preference, learning and dissemination.

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Table 1.
US-Mexico Difference in Health Outcome

	2003 or earlier		2004	
	US	Mexico	US	Mexico
Fertility rate, total (births per woman)	2.04	2.21	2.04	2.2
Adolescent fertility rate (births per 1,000 women ages 15-19)	50.83	68.74	50.33	67.28
Birth rate, crude (per 1,000 people)	14.14	19.3	14.13	18.8
Hospital beds (per 1,000 people)	3.3	1		
Mortality rate, infant (per 1,000 live births)	7	25	6.7	22.6
Mortality rate, under-5 (per 1,000)	9	29	7.6	27.6
Life Expectancy at Birth (years)	77	74		
Contraceptive Pill Use [#]			15.6	7.1
Condom Use[#]			13.3	3.7

Sources: WDI (World Bank, 2006), UN (United Nations, 2005)
[#] Percentage using contraception among women who are married or in union. Data on contraceptive use was compiled primarily from surveys of nationally representative samples of women of reproductive age (usually 15 to 49 years old). Please see http://www.un.org/esa/population/publications/contraceptive2005/WCU2005.htm for more details

Table 2.
Migration Profile in the Sample

Variable	Total	Women	Men
	(1)	(2)	(3)
Proportion of people have gone to the US between 1987 and 1997	0.0301	0.0096	0.052
	(.1709)	(.0974)	(.2219)
Proportion of people who or their partner have gone to the US between 1987 and 1997	0.0504	0.0467	0.0542
	(.2187)	(.211)	(.2265)
Proportion who have any FEMALE member of household has gone to US between 1987 and 1997	0.0133	0.0155	0.0111
	(.1147)	(.1234)	(.1047)
Proportion who have any member of household has gone to US between 1987 and 1997	0.0814	0.0796	0.0833
	(.2734)	(.2706)	(.2764)
Observations	184418	95067	89351

Standard deviations in brackets

Table 3.
Descriptive Statistics: ENADID 1997 Dataset

Panel A

Variable	Full Sample	Migrant Family	non-Migrant Family
age	25.5659	22.7553	25.8199
	(19.4026)	(17.548)	(19.5417)
schooling_dumm	0.5289	0.5274	0.5291
	(.4992)	(.4993)	(.4992)
catholic_dumm	0.7822	0.7755	0.7828
	(.4127)	(.4173)	(.4123)
married_dumm	0.0935	0.0962	0.0932
	(.2911)	(.2949)	(.2907)
working_dum	0.5972	0.5602	0.6004
	(.4905)	(.4964)	(.4898)
rural_dumm	0.438	0.559	0.4271
	(.4961)	(.4965)	(.4947)
no_health_insur	0.5943	0.6944	0.5853
	(.491)	(.4606)	(.4927)
hh_lnpci	8.4726	8.3751	8.4813
	(1.1454)	(1.0472)	(1.1533)

Panel B

Variable	Full Sample	Migrant Family	non-Migrant Family
current_pills	0.1459	0.1757	0.1431
	(.3531)	(.3806)	(.3502)
current_condoms	0.0741	0.0815	0.0734
	(.2619)	(.2736)	(.2607)
ever_use_pills	0.3143	0.3529	0.3109
	(.4643)	(.4779)	(.4629)
ever_use_condom	0.1479	0.1854	0.1445
	(.355)	(.3887)	(.3516)
current_pills_only	0.141	0.1699	0.1383
	(.3481)	(.3757)	(.3452)
current_condoms_only	0.0696	0.0774	0.0688
	(.2544)	(.2673)	(.2532)
current_condoms_pills	0.2173	0.2543	0.2137
	(.4124)	(.4356)	(.4099)

Standard deviations in brackets

Table 4.
Probit Estimates of the Effects of Migration on Contraceptive Use

	Dependent Variable		
	current_pills	current_condoms	current_condoms_pills
	(1)	(2)	(3)
us_migration_exp_hh	0.055	0.095	0.089*
	(0.053)	(0.060)	(0.047)
age	-0.028***	-0.022***	-0.032***
	(0.002)	(0.003)	(0.002)
schooling_dumm	0.158***	-0.167**	0.02
	(0.061)	(0.069)	(0.055)
catholic_dumm	-0.017	0.084	0.034
	(0.044)	(0.062)	(0.045)
married_dumm	0.016	-0.167***	-0.057
	(0.048)	(0.051)	(0.042)
working_dum	0.012	0.051	0.031
	(0.033)	(0.040)	(0.030)
no_health_insur	-0.099***	-0.126***	-0.134***
	(0.035)	(0.039)	(0.029)
social_strata	-0.021	-0.077***	-0.049***
	(0.016)	(0.020)	(0.015)
rural_dumm	0.084*	-0.193***	-0.017
	(0.046)	(0.045)	(0.040)
Constant	-0.296***	-0.408***	0.302***
	(0.112)	(0.136)	(0.104)
Observations	11907	11907	11907

Robust standard errors in brackets

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

Standard Errors are clustered around municipalities.

Table 5.
Instrumental Variable Estimates of the Effects of Migration on Contraceptive Use

	Dependent Variables		
	current_pills	current_condoms	current_condoms_pills
	(1)	(2)	(3)
us_migration_exp_hh	2.333***	1.321***	2.322***
	(0.359)	(0.425)	(0.333)
age	-0.018***	-0.019***	-0.022***
	(0.003)	(0.003)	(0.003)
schooling_dumm	0.096*	-0.173***	-0.012
	(0.055)	(0.066)	(0.048)
catholic_dumm	-0.033	0.071	0.008
	(0.039)	(0.059)	(0.038)
married_dumm	0.041	-0.143***	-0.017
	(0.041)	(0.050)	(0.038)
working_dum	0.037	0.063	0.052*
	(0.028)	(0.039)	(0.027)
no_health_insur	-0.128***	-0.146***	-0.156***
	(0.030)	(0.038)	(0.027)
social_strata	-0.01	-0.069***	-0.033***
	(0.013)	(0.020)	(0.013)
rural_dumm	0.028	-0.206***	-0.052
	(0.039)	(0.043)	(0.034)
Constant	-0.481***	-0.514***	-0.001
	(0.098)	(0.129)	(0.103)
Observations	11907	11907	11907

Robust standard errors in brackets

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

Standard Errors are clustered around municipalities.

Table 5a.
 Instrumental Variable Estimates of the Effects of Migration on Contraceptive Use (Marginal Effects[#])

	Dependent Variables		
	current_pills	current_condoms	current_condoms_pills
	(1)	(2)	(3)
us_migration_exp_hh	0.754***	0.363**	0.753***
	(0.062)	(0.173)	(0.067)
age	-0.005***	-0.003***	-0.005***
	(0.001)	(0)	(0.001)
schooling_dumm	0.025	-0.029*	0.024
	(0.013)	(0.013)	(0.013)
catholic_dumm	-0.009	0.01	-0.008
	(0.011)	(0.008)	(0.011)
married_dumm	0.011	-0.020**	0.013
	(0.011)	(0.006)	(0.011)
working_dum	0.01	0.01	0.009
	(0.008)	(0.006)	(0.008)
no_health_insur	-0.034***	-0.022***	-0.033***
	(0.008)	(0.006)	(0.008)
social_strata	-0.003	-0.011***	-0.001
	(0.003)	(0.003)	(0.003)
rural_dumm	0.007	-0.030***	0.011
	(0.011)	(0.006)	(0.01)
Observations	11907	11907	11907

Robust standard errors in brackets

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

Standard Errors are clustered around municipalities.

[#]*Marginal effect refers to the change in the probability for an infinitesimal change in each independent, continuous variable and the discrete change in the probability for dummy variables, calculated at the average.*

Table 6.
First Stage Results

	Current_contraceptive	Past Contraceptive
	Dependent Variable: us_migration_exp_hh	
prop_mig_pop_munic	0.139***	0.100***
	(0.034)	(0.021)
age	-0.001***	-0.001***
	(0.000)	(0.000)
schooling_dumm	0.007	0.019***
	(0.009)	(0.005)
catholic_dumm	0.01	0.006
	(0.008)	(0.006)
married_dumm	-0.015**	0
	(0.007)	(0.005)
working_dum	-0.015**	-0.016***
	(0.006)	(0.004)
no_health_insur	0.024***	0.012***
	(0.006)	(0.003)
social_strata	0.001	0
	(0.003)	(0.002)
rural_dumm	0.023***	0.033***
	(0.008)	(0.006)
Constant	0.067***	0.047***
	(0.019)	(0.011)
Observations	11907	36584
	Test of Weak Identification	
	Cragg-Donald F statistic	
	(p-value)	
	189.125	349.107
	(0.00)	(0.00)

Robust standard errors in brackets

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

Standard Errors are clustered around municipalities.

Table 7.
Instrumental Variable Estimates of the Effects of Migration on Contraceptive Use with Municipality-level Controls

	Dependent Variables		
	current_pills	current_condoms	current_condoms_ pills
	(1)	(2)	(3)
us_migration_exp_hh	1.846***	0.916**	1.792***
	(0.433)	(0.533)	(0.399)
age	-0.020***	-0.020***	-0.024***
	(0.003)	(0.003)	(0.003)
schooling_dumm	0.117**	-0.193***	-0.015
	(0.058)	(0.069)	(0.053)
catholic_dumm	-0.001	0.072	0.037
	(0.042)	(0.061)	(0.042)
married_dumm	0.036	-0.158***	-0.034
	(0.046)	(0.051)	(0.041)
working_dum	0.014	0.03	0.022
	(0.031)	(0.040)	(0.029)
no_health_insur	-0.088***	-0.125***	-0.122***
	(0.034)	(0.040)	(0.029)
social_strata	-0.017	-0.068***	-0.040***
	(0.013)	(0.020)	(0.013)
rural_dumm	0.126**	-0.058	0.078*
	(0.051)	(0.061)	(0.046)
prop_employed	0.026***	0.012	0.025***
	(0.008)	(0.009)	(0.006)
prop_second	-0.062***	0.021	-0.039***
	(0.018)	(0.017)	(0.014)
prop_fertility	-0.006	0.003	-0.004
	(0.004)	(0.005)	(0.003)
prop_female_doctors	-0.887***	0.195	-0.622**
	(0.273)	(0.284)	(0.243)
prop_skilled	0.033***	0.007	0.028***
	(0.008)	(0.009)	(0.006)
Constant	-1.469***	-1.566***	-1.108***
	(0.482)	(0.519)	(0.362)
Observations	11798	11798	11798

Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, Standard Errors are clustered around municipalities.

Table 8.
Instrumental Variable Estimates of the Effects of Migration on Contraceptive Use using Alternative Definition of Migrant Household [#]

	Dependent Variables		
	current_pills	current_condoms	current_condoms_pills
	(1)	(2)	(3)
us_migration_exp_fem_hh	8.697***	8.009***	8.674***
	(0.436)	(0.768)	(0.435)
age	-0.004	-0.008*	-0.005*
	(0.003)	(0.004)	(0.003)
schooling_dumm	0.007	-0.093**	-0.022
	(0.038)	(0.047)	(0.035)
catholic_dumm	0.006	0.045	0.017
	(0.030)	(0.040)	(0.030)
married_dumm	-0.016	-0.088**	-0.032
	(0.028)	(0.041)	(0.027)
working_dum	0.001	0.02	0.005
	(0.026)	(0.029)	(0.026)
social_strata	0.012	-0.017	0.005
	(0.009)	(0.020)	(0.010)
no_health_insur	-0.050*	-0.078**	-0.058*
	(0.029)	(0.035)	(0.030)
rural_dumm	0.013	-0.085*	-0.009
	(0.025)	(0.046)	(0.025)
Constant	-0.216***	-0.306***	-0.088
	(0.075)	(0.099)	(0.079)
Observations	11907	11907	11907

Robust standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1
Standard Errors are clustered around municipalities

#A Household is treated as a migrant household if a FEMALE member has gone to the US between 1987 and 1997

Table 9.
Instrumental Variable Estimates of the Impacts of Personal or Partner Migration on Contraceptive Use

	Personal Migration Experience			Partner Migration Experience		
	current_pills	current_condoms	current_condoms_pills	current_pills	current_condoms	current_condoms_pills
	(1)	(2)	(3)	(4)	(5)	(6)
us_migration_exp	10.699**	2.703*	13.143**			
	(4.323)	(1.543)	(5.218)			
us_migration_exp_partner				2.634***	1.518***	2.625***
				(0.395)	(0.489)	(0.370)
age	-0.004***	-0.003***	-0.007***	-0.018***	-0.019***	-0.021***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)
schooling_dumm	0.002	-0.038**	-0.034	0.096*	-0.171***	-0.009
	(0.038)	(0.015)	(0.048)	(0.054)	(0.066)	(0.047)
catholic_dumm	-0.015	0.009	-0.004	-0.053	0.059	-0.012
	(0.033)	(0.011)	(0.041)	(0.037)	(0.061)	(0.038)
married_dumm	-0.015	-0.028***	-0.04	0.043	-0.141***	-0.014
	(0.031)	(0.010)	(0.038)	(0.041)	(0.050)	(0.038)
working_dum	0.016	0.011	0.026	0.045	0.068*	0.060**
	(0.029)	(0.009)	(0.036)	(0.028)	(0.039)	(0.026)
social_strata	0.017	-0.005	0.013	-0.122***	-0.144***	-0.149***
	(0.012)	(0.005)	(0.015)	(0.029)	(0.038)	(0.027)
no_health_insur	-0.050*	-0.024***	-0.072**	-0.011	-0.070***	-0.034***
	(0.029)	(0.009)	(0.035)	(0.013)	(0.019)	(0.012)
rural_dumm	0.021	-0.024***	-0.001	0.024	-0.206***	-0.054
	(0.027)	(0.008)	(0.032)	(0.039)	(0.043)	(0.034)
Constant	0.16	0.191***	0.340**	-0.464***	-0.507***	0.004
	(0.113)	(0.034)	(0.133)	(0.095)	(0.129)	(0.103)
Observations	11907	11907	11907	11907	11907	11907

Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, Standard Errors are clustered around municipalities

Table 10.
Instrumental Variable Estimates of the Effects of Migration on Contraceptive Use across five Socio-economic Strata

	Dependent Variable: current_condoms_pills				
	(1)	(2)	(3)	(4)	(5)
us_migration_exp_hh	2.228***	2.337***	2.691***	1.907**	3.572***
	(0.389)	(0.357)	(0.533)	(0.763)	(0.496)
age	-0.026***	-0.018***	-0.021***	-0.021***	-0.012
	(0.004)	(0.004)	(0.005)	(0.007)	(0.011)
schooling_dumm	0.055	-0.037	-0.062	-0.032	0.077
	(0.080)	(0.083)	(0.106)	(0.180)	(0.337)
catholic_dumm	0.086	-0.014	0.007	-0.11	-0.291
	(0.073)	(0.067)	(0.077)	(0.145)	(0.198)
married_dumm	-0.160***	0.089	-0.036	0.339***	-0.247
	(0.061)	(0.057)	(0.073)	(0.108)	(0.201)
working_dum	0.012	0.061	0.074	0.254**	0.02
	(0.043)	(0.047)	(0.063)	(0.104)	(0.180)
no_health_insur	-0.148***	-0.225***	-0.161**	-0.009	-0.186
	(0.046)	(0.049)	(0.070)	(0.107)	(0.164)
rural_dumm	-0.123***	-0.057	0.157**	-0.097	-0.191
	(0.045)	(0.049)	(0.068)	(0.131)	(0.186)
Constant	0.032	-0.127	-0.134	-0.368	0.071
	(0.167)	(0.154)	(0.185)	(0.303)	(0.458)
Observations	4638	3919	2196	870	221

Robust standard errors in brackets

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Standard Errors are clustered around municipalities.

NOTE: *Columns 1-5 correspond to five socio-economic strata respectively*

Table 11.
Instrumental Variable Estimates of the Effects of Migration on
Contraceptive Use for Additional Outcome Variables

	ever_use_pills	ever_use_condom
us_migration_exp_hh	2.115***	1.346***
	(0.473)	(0.326)
age	0.031***	0.005***
	(0.002)	(0.001)
schooling_dumm	0.315***	0.217***
	(0.044)	(0.035)
catholic_dumm	-0.101***	-0.073**
	(0.025)	(0.031)
married_dumm	0.304***	0.109***
	(0.039)	(0.026)
working_dum	-0.149***	-0.137***
	(0.027)	(0.022)
no_health_insur	-0.247***	-0.321***
	(0.023)	(0.020)
social_strata	-0.004	-0.047***
	(0.009)	(0.011)
rural_dumm	-0.132***	-0.236***
	(0.029)	(0.027)
Constant	-1.550***	-0.990***
	(0.094)	(0.059)
Observations	36584	35139

Robust standard errors in brackets

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

Standard Errors are clustered around municipalities.

Relation between Proportion of Current Migrant and Historic Migration Stock at municipality Level

Historic proportion of Migrants at the Municipality level (%)

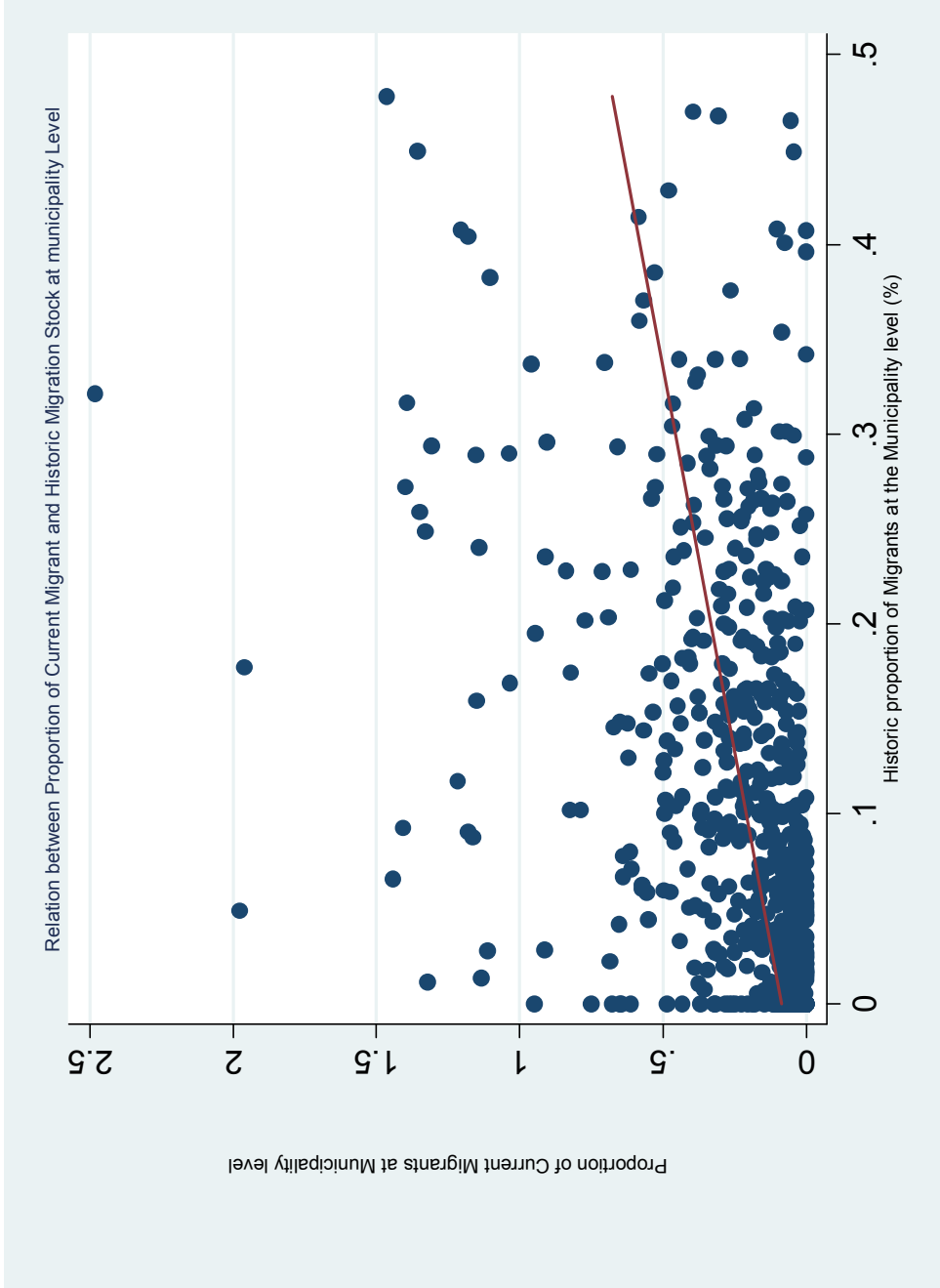Proportion of Current Migrants at Municipality level

Figure 1. Simple scatter plot and line fit between current (1997) and historic migration (circa 1985) at the municipality level
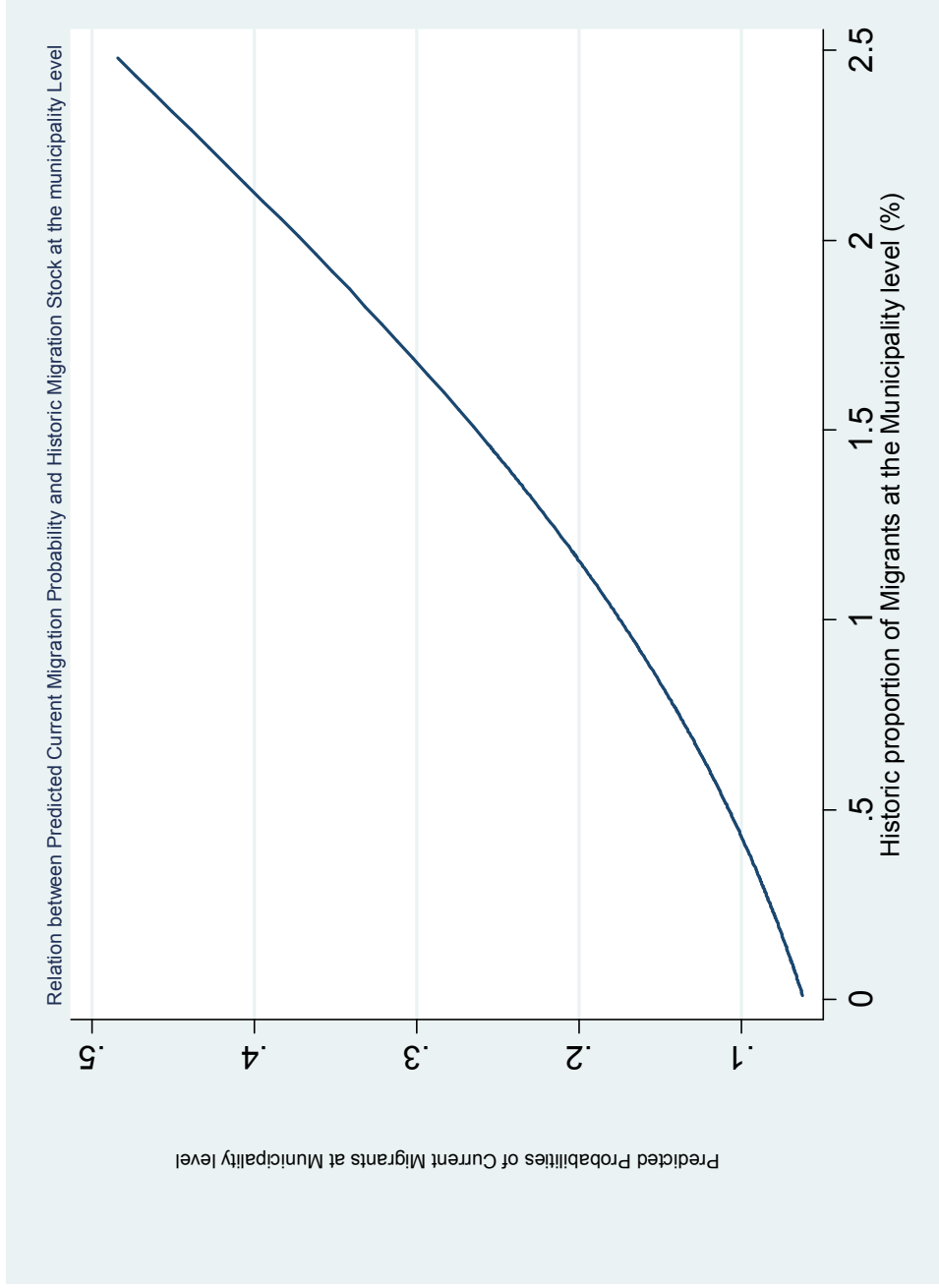
36

Figure 2. Spline plot between historic migrant proportion(circa 1985) and predicted probability based on current migration (1997)

Appendix: Definition of variables used in the study

Panel A: Individual Level Outcome Variables (correspond to 1997)	
current_pills	0/1 Dummy Variable, =1 if currently using contraceptive pills
current_condoms_pills	0/1 Dummy variable, =1 if Currently using either pills or condoms or both
current_condoms	0/1 Dummy Variable, =1 if currently using condoms
ever_use_pills	0/1 Dummy Variable, =1 if used pills ever
ever_use_condom	0/1 Dummy Variable, =1 if used condoms ever

Panel B: Individual Level Migration Variables (correspond to 1997)	
us_migration_exp	0/1 Dummy variable, =1 if the person has gone to the US between 1987 and 1997
us_migration_exp_partner	0/1 Dummy variable, =1 if the woman or her partner have gone to the US between 1987 and 1997
us_migration_exp_fem_hh	0/1 Dummy variable, =1 if any FEMALE member from the family has gone to the US between 1987 and 1997
us_migration_exp_hh	0/1 Dummy variable, =1 if ANY member from the family has gone to the US between 1987 and 1997

Panel B: Individual Level Control Variables (correspond to 1997)	
age	age in years, as reported
schooling_dumm	0/1 Dummy Variable, =1 if ever attended school
catholic_dumm	0/1 Dummy Variable, =1 if Catholic
married_dumm	0/1 Dummy Variable, =1 if currently married
working_dum	0/1 Dummy Variable, =1 if currently employed
rural_dumm	0/1 Dummy Variable, =1 if belongs to Rural Area
no_health_insur	0/1 Dummy Variable, =1 if does not have Health Insurance
lnhh_pci	Log of Percapita household income
social_strata	The survey divides the population into six socio-economic strata, 1 being the richest

Panel C: Municipality-level Variables (correspond to 1990 except prop_mig_pop_munic)	
prop_employed	Proportion of people employed
prop_second	Proportion of people who have completed secondary education
prop_fertility	Proportion of women who have a child in the last year
prop_female_doctors	Proportion of Female Doctors in the Population
prop_skilled	Proportion of skilled Workers
prop_mig_pop_munic	Proportion of people who have been to US in 1985

Note: All proportions have been calculated using total municipality population