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The Health and Labor Market Effects of Spouse Choice, Maternity Leave and Parental Work

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by

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ABSTRACT

This dissertation explores the health and labor market effects of spousal and parental choices. First chapter of this dissertation studies international marriages in Europe. The effect of international marriage - a union between a country native and an immigrant - on social and family outcomes is endogenous due to the selection into marriage markets and non-random spousal choice. In this paper I use European Union membership and availability of cheap travel as region-specific instrumental variables that increased the probability of intermarriage in Europe. The two-stage least squares analysis applied to 1977-2006 IPUMS International Project Census micro data shows no significant difference in the family size or number of children between intermarried and same-nativity couples. However, it does reveal higher labor force participation rates and much lower marriage rates among mixed nationality couples.

In the second chapter, I use Russia's 1981-82 maternity benefit expansion to estimate the long-run effects of maternity leave on health and other outcomes of children. The program was rolled out in stages and has extended both partially paid and unpaid leave for the vast majority of women. To estimate the effects of the program I apply a difference-in-differences framework to the recent 2000-2014 Russian Longitudinal Monitoring Survey data that contain information on both affected and unaffected cohorts, while also taking advantage of the fact that not all regions implemented the program simultaneously. While the results suggest there is no difference in the overall health of individuals that are born before and after the benefit roll-out, there is strong evidence that those born after the reform are less likely to have chronic gastrointestinal diseases, which could be attributed to better nutrition and breastfeeding duration in the first year of life.

Third chapter proposes a new way to estimate the effect of maternal labor supply on the achievement of children. I use a country-specific measure of gender inequality as an instrumental

variable for the female immigrant's decision to work. For the married women in the New Immigrant Survey, higher values of the Gender Inequality Index were positively correlated with the propensity to work for pay and work longer hours, suggesting their self-selection into the US immigration. Two-stage estimates further show that children of working mothers have reading and math scores that are over one standard deviation above average. An additional 10 hours a week of maternal work is estimated to increase reading scores by 37% relative to mean and quantitative reasoning scores by 24% relative to the mean. I also find that working mothers visit their children's classes and attend school meetings more frequently than others; hence, the observed improvement in test scores could be due to a higher involvement of parents in their child's school curriculum.

CHAPTER 1:
Social and Economic Impacts of International Marriages in Europe

1.1. Introduction

Globalization has been a dominant trend in the international relations ever since the end of World War II. The increased interdependence between countries has helped open up many national borders, start up international enterprises and develop global labor markets. These events helped make immigration today as prominent as ever, with a lot of migration flows happening between countries that have formal economic and political agreements. The proportion of foreign-born individuals residing in countries like Spain, France, Ireland and Austria exceeded 10 percent as of 2005.[1] Additionally, between the years 1990 and 2010, the UK has increased the proportion of immigrants from 6.4% to 11.3% of total population, while Italy has more than tripled it, from 2.5 to 7.9%.[2]

High dissemination of immigrants would inevitably alter the composition and functioning of both labor and marriage markets of the host country, and thus should be of high interest to policy-makers. While much of economic research today is focused on issues related to immigration, including immigrant assimilation in the host country (Meng and Gregory, 2005), marriage and education trade-off (Nielsen, Smith and Çelikaksoy, 2009), and the way immigrant population alters the host country's marriage market conditions (Angrist, 2002), the questions of causal effects of intermarriage on family structure and labor market decisions remain unanswered. Meanwhile, international marriage (also called intermarriage), defined as the formation of families between natives and immigrants, is no longer an unusual phenomenon in

[1] OECD Country Statistical Profiles (http://stats.oecd.org/).
[2] UN Population Division, *Trends in International Migrant Stock: The 2013 Revision*, September 2013.

many developed countries.[3] In this paper, we fill a gap in the existing literature by evaluating how intermarriage affects fertility, family formation and size, and the decision to participate in the labor market. It is particularly of interest whether intermarriage contributes to the previously observed trend in changing marriage structure, less traditional views on children and household specialization (Gubernskaya, 2010).

Given a high correlation between intermarriage and immigrant stock of a given country (Lanzieri, 2012), it is intuitive to study the effects of intermarriage in regions with high immigrant population. As of 2013, the world average for immigrant stock as a proportion of the population is 3.2% overall and 10.8% for developed counties, while for Western Europe it is as high as 12.7%.[4] This makes Europe an ideal geographical location to study the effects of intermarriage.

This paper is the first to use new instrumental variables to control for existing marriage market selection and estimate causal effects of intermarriage. Whether individuals choose their own partner or are arranged to marry someone by their families, matching in marriage markets is not randomized. Economic theory of marriage markets developed by Becker (1974) predicts assortative mating, or the tendency for people to pick their spouses based on their personal traits. Additionally, in case of intermarriage, younger and better-educated individuals receive greater exposure to other cultures and could therefore become more open-minded towards intermarriage.

To deal with self-selection in intermarriages we use two stage least squares (2SLS) instrumental variables that are unique to our sample and time period. We find that the European Union membership, the introduction of Euro and the airline deregulation in any given European

[3] The Economist article "Herr and Madame, Senor and Mrs.", Print Edition, November 12, 2011 (http://www.economist.com/node/21538103/print).
[4] United Nations, Department of Economic and Social Affairs (2013). Trends in International Migrant Stock: The 2013 revision (United Nations database, POP/DB/MIG/Stock/Rev.2013).

country are all suitable instruments to deal with endogeneity associated with international marriage. These instrumental variables are strongly correlated with intermarriage and are not directly correlated with the outcomes, which in this paper are family structure and labor market participation of individuals. Our results show that intermarried couples do not have fewer children overall, while more recent cohorts tend to have younger children in their household. Intermarried people are much more likely to cohabit than those from same-nativity unions, and also tend to have significantly higher labor force participation rates.

The paper is structured as follows. After a brief literature review in section two, section three describes data and econometric methods used in this paper. Section four describes the institutional background and provides an overview of our instrumental variables, including the mechanism of their work, empirical specifications and the first stage estimate analysis. Section five presents IV estimates for the outcome variables. Lastly, section six discusses some of the implications and concludes.

1.2. Literature Review

The existing literature on intermarriage generally focuses on assimilation of first- and second-generation migrants. Meng and Gregory (2005) use sex ratios and individual probabilities of marrying within their ethnic group to show that, in Australia, immigrant women who married native men had significantly higher labor force participation and earnings than immigrant women who married other immigrants. This could be due to the fact that when two married individuals already differ from each other in significant cultural ways, they would be more likely to abandon the traditional marital roles as well. Alternatively, presence of a native spouse could increase

networking opportunities and language skills of incoming immigrants, which in turn would speed up their social integration and entry into the job market (Bleakley and Chin, 2010).

The seminal work of Angrist (2002) looks at 20th Century US immigrants and uses the variation in the incoming cohorts' sex ratios as an instrument for family and labor market outcomes. The study used a comprehensive data set, which included the ethnicity of couples, and utilized a policy-induced change in the immigration cohort composition as a natural experiment to deal with the omitted variables bias and selection issues. Key findings show that in a high-sex ratio environment, when marriage markets include more males than females, marriage rates are higher for both sexes, female labor force participation decreases, family incomes rise, and the welfare of children is increased. The empirical approach of this paper is based on the assumption that incoming immigrants are willing to marry only within their ethnicity group, which means they marry either first or second-generation immigrants from the same country, and intermarriage is not considered an option.

Levchenko and Solheim (2013) show that migration for marriage increases the dissimilarity of intermarried and native couples. Russian-US intermarried couples are significantly different from native US couples in their socio-economic characteristics. While this analysis is based on one country and a very narrow immigrant population, it shows that people select themselves in certain marriage markets, and some of that selection is likely to be unobservable to researchers. In cases like these, lack of assortative mating by education in mixed couples could be beneficial as it can potentially reduce population income inequality in the long run (Greenwood, 2014).

In other cases, intermarried couples can have similar levels of education and same opportunity costs to specializing in home production. Using panel data in Germany Nottmeyer

(2014) finds that intermarriage is related to less specialization among the cohabiting couples. Particularly, native women seem to have more bargaining power and tend to increase their labor force participation. On the other hand, intermarried natives specialize more than native couples, which might suggest adaptation of more traditional views on marriage.

Sociology literature provides some intuition on the changing views on specialization and marriage observed in these studies. Gubernskaya (2010) looks at Likert scale survey data from trends in marriage and children, over multiple European countries, analyzing socio-demographic characteristics as predictors for specialization decisions. She finds that across all countries and socio-economic groups, opinions on marriage and children become less traditional over time (1980s - 2000s). She refers to several main sociological theories behind the attitude change - cohort replacement (inter-cohort change), economic modernization (changes in opportunity), second demographic transition (SDT) and intra-cohort change. The theories are used to explain why women today are more accepting of non-traditional family structures, cohabitation, full-time work, childbearing outside of marriage and even childless life. Our paper tests a potential source of these ideological changes by investigating whether the increase of intermarriage is related to the non-traditional views on children, marriage and work, or whether it brings mixed-nativity couples closer together in their ideological views.

Lanzieri's (2012) statistical analysis of mixed marriages in Europe over the last 20 years identifies some of the importance and challenges of studying intermarriage, while analyzing trends and prevalence of intermarriage across countries. While proportion of intermarriages increases for all groups of countries, it is not always for the same reason. Northern European countries experience an increase in the mixed marriage rates over his study period but mostly due to decreasing marriage rates overall. Eastern European countries, many of which were not

directly influenced by the EU and the introduction of Euro, have the lowest mixed marriage proportions of the whole region, with some countries showing an increase and others having a stable trend in proportion of intermarriages.

In another special regional case, countries like Switzerland and Luxembourg have substantially more international marriages, all due to small population, multiple national languages and limited opportunities on the marriage market. Lanzieri (2012) also used a self-constructed endogamy/exogamy measure and concluded that for European region overall, the attitude toward marriage is weakly endogamous or indifferent. In other words, people generally marry within their nationality, but do not limit themselves to natives only, especially if their national market has size or sex ratio restrictions, or if there are many foreigners residing locally. These findings confirm the relevance of our instruments in this paper; the increased number of foreigners due to political and economic unions in Europe would increase opportunities for mixed friendships and marriages.

In a related analysis, Esteve et al. (2011) looks at cross-border marriage formation as related to the number of foreigners present in the host country. Like Lanzieri (2012), the paper finds high correlation between the number of foreigners and number of mixed marriages, but the elasticity is higher for immigrant women and lower for immigrant men. Both Lanzieri (2012) and Esteve et al (2011) set a good background for the analysis of intermarriage, but such demographic literature does not provide causal inference on its determinants or its social and labor market effects on the host country, which is another literature gap we fill in this paper.

1.3. Instrumental Variables

In this study, we look at the European Union, Eurozone and the deregulation of airlines within Europe as economic initiatives that ended up promoting business and personal relationships across the country borders. Next, we describe the chosen instrumental variables, the mechanism of their work on the increased prevalence of international marriages and their independence from household and labor market characteristics.

Since we are working with survey data and want to establish the effect of a particular type of marriage on family and labor outcomes, ordinary least squares and binary econometric models will be biased by selection. One way to deal with endogeneity is to include relevant instrumental variables. If instrumental variables are strongly correlated with the endogenous variable and at the same time are not directly correlated with the outcomes, unbiased estimates can be obtained. We believe that the formation of political and economic unions among neighboring countries provides a good instrument for marriage market selection. Such unions are typically formed to pursue mutual economic growth and other macroeconomic goals; they promote business and tourism volume among the participating countries without directly targeting individual and family outcomes.

The European Union (EU) started out as a European Coal and Steel Community between only six countries; a few decades later the community has developed into a single market economic and political zone made up of 28 countries.[5] The close diplomatic relations of the European countries were written into a law first in 1951 with the Treaty of Paris, then in 1957

[5] As of 2015 European Union member countries included Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK.

with the Treaty of Rome, and later in 1993 with the Treaty of Maastricht, all of which expanded the membership and legislative power of the union.[6]

Introduced later in 1999 as the common currency of the European Union, the Euro has eliminated exchange rate costs and increased business and trade among participating countries (Micco, Ordonez and Stein 2003, Bun and Klaassen 2002, Berger and Nitsch 2005, Flam and Nordström 2006, Chintrakarn 2008). It was a much-anticipated next step in the further integration of the European Union countries. With the United Kingdom and Denmark as the only exceptions[7], each member of the EU had to start accepting Euro as their new common currency, or pledge to accept it at a later date. As of 2015, 19 out of 28 European Union member states have adopted Euro as their currency.[8]

To see relative change in trade patterns of EU member states following the 1993 Treaty of Maastricht and 1999 Eurozone establishment we can refer to OECD country profile statistics. As an example, Spain saw an increase in its exports (as a percent of GDP) from 16% in 1992 to over 20% in 1994. Likewise, Slovenia, a country that entered EU in 2004 and Eurozone in 2007, had the GDP share of its exports increase from 50% in 2003 to 64% in 2006.[9] In fact, all of the countries that adopted Euro in 1999 saw a substantial increase in their import and export share.

In the first stage of our analysis, we propose that the increase in trade and business connections between the EU countries has contributed to the formation of personal relationships. In addition to that, the incorporation of the earlier Schengen agreement into European Union law has made it possible to easily travel between the member states and maintain those close

[6] Official website of the European Union (http://europa.eu/about-eu/eu-history/).
[7] They have negotiated an opt-out from otherwise mandatory adaptation of the Euro according to the Maastricht Treaty of 1992.
[8] Seven countries in process of adopting Euro include Bulgaria, Czech Republic, Hungary, Poland, Romania, Sweden and Croatia. Official website of the European Union (http://europa.eu/about-eu/basic-information/money/euro/)
[9] OECD Country Statistical Profiles (http://stats.oecd.org/).

relationships, leading to more friendships and marriages.[10] Figure 1-1 uses data collected for this research to plot time series graphs showing the proportion of international marriages across different countries of the European Union. Green and red lines indicate a year in which a country has become an EU and a Eurozone member, respectively. It is easy to see that for all EU members the proportion of intermarriages has gone up, especially following the membership entry. In contrast, Figure 1-2 shows that for countries that are not members of the EU (for the time period studied here) intermarriage rates have remained stable or have decreased.[11]

To act as an instrumental variable for purposes of this research, European Union must not only be highly correlated with formation of personal relationships, but also be exogenous to our outcomes of interest. European Union was primarily established to end military conflicts and promote peace and prosperity between European countries, and therefore its integration policies did not target specific social outcomes like fertility and within-family specialization. In the 1970s, the EU was increasing funding and infrastructure for poorer regions of its member countries to decrease unemployment, but it was only in the 2000s that it began targeting female labor force participation.[12]

Another major event that happened in Europe and has also increased travel was the government deregulation of airlines in 1997. Prior to deregulation, European airlines had limited control over their flight routes and faced many price restrictions, much like US airlines prior to their deregulation in 1978. EU started easing air travel policies in 1993, and four years later the initiatives have allowed formation of smaller and cheaper airlines. Those airlines could operate freely in EU member states, often had only a few main bases and made money travelling short

[10] We considered using Schengen Agreement as another instrumental variable; however, the census dates and countries fully overlap with the Eurozone membership in our sample.
[11] Switzerland had a large proportion of intermarriages at the beginning of the studied period and it grew steadily after that. However, this country is a special case as noted earlier on page 6.
[12] In the last 15 years, development programs such as Lisbon Strategy and Europe 2020 have aimed to increase LFP in European countries. Specifically, the initiatives target female LFP by improving access to childcare facilities.

routes to neighboring countries. Some of the first "economy" airlines that were established around the deregulation period are still popular today, i.e. Ryan Air and EasyJet. This much more affordable and faster transportation provided another gateway for Europeans and foreigners to travel and expand their personal and business networks.

1.4. Data and Empirical Model

1.4.1. Data and Sample

Our individual-level data comes from the IPUMS International Project of University of Minnesota, which was a result of a collaboration of the Minnesota Population Center, National Statistical Offices, and international data archives.[13] The project is a collection of publicly available international census data, currently counting over 250 country-year samples. Sample sizes and availability vary, with some countries represented at less than 1% due to data availability (i.e. India, Indonesia, Nigeria) or only a few thousand households due to country size (i.e. Fiji, Saint Lucia). However, most developed countries, European ones in particular, are represented at 10% of population with over 500,000 households. Provided variables include household characteristics such as geographical location and constructed family interrelationships, as well as a variety of individual level data on nativity, education and occupational status.

We use samples of countries that at present are members of the European Union, as well as countries that directly neighbor with the EU region.[14] Completeness of survey data on at least one of the national origin variables, age, occupation and education is the primary criteria for our sample selection. Additionally, we needed the surveys to have comparable education and

[13] Minnesota Population Center. *Integrated Public Use Microdata Series, International: Version 6.3* [Machine-readable database]. Minneapolis: University of Minnesota, 2014. (https://international.ipums.org/international/)
[14] Data on the European Union and Eurozone membership status for the countries in my sample was collected from the official website of the European Union (http://europa.eu/).

occupation variables to serve as controls in the regressions. In the end, our individual and household level data come from 11 countries that fit our selection criteria: Austria, France, Greece, Ireland, Italy, Portugal, Romania, Slovenia, Spain, Switzerland and Turkey. Except for Slovenia and Italy, each country is represented by two or more Census years spanning from 1977 to 2006. The first two columns of Table 1 list the 29 samples used here and the original Census population fractions of each one. Census fractions for my data selection range from 4.2 to 33% of the population, with the majority of samples represented by either 5% or 10% fractions.

For each of the samples we indicate if a country was a member of European Union, Eurozone or had their airlines deregulated in their census year.[15] For example, in Table 1-1 we can see that in Greece was part of the EU in census year 1991, but it was not part of Eurozone nor did it have airline deregulation at that time. However, by the time 2001 census surveys were collected, Greece was part of all three groups.

The IPUMS International project provides a constructed variable on the location of spouse or cohabiting spouse within the household for each surveyed individual, which is how we are able to identify and link together all couples. We then define intermarriage, as a variable equal to 1 if within a married or cohabiting couple one person is foreign-born and one is native-born in the country. The variable is constructed mainly from the information on nativity, which distinguishes people born in the country of survey from those who are migrants. If nativity status is missing for any given sample, we redefine intermarriage based on country of birth or citizenship status. Likewise, intramarried, or same nativity, couples are identified when one of the partners is native-born, or both partners are foreign-born and from the same country of origin.

[15] Data on cheap flight routes following the deregulation was collected on airline and travel websites, primarily https://www.ryanair.com/us/en/, http://www.easyjet.com/en, https://www.ricksteves.com/travel-tips/transportation/budget-flights.

We ultimately want to compare individuals in intermarried unions to those from homogeneous unions, regardless whether those same-nativity couples come from native or immigrant families. Second to last column of Table 1 lists the proportion of intermarried individuals in each country-year sample. Average proportion of intermarried people in our estimation sample is 5.32% of the married or cohabiting population, which varies among year-country groups from less than 1 percent in Greece 1981 and Romania 2002 to over 16 percent in Switzerland 1990 and Ireland 2002.

We keep only those individual observations that we can link to a spouse or a cohabiting partner. Only group that we specifically exclude are individuals in the armed forces, since only some of the country surveys identify them in a population. After taking a 15% random sample of total available linked observations in order to compress the data to a manageable size, our final estimation sample size consists of 2,547,735 individuals. Last column of Table 1-1 shows how many observations come from each of the census samples.

1.4.2. Empirical Specification

To address the potential endogeneity of intermarriage, we estimate the first stage equation as below:

$$intermar_{irct} = const + \alpha E_{ct} + \beta X_{irct} + Trend_{ct} + \zeta_r + \varepsilon_{irct} \quad (1)$$

where *intermar* is an indicator variable whether or not individual *i* in region *r* of country *c* is intermarried in the survey year *t*. Our instrumental variable is represented by E_{ct}. Variable $E_{ct} = 1$ if country c is part of the EU in year t or if country c has access to cheap flights. Trend specification ($Trend_{ct}$) varies by census year and country, and is included as linear, quadratic or country-specific. The last component of the equation is a regional fixed effect ζ_r, which is also used for clustering in the regressions. Regions are defined at the ENUTS3 level - European

Nomenclature of Territorial Units for Statistics 3 - the third narrowest level within countries, or smallest geographical category available.

Controls X_i include indicator variables for age, education and occupation groups. Age groups are 12-18, 19-25, 26-35, 36-45 and over 46. Education variable is standardized across all European countries and is categorized into primary, secondary and university levels, with less than primary as the base category. Occupations are grouped in 9 general categories, which include legislators and officials, professionals, technicians, clerks, service workers, agricultural and fishery, crafts and trade, plant and machine operators and elementary occupations.

Table 1-2 shows sample statistics as well statistics for sub-samples as by intermarriage status. The difference in socio-demographic variable means confirms the presence of self-selection in a marriage market. Comparing some characteristics of intermarried individuals with those married endogamously, or within their nationality, it appears that the two groups differ from each other in significant ways. Intermarried people are slightly younger than their counterparts, have higher rates of university completion and are more likely to hold professional and managerial jobs.

The dependent variables of interest in this paper are family formation and labor force participation. These variables are likely to be affected by the type marriage, and are of high policy interest. Outcome variables include number of own children living in the household, number of children under five, official marital status and overall family size, as well as labor market participation. Comparing simple means of subgroups by marriage type in Table 1-2, we see statistically fewer children and smaller family sizes for intermarried individuals. Labor force participation rates are over 5 percentage points higher for those who are intermarried. There is

also a dramatic difference in the cohabitation rates – proportion of intermarried couples that are not officially married is 13.3%, more than double the sample average of 6.6%.

Equation 2 outlines the second stage for estimating the causal effect of intermarriage on the outcome variables as follows:

$$outcome_{irct} = const + \alpha \widehat{intermar}_{irct} + \beta X_{irct} + trend_{ct} + \zeta_r + \upsilon_{irct} \quad (2)$$

Instrumental variables are used in Two Stage Least Squares (2SLS) regressions for continuous outcomes and Two Stage Residual Inclusion (2SRI) is used for binary outcomes including labor force participation and an indicator variable for cohabiting, or not being officially married. 2SRI is an instrumental variables method that is an alternative to 2SLS and designed and proved consistent specifically for binary outcome models (Terza 2009). Instead of using predicted endogenous variables in the second stage, the method proposes using the true endogenous variable values and the residual values from the first stage. The model then follows equation 3:

$$outcome_{irct} = const + \alpha intermar_{irct} + \beta resid_{irct} + \gamma X_{irct} + trend_{ct} + \zeta_r + u_{rict} \quad (3)$$

$$resid_{irct} = intermar_{irct} - \widehat{intermar}_{irct}$$

Using 2SRI instead of the Two Stage Least Squares results in a more intuitive interpretation of estimates if we are estimating intermarriage effects on binary outcomes. Residual inclusion method not only restricts the estimates to be between 0 and 1, like a regular probit, but also controls for endogenous variables, like a 2SLS regression. For comparison with instrumental variables estimates, we run ordinary least squares (OLS) for continuous and Probit regressions for binary outcomes, all while controlling for the same set of independent variables, regional fixed effects and time trends as in equation (1).

1.5. Results

1.5.1. First Stage

Table 1-3 shows results under three different specifications of the trend variable. Overall, our estimates are robust across different trend specifications. Panel A shows that the European Union increased the prevalence of intermarriage by about 4.5 to 5 percentage points, or 85-95 percent compared to the overall sample mean of 5.3%. Likewise, Eurozone membership increased the probability of being intermarried by 2.5 percentage points (Panel B). Compared to the overall mean, this is a sizeable, almost a 50% increase. Panel C shows the estimate of the Airline deregulation reform, and suggests that the presence of a cheap airline has increased the probability of intermarriage by 1.6 to 1.9 percentage points.

The estimates in Panel B and Panel C are similar in magnitudes; therefore, we combine Eurozone and cheap airline availability to form a single instrumental variable (cheap travel hereafter). Countries that have switched to the Euro and have also gained access to cheap air travel experienced a significant reduction in travel and international business transaction costs through both of these reforms. More importantly, the treatment groups of Eurozone and cheap airline instruments in our data differ by only 2 country-year samples.[16] Panel D shows that the formation of the Eurozone and the availability of cheap airline travel have increased the intermarriage rates in the region.

1.5.2. OLS/Probit and 2SLS/2SRI

Main estimates of intermarriage effects on linear and binary outcomes are outlined in tables 1-4 and 1-5 respectively. In those tables, columns 1 through 3 report OLS/Probit estimates

[16] Switzerland in 2000 had access to cheap airlines but was not part of the Euro zone; Greece in 2001 was part of the Euro zone but did not have cheap travel routes outside of the country.

of intermarriage, columns 4 through 6 show intermarriage effects as instrumented with EU membership, while columns 7 through 9 show estimates from intermarriage effects instrumented with cheap travel. Equations 2 and 3 were estimated on the full sample first and then on the subsamples stratified by sex, nativity and both sex and nativity variables. All estimations are performed with the set of full controls, regional fixed effects, regional clusters, and three types of trend variables to insure the robustness of the results.

Intermarriage effects with EU instrument

Table 1-4 summarizes results for the linear outcomes as estimated with least squares and just-identified 2SLS with two separate IVs, EU and cheap travel variables. First we look at family size and composition variables. While OLS suggests that intermarriage leads to 0.11 fewer kids (which is 8% relative to the mean of 1.4) and therefore smaller family sizes, two stage least squares with the EU instrument show that there are no statistically significant effects on number of children, number of younger children or family size due to intermarriage.
Tables 1-5-1 and 1-5-2 report Probit and 2SRI estimates for binary outcomes. Both tables report estimation results from equation 3; marginal effects are presented in table 1-5-1, while conditional predicted probabilities are shown in Table 1-5-2. In panel A of columns 1 to 3 of both tables, probit estimation shows a slight decrease in labor force participation for the overall sample. On the contrary, IV regressions in columns 4 to 6 show a significant 42-percentage point increase in predicted LFP probability due to intermarriage. This estimate is also consistent across linear, quadratic and country-specific trend specifications.

Panel B in Table 1-5-1 shows the predicted probabilities for couples to cohabitate as opposed to officially marry, conditioning on the type of their marriage. Probit marginal effects in

first three columns show a small 0.01 percentage point increase in that probability for intermarried individuals, a predicted probability increase from 6.5 to 7.9% (Table 1-5-2). Using either IV in 2SRI estimation reveals a much more dramatic increase in cohabitation probability from around 6% to as high as 80-90%.[17]

Appendix table 1-A1 checks the robustness of these estimates by using alternative specifications of regional trends in equations 2 and 3, as well as by using an alternative sample specification. First column of 1-A1 reports estimates from an equation that uses ENUTS1 regional definition, which results in larger and fewer total regions than ENUTS3. The second column regression uses country fixed effects, resulting in even fewer regional dummies. Finally, last column of table 1-A1 reports estimates based on a more homogeneous sample that excludes Turkey. The magnitudes of the estimates from all three regressions differ slightly from previous specifications, but are consistent with the main model results in terms of their signs and statistical significance.

Intermarriage Effects Instrumented with Cheap Travel

The main difference between the 2SLS regressions using two different instrumental variables lies in the estimated effect on the number of children in the household. When using cheap travel, a union of Eurozone members and countries affected by airline deregulation, we obtain a significant estimate of 0.9 to 1.3 more of younger children for intermarried households. This contrasts the no effect found for a cohort affected by the EU membership. The two cohorts are about a decade apart in the timing of their exposure to the instruments and the mechanism of

[17] Estimation results using alternative specifications of regional fixed effects, ENUTS1 and country-specific, as well as estimates from a sample excluding Turkey, are consistent with the main results and are reported in appendix Table A-1.

their work.[18] Therefore, it is not surprising that we see a different estimate of the effect of intermarriage on the number of younger kids. Cohorts affected by cheap travel in the late 1990s had better labor force participation opportunities, family and career outlooks than cohorts affected by EU memberships before 1990s, and were hence more likely to postpone childbearing to a later phase in life.

Large positive effects of intermarriage on labor force participation and probability of cohabitation still hold when we use cheap travel instrument. While the magnitude of LFP participation probability change remains unchanged, estimated probability increase for cohabitation is now as high as 80-87 percentage point change, compared to 53-81 percentage point change range estimated with EU membership instrument. This is also in line with a different, more open-minded social environment in the 1990s as compared to 1980s.

Intermarriage Effects by Subgroups

To identify where the main intermarriage effects might stem from, we stratify the estimation sample by population subgroups such as sex, nativity, and both sex and nativity. Since our results are robust across different trend specifications in Tables 1-4 and 1-5, only results with a linear trend are reported below. While there was no effect of intermarriage on the number of children in the overall sample, immigrants who marry a native tend to have 1.3 more children than immigrants who intra-marry (Table 1-6, Panel A). Additionally, immigrant males who marry native women tend to have more pre-school children at the time of survey than those who marry immigrant women, which suggests that they are likely have children later in life (Table 1-6, Panel B).

[18] Earliest Census sample to be a member of European Union in my data is Greece 1981, while the earliest Census with cheap travel is France 1999.

The increase in the probability to participate in the labor market does not hold for intermarried immigrants; estimates in panel D actually show there is a small 12-percentage point decrease in probability that immigrant males participate in the labor market when they marry to native women. The intermarriage effect on LFP is largest for native females.

The decrease in marriage rates due to intermarriage holds for both males and females, but does not hold for immigrant population. Strongest effect stem from native females who marry immigrants; they are 88.4 percentage points more likely to live together with their partners without marriage than those who choose another native (Table 1-6, Panel E). Smallest effect among the native males is less statistically significant but is still substantial – 55.1 percentage point increase in probability of cohabitation if their partner is an immigrant, as compared to those with native partners.

Intermarriage effects within and outside of Europe

To investigate the effects of intermarriage further we separate the endogenous variable into two sub-types – marriage between a native and a resident of another European country, and marriage between a native and an immigrant from outside Europe. Due to increased cultural integration in the EU region intermarriage between citizens of member countries may have less social and immigration challenges than intermarriages with citizens outside of EU. Both EU and cheap flight are used in the same regression in order to instrument for two endogenous variables.

Panel A of Table 1-7 shows that while both instruments are suitable to be used together (F-test is >10), EU instrument is responsible for variation in intermarriage within Europe while Cheap travel causes variation in intermarriages outside of Europe. Two instrument 2SLS

analysis reported in Panel B of Table 1-7 does not reveal differential trends on number of children or family sizes of intermarried couples either within or outside Europe. Intermarriages outside Europe have 1.4-1.7 more of young children than same-nativity couples. Overall, the labor supply effect holds for both types of intermarried couples, but it is stronger for those intermarried outside of Europe. The higher probability to cohabit rather than marry seems to be stemming from intermarried Europeans; they are 66-80 percentage points more likely to be cohabiting than the natives.

1.6. Discussion and Conclusion

Intermarried individuals stand out from others in the population due to clear observable differences in the structure of their family and organization of their work life. This appears to stem, at least partially, from intermarriage itself. Instrumental variables analysis in this paper confirms that some of the observed differences are due to intermarriage, while others are simple correlations resulting from selection. Main social effects of intermarriage are in the labor market behaviors of partners, and not in the fertility or family structure. The higher labor supply of intermarried native females found here is consistent with the analysis of Nottmeyer (2014), which suggests higher bargaining power should decrease specialization within the household.

Another key result of this study is that intermarried couples do not have fewer children than native couples. However, for more recent cohorts, they tend to have younger children that are under school age, which means they have children later in life, compared to native or immigrant families. The results are consistent with the later marriage trend observed in many countries (Gubernskaya, 2010). Also supportive of the previous literature is the observed trend for intermarried couples to cohabitate as opposed to marry. Cohabitation not uncommon in most

developed countries.[19] It reflects the lower return to early marriage and the preference for pursuing career and personal goals before settling down. Higher labor force participation rates for both men and women would confirm this theory. In case of intermarriage, it is also possible that certain cultural barriers prevent couples from tying the knot. Another explanation could lie in the structure of the EU itself: in presence of open borders, same currency and similar social policy, there may be little added benefit to formalize a personal relationship with marriage.

The findings in this paper have useful policy implications. Lately, EU has focused more and more on bringing all of its member countries up to common economic standards, which includes higher labor force participation in particular. Programs like the unsuccessful Lisbon Strategy and ongoing Europe 2020 focus on female LFP in particular by increasing the number and quality of childcare facilities. Intermarriage provides another channel through which EU countries could achieve higher LFP, and thus policies to promote assimilation of single immigrants would be beneficial for EU's economic goals. However, one must also consider the potential spillovers of the LFP effects. Higher female labor force participation, and thus a lesser degree of spousal specialization, could mean higher household incomes but less time spent with children.

We have identified the causal effects of intermarriage on the family structure and labor market participation decisions of European couples. While questions about the exact mechanism of intermarriage remain unanswered, our findings are a first stepping-stone to more research on the subject, which would eventually help create better immigration and social policies in the EU countries. As globalization increases the number of migrants, it also influences the attitudes of the native and immigrant communities in the host country (Lanzieri 2012), which in turn affects

[19] In OECD-25 countries, between 2006 and 2011, 6.8% of the population age 20 and over are cohabiting, versus 49.9% who are married and 15.2% that are single. (OECD Family Database, SF3.3: Cohabitation rate and prevalence of other forms of partnership)

the prevalence of international marriages. This and other research on intermarriage outcomes can lessen the stigma against mixed marriages, promote European integration and further diversification of European countries.

Despite the large scale of the IPUMS data and innovative instrumental variables used in this paper, there is still a great need for micro data with comprehensive measures of the ethnicity and migration. Future research could explore other instrumental variables or survey intermarried couples directly to get a better idea of why their family and work decisions deviate from the norm.

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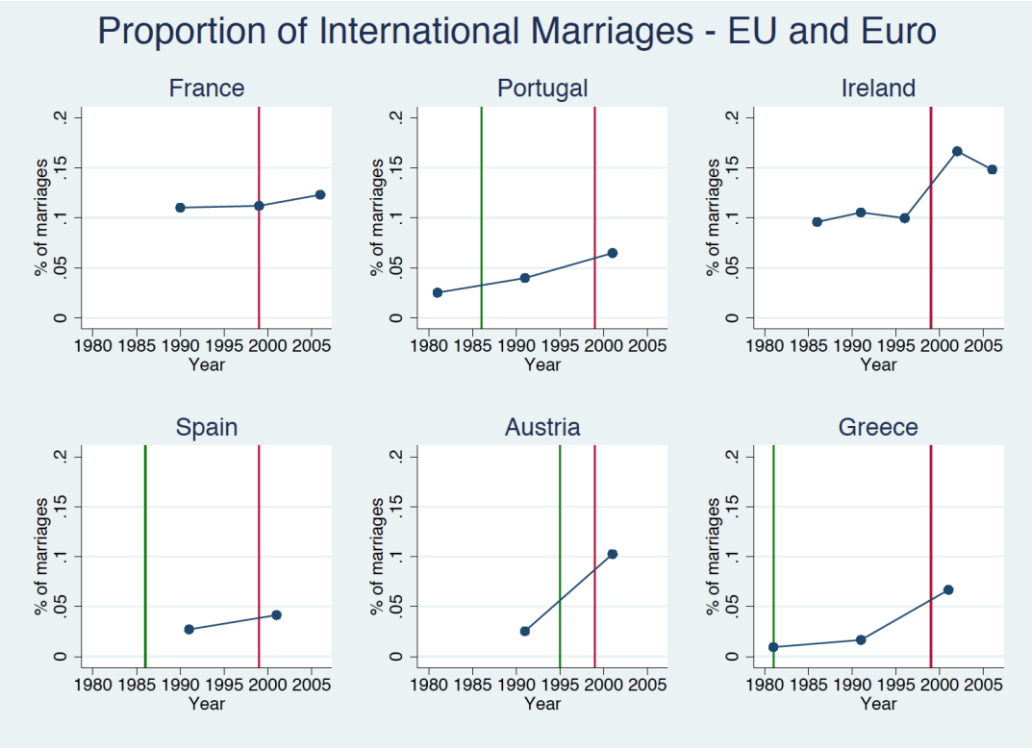
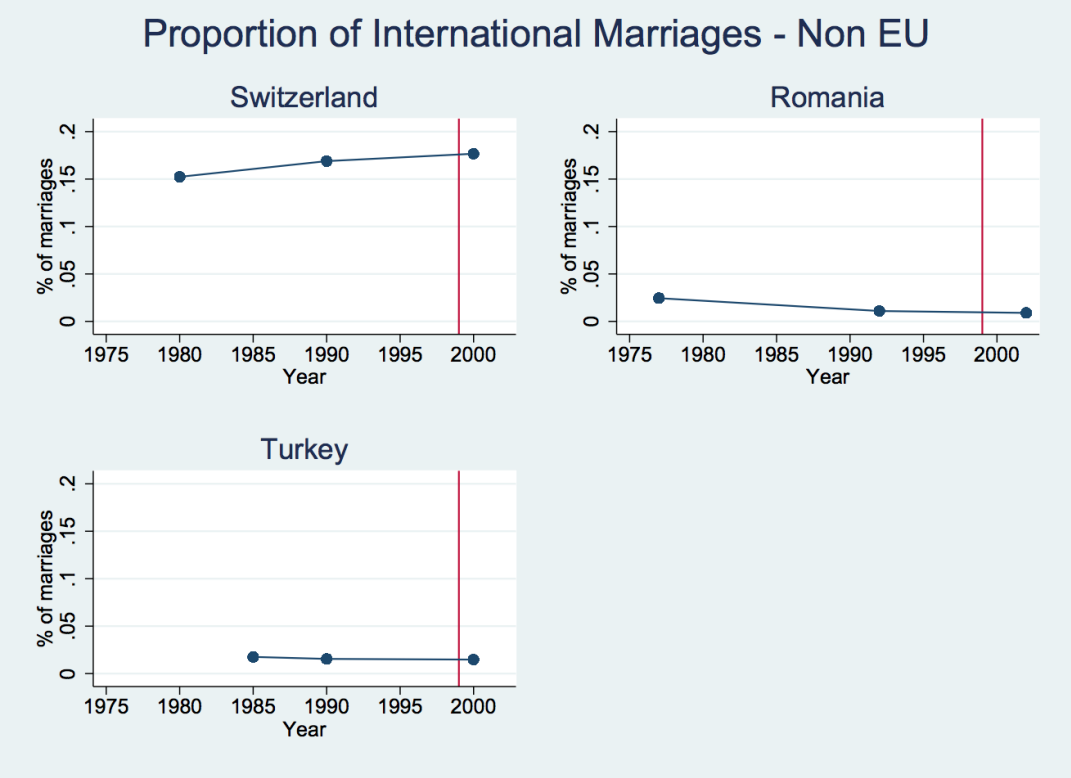
Figure 1-1: Proportion of International Marriages in the EU Member Countries



Notes: Green Line indicates country's entry into the European Community or the European Union. Red line indicates year of Euro Zone establishment, 1999. Source: Own data analysis using STATA, data from IPUMS International Project 1977-2006 (COLOR NEEDED)

Figure 1-2: Proportion of International Marriages in the EU Non-Member Countries



Notes: Red line indicates year of Euro Zone establishment, 1999. Source: Own data analysis using STATA, data from IPUMS International Project 1977-2006

Table 1-1: Proportion of Intermarried by Country-Year Sample

IPUMS Sample	Census Fraction (%)	Census Size	Group Membership			Sample Proportion of Intermarried	Sample Totals
			EU	Eurozone	Cheap Flights		
Austria 1991	10	780,512				2.55	53,017
Austria 2001	10	803,471	✓	✓	✓	10.26	55,593
France 1990	4.2	2,360,854	✓	✓		11.03	168,809
France 1999	5	2,934,758	✓	✓	✓	11.21	170,969
France 2006	33	19,973,287	✓	✓	✓	12.32	156,921
Greece 1981	10	923,108	✓	✓		0.95	70,767
Greece 1991	10	951,875	✓	✓		1.67	73,621
Greece 2001	10	1,028,884	✓	✓	✓	6.68	76,275
Ireland 1986	10	355,020	✓	✓		9.59	18,807
Ireland 1991	10	353,149	✓	✓		10.54	18,992
Ireland 1996	10	365,323	✓	✓		9.98	20,516
Ireland 2002	10	410,688	✓	✓	✓	16.67	23,216
Ireland 2006	10	440,314	✓	✓	✓	14.83	26,079
Italy 2001	5	2,990,739	✓	✓	✓	4.58	186,566
Portugal 1981	5	492,289				2.52	35,068
Portugal 1991	5	491,755	✓	✓		3.98	36,755
Portugal 2001	5	517,026	✓	✓	✓	6.48	40,393
Romania 1977	10	1,937,021				2.44	123,526
Romania 1992	10	2,238,578				1.10	169,878
Romania 2002	10	2,137,967				0.90	164,866
Slovenia 2002	10	179,632				9.82	12,409
Spain 1991	5	1,931,458	✓	✓		2.72	135,932
Spain 2001	5	2,039,274	✓	✓	✓	4.16	142,032
Switzerland 1980	5	317,803				15.24	22,586
Switzerland 1990	5	342,797				16.89	25,158
Switzerland 2000	5	364,086			✓	17.67	26,478
Turkey 1985	5	2,554,364				1.76	118,205
Turkey 1990	5	2,864,207				1.55	163,209
Turkey 2000	5	3,244,456				1.48	211,092
Overall						5.32	2,547,735

Table 1-2: IPUMS Summary Statistics

VARIABLES	Sample Mean	Sample Mean by Marriage Type		Mean Difference	T-test Statistic
		International	Other		
Panel A: Outcomes					
Number of own children	1.396	1.145	1.410	-0.265***	-69.29
Number of own children under 5	0.267	0.272	0.267	0.005***	3.01
Family size	3.781	3.3	3.808	-0.513***	-96.11
In the labor force	0.593	0.646	0.590	0.056***	40.03
Cohabiting (not married)	0.066	0.133	0.062	0.071***	100.85
Panel B: Individual Controls					
Age 12-18	0.004	0.002	0.004	-0.002***	-12.89
Age 19-25	0.062	0.049	0.063	-0.014***	-20.69
Age 26-35	0.218	0.239	0.216	0.023***	19.71
Age 36-45	0.233	0.258	0.232	0.026***	22.02
Age 46 +	0.483	0.453	0.485	-0.033***	-23.39
Less than primary school	0.216	0.114	0.222	-0.107***	-93.7
Primary school	0.458	0.385	0.462	-0.077***	-55.11
Secondary school	0.237	0.315	0.233	0.082***	68.91
University degree	0.087	0.188	0.0813	0.107***	136.67
Legislators, senior officials and managers	0.038	0.058	0.037	0.022***	40.21
Professionals	0.048	0.087	0.046	0.042***	70.1
Technicians and associate professionals	0.053	0.096	0.051	0.045***	71.64
Clerks	0.045	0.065	0.044	0.022***	37.15
Service workers	0.070	0.089	0.069	0.02***	27.71
Skilled agricultural and fishery workers	0.105	0.02	0.109	-0.089***	-104.89
Crafts and related trades workers	0.091	0.078	0.092	-0.014***	-17.27
Plant and machine operators and assembly	0.056	0.055	0.056	-0.001	-1.27
Elementary occupations	0.041	0.042	0.041	-0.001	-1.32
Unemployed / Not in the labor force	0.399	0.376	0.401	-0.024***	-17.73
N		135,524	2,412,211		

Notes: Stars indicate significance levels ***p<0.01 **p<0.05 * p<0.1

Table 1-3: The Effect of Country Memberships on the Proportions of Intermarriages

VARIABLES	(1) Linear Trend	(2) Quadratic Trend	(3) Country Trend
Panel A			
European Union	0.0451***	0.0450***	0.0492***
	(0.00460)	(0.00408)	(0.00486)
Panel B			
Euro	0.0281***	0.0275***	0.0238***
	(0.00320)	(0.00365)	(0.00517)
Panel C			
Cheap Flights	0.0187***	0.0159***	0.0172***
	(0.00385)	(0.00395)	(0.00488)
Panel D			
Cheap Travel	0.0287***	0.0280***	0.0215***
(Euro or Cheap Flights)	(0.00301)	(0.00338)	(0.00476)
Observations	2,547,735	2,547,735	2,547,735

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each panel and column is a separate regression with full controls and regional fixed effects, clustered at the regional ENUTS3 level.

Table 1-4: OLS and IV Linear Outcomes

	OLS			2SLS with EU Instrument			2SLS with Cheap Travel Instrument		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OUTCOMES	Linear Trend	Quadratic Trend	Country Trend	Linear Trend	Quadratic Trend	Country Trend	Linear Trend	Quadratic Trend	Country Trend
Panel A: Number of Own Children									
Intermarriage	-0.113***	-0.113***	-0.113***	-0.621	-0.622	-0.633	0.621	0.818	-0.750
	(0.027)	(0.027)	(0.029)	(1.256)	(1.255)	(1.308)	(1.452)	(1.645)	(1.201)
Panel B: Number of Own Children Under 5									
Intermarriage	0.006	0.005	0.005	0.108	0.106	-0.283	1.232***	1.290***	0.909***
	(0.0052)	(0.0052)	(0.0056)	(0.21)	(0.199)	(0.21)	(0.247)	(0.217)	(0.307)
Panel C: Family Size									
Intermarriage	-0.111***	-0.111***	-0.110***	-2.091	-2.096	-1.978	0.010	0.110	-2.826*
	(0.032)	(0.032)	(0.035)	(1.575)	(1.562)	(1.64)	(2.798)	(3.225)	(1.706)

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression on 2,547,735 observations with full controls and regional fixed effects, clustered at the regional ENUTS3 level.

Table 1-5-1: Marginal Effects from Probit and 2SRI for Binary Outcomes

	Probit			2SRI with EU Instrument			2SRI with Cheap Travel Instrument		
	(1) Linear Trend	(2) Quadratic Trend	(3) Country Trend	(4) Linear Trend	(5) Quadratic Trend	(6) Country Trend	(7) Linear Trend	(8) Quadratic Trend	(9) Country Trend
Panel A: LFP									
Intermarriage	-0.00490	-0.00484	-0.00727	0.422***	0.422***	0.418***	0.422***	0.422***	0.420***
	(0.004)	(0.004)	(0.005)	(0.001)	(0.002)	(0.021)	(0.001)	(0.000)	(0.014)
Observations	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209
Panel B: Not Married									
Intermarriage	0.0147***	0.0143***	0.0144***	0.690***	0.526***	0.814***	0.803***	0.843***	0.873***
	(0.003)	(0.002)	(0.003)	(0.163)	(0.160)	(0.080)	(0.121)	(0.098)	(0.022)
Observations	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression with full controls and regional fixed effects, clustered at the regional ENUTS3 level.

Table 1-5-2: Predicted Probabilities from Probit and 2SRI for Binary Outcomes

	Probit			2SRI with EU Instrument			2SRI with Cheap Travel Instrument		
	(1) Linear Trend	(2) Quadratic Trend	(3) Country Trend	(4) Linear Trend	(5) Quadratic Trend	(6) Country Trend	(7) Linear Trend	(8) Quadratic Trend	(9) Country Trend
Panel A: LFP									
Intermariage = 0	0.594***	0.594***	0.594***	0.558***	0.558***	0.559***	0.558***	0.558***	0.559***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.005)	(0.000)	(0.000)	(0.004)
Intermariage = 1	0.589***	0.589***	0.587***	0.980***	0.980***	0.978***	0.980***	0.981***	0.979***
	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.016)	(0.000)	(0.000)	(0.010)
Observations	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209	2,424,209
Panel B: Not Married									
Intermariage = 0	0.0648***	0.0648***	0.0648***	0.0585***	0.0585***	0.0585***	0.0584***	0.0584***	0.0585***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)
Intermariage = 1	0.0794***	0.0795***	0.0792***	0.748***	0.584***	0.872***	0.881***	0.888***	0.935***
	(0.002)	(0.002)	(0.002)	(0.162)	(0.159)	(0.080)	(0.102)	(0.0952)	(0.0187)
Observations	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520	2,315,520

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression with full controls and regional fixed effects, clustered at the regional ENUTS3 level.

Table 1-6: Intermarriage Effect by Subgroup with EU instrument

VARIABLES	(1) Male	(2) Female	(3) Immigrant	(4) Native	(5) Immigrant Female	(6) Immigrant Male	(7) Native Male	(8) Native Female
Panel A: Number of Children	0.316	-0.158	1.337**	-1.749	1.097*	1.393***	-0.0519	-0.897
	(1.141)	(1.185)	(0.612)	(2.210)	(0.630)	(0.475)	(1.886)	(2.236)
Panel B: Number of Children Under 5	0.293*	0.161	0.221	0.0600	0.118	0.270*	0.356	0.154
	(0.178)	(0.218)	(0.162)	(0.354)	(0.192)	(0.142)	(0.292)	(0.394)
Panel C: Family Size	-1.231	-1.816	0.280	-4.401	-0.105	0.475	-2.753	-4.084
	(1.452)	(1.435)	(0.761)	(2.860)	(0.753)	(0.633)	(2.446)	(2.828)
Panel D: LFP	0.295***	0.546***	-0.0350	0.418***	-0.0140	-0.123**	0.288***	0.550***
	(0.007)	(0.015)	(0.133)	(0.001)	(0.192)	(0.056)	(0.001)	(0.000)
Panel E: Not Married	0.756***	0.802***	-0.0605	0.590*	-0.0677	-0.0639	0.551*	0.884***
	(0.129)	(0.091)	(0.044)	(0.315)	(0.054)	(0.047)	(0.307)	(0.066)
Observations	1,273,819	1,273,916	162,038	2,385,697	81,786	80,252	1,193,567	1,192,130

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression with full controls, linear trend and regional fixed effects, clustered at the regional ENUTS3 level.

Table 1-7: Two Stage Estimates for Endogenous Variables Regressions

	Intermarriage	
	(1) In Europe	(2) Outside of Europe
Panel A: First Stage		
Cheap Travel	0.0039	0.0209***
	-0.006	-0.0038
EU	0.0387***	-0.00308
	-0.0055	-0.0025
F-test	50.56	26
R-Squared	0.055	0.019

	Number of Own Children		*Number of Own Children Under 5*		*Family Size*		*LFP*		*Not Married*	
	(1) OLS	(2) 2SLS	(1) OLS	(2) 2SLS	(1) OLS	(2) 2SLS	(1) Probit	(2) 2SRI	(1) Probit	(2) 2SRI
Panel B: Second Stage										
Intermarriage in EU	-0.107***	-0.846	0.008***	(0.096)	-0.094***	-2.472	0.007***	0.153	0.017***	0.792***
	(0.0122)	(1.385)	(0.002)	(0.208)	(0.0172)	(1.551)	-0.0016	(0.159)	-0.0024	(0.110)
Intermarriage outside of EU	-0.130	1.208	-0.002	1.764***	-0.164	1.004	0.012***	0.370***	0.009**	0.056
	(0.0985)	(2.028)	(0.0201)	(0.444)	(0.137)	(3.833)	-0.0032	(0.0897)	-0.0034	(0.118)

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression with full controls, regional fixed effects and linear trend. All regressions are clustered at the regional ENUTS3 level.

APPENDIX TABLES

Table 1-A1: Two Stage Least Squares and Residual Inclusion Estimates: Alternative Specifications

	(1) ENUTS1 Regional Fixed Effects	(2) Country Fixed Effects	(3) Sample Excludes Turkey
Panel A:	-0.843	-0.888	-0.925
Number of Children	(1.036)	(1.320)	(1.448)
Observations	2,547,735	2,547,735	2,055,229
Panel B:	0.422***	0.422***	0.290**
LFP	(0.00147)	(0.00126)	(0.122)
Observations	2,424,209	2,424,209	1,931,703
Panel C:	0.667***	0.712*	0.668***
Not Married	(0.250)	(0.375)	(0.123)
Observations	2,315,520	2,315,520	1,823,014
St. Errors clustered by:	ENUTS1	Country	ENUTS3

Notes: Standard errors in parentheses, stars indicate significance levels *** p<0.01, ** p<0.05, * p<0.1. Each column is a separate regression with EU instrument, full controls and a linear time trend.

CHAPTER 2:
Maternity Leave and Long-Run Health Outcomes of Children:
Insights from Soviet Russia

2.1. Introduction

Maternity leave provides working mothers with an opportunity to spend time off with a newborn without worrying about their job security and loss of income. Growing labor force participation among women and the persistence of traditional gender roles within the family have secured rights to paid leave after birth as a standard component of employment policy across the globe. In fact, only two countries remain that do not mandate paid leave after childbirth – Papa New Guainía and the United States.[20] Despite the US female labor force participation growth from 33% in the 1950 to as high as 60% in the late 1990s[21], the only federal maternity leave legislation was Family and Medical Leave Act (FMLA) of 1993, which guaranteed 12 unpaid weeks of leave following child birth or adoption. Moreover, while division of labor between spouses is reported to be much more equal than it was in 1960s, women in the US spend twice as much time on childcare than men.[22]

Specific maternal investments during early childhood are hard to identify and measure, and there is mixed evidence on whether there are long-run benefits to a mandate of prolonged paid maternity leave that would outweigh its explicit costs to the payer, implicit costs to the economy and as well as any potential spill-over costs (Gruber 1994, Ruhm 1998).[23] Due to

[20] International Labour Organization 2014 Report.
[21] Seasonally Adjusted Civilian Labor Force Participation Rate – Women, 16 and older, reported by US Bureau of Labor Statistics.
[22] In 1965 women spent 42 hours per week on housework and childcare, while men spent only 6.5 hours per week. In 2011, it was 32 and 17 hours for women and men, respectively. For childcare in particular, women spent 14 hours a week while men spent only 7. (Data from Pew Research analysis of the American Time Use Survey, http://www.pewsocialtrends.org/2013/03/14/modern-parenthood-roles-of-moms-and-dads-converge-as-they-balance-work-and-family/)
[23] In a study of European countries following their extension of paid maternity leave, Ruhm (1998) sees an increase in female employment but a decrease in wages relative to a male comparison group. Gruber (1994) studied state-

scarce availability of relevant individual level data long-term health effects of maternity leave have not been studied until now. This paper fills the gap in the existing literature by looking at health and behavioral outcomes of the affected children when they are 25 and older.

Using the difference-in-differences analysis, this study employs a quasi-experimental setting of the 1980s maternity leave expansion in Russia to provide first estimates of the positive effects of prolonged paid maternity leave on health of children when they are grown up. The policy was introduced in different regions of the country at different times, and has ultimately extended paid leave from 2 to 12 months after birth, and job-protected unpaid leave from 12 to 18 months for all working women in the USSR. I use Russian Longitudinal Monitoring Survey data to select a sample of adults born 5 years before and after the maternity leave expansion, for whom I can observe perceived health, health utilization and health behaviors, as well as educational attainment and wages. We find that longer maternity leave reduced the incidence of chronic gastro-intestinal diseases by 8-9 percentage points, or over 80% of the population mean.

Several transmission channels should be considered when studying the impacts of maternity leave on children's long-run outcomes. Figure 2-1 outlines how maternity leave may influence outcomes in the short-run, and considers the outcomes that would subsequently be affected in the long-run. Maternity leave directly affects mother's behavior around the time of childbirth. Even before the baby is born, leave eligibility reduces maternal stress by insuring job security and/or temporary income. This leads to better birth outcomes such as lower infant mortality and higher birth weights (Ruhm 2000; Rossin 2011). After birth, take up of maternity leave means more available time for the new mother, which she can allocate either towards taking care of herself or her child. While there is evidence that new mothers who work longer

specific health insurance mandates and found that employers offset higher cost of insuring women of childbearing age by decreasing their wages.

hours have higher levels of stress, depressive symptoms and lower self-reported health, it does not seem to correlate with parenting quality (Chatterji et al. 2013). The additional time spent with children, however, translates to higher probability to breastfeed (Huang and Yang 2015). Breastfeeding has been shown to support baby's immune system and is highly advocated for by all major government health organizations[24], even though there is no consistent evidence that its benefits have causal interpretation (Evenhouse and Reilly 2005; Baker and Milligan 2008; Fletcher 2011; Rothstein 2013)[25].

Finally, there are other parental investments that occur during the maternity leave that are hard to self-report and measure. Maternity leave expansions have aided in exploring relationship between early childcare and long-term educational and labor market outcomes of the affected children. To date, findings suggest either no effect or small effects of extended leave on education levels or wages (Dustman and Schoenberg 2011, Carneiro et al. 2015).

A reduction in the prevalence of chronic gastro-intestinal diseases found in this paper combined with evidence from the medical literature suggests that breastfeeding may be an important determinant for health later in life. In the next section, I discuss the policy background and relevant literature, and explore how the importance of breastfeeding is a suggestive conclusion. Section 2.3 discusses data and main empirical model, then section 2.4 outlines results for all outcomes. Section 2.5 provides robustness checks to the estimated reduction in gastro-intestinal diseases, and the final section discusses cost and policy implications.

[24] The World Health Organization, the American Academy of Pediatrics, the U.S. Department of Health and Human Services, and Healthy People 2010.

[25] Evenhouse and Reilly (2005) find that cognitive ability improvement holds in within-family analysis, while other correlations disappear. Fletcher (2011) also sees the elimination of any positive effects when focusing on families who treat their children equally. In a longitudinal study Rothstein (2013) sees a positive effect of breastfeeding for 6 months and longer on cognitive test scores, but it does not hold in within-sibling analysis. Finally, using Canadian data, Baker and Milligan (2008) do not find an improvement in infant health outcomes following a maternity leave mandate.

2.2. Background and Policy

Between 1922 and 1991, Russia was part of the Soviet Union and under a socialist political rule. The communist country had strict law-enforceable work ethic standards and high gender parity in labor force.[26] Russian men and women were equally expected to complete their education beyond high school and become productive members of society. Yet within the household, Soviet women were solely in charge of cooking, cleaning and raising children. [27] The resulting "double burden" for women did not provide enough incentive to have multiple children, and left the USSR struggling to increase fertility rates throughout its existence. For example, since 1940s, the government collected an annual tax on childlessness.[28] Additionally, since 1947, families with more than three kids received some financial support; however, the proportion of those families in the population was small.

At the same time, scarce availability of birth control and increasing prominence of pre-marital relationships resulted in an increase in unplanned pregnancies, and forced many people into 'shot-gun' marriages at a very young age. It then became evident that earlier childbearing compromised advancement to higher education and the beginning of productive working life. Young adults struggled to raise their new families on low incomes and became dependent on immediate relatives and the state for financial support (Zakharov, 2008). In 1974, monthly

[26] Unemployment (defined as not working for over 4 months in a year) was punishable by seizure of property and 2 to 5 years of labor camp (Supreme Soviet of Russia; May 4, 1961).
[27] The concept of a new soviet woman – one who is a both productive member of society and a dutiful mother and wife – stems from Stalin ideology back in 1919.
[28] A 6% income tax affected unmarried men aged 25-50 and married women 20-45 years of age. Newlyweds were not taxed in the first year of marriage, which encouraged them to conceive right away.

support payments were introduced for extremely low-income families[29], but this novelty merely helped families maintain a minimum standard of living. There was a need for new social policy that would be more allowing to the simultaneous work and the upbringing of children.

At that time, working women were entitled to only 56 days of paid leave before and after birth, 112 days total. In 1970, the government added on to this policy by introducing a one-year job-protected leave after childbirth. The leave was unpaid, but it counted towards the overall employment history of a woman, which was crucial for future pensions and benefits. However, the opportunity costs of having a child, in terms of foregone wages, has remained high.

2.2.1. 1980s Maternity Leave Expansion

By the 1980s, women in Russia did not have paid maternity leave or any other monetary benefits beyond the 112 days around the time of the childbirth, and could not take maternity leave for more than 12 months after birth. New maternity leave policy was announced in the beginning of 1981 and had three components. First was a one-time payment equal to 50 rubles at the time of first childbirth and equal to 100 rubles for subsequent births. Second, a partially paid leave equal to about 30% of average salary was introduced until the child turned one.[30] Finally, job protected leave was extended until the child turned 18 months of age.

The new policy was enabled in two stages on the Russian territory. Phase I took effect on November 1, 1981 in low-population regions of Russia, which included 37 Siberia and the Far

[29] Families with per-capita income of less than 50 rubles a month (less than 75 rubles/month for Siberia and Far East Regions) were issued a stipend of 12 rubles a month per child and until the child turned 8 years old (Goskomtrud and Secretariat VTsSPS, September 25, 1974.)

[30] Women in the Northern and Eastern regions of Russia received 50 rubles a month, and women in the rest of the country received 35 rubles a month. This was proportionate to the average salary differences between those regions. For comparison, 80% of the population earned no more than 150 rubles per month, and the largest income distribution class was 75-100 (23% of population) (Alexeev and Gaddy, 1993).

East regions.[31] Phase II extended benefits to the rest of the republic[32] a year later, on November 1, 1982 (Figure 2-2). Soviet territories other than Russia saw maternity leave expansions even later.[33] Women with total employment history of at least 1 year or those studying in polytechnic institutions or universities were eligible for benefits. Given the gender equality in education and the labor force that prevailed in the Soviet Union, majority of Russian women were covered under the new law.

Malkova (2014) showed that this leave expansion had positive and lasting effects on fertility. She finds an increase in fertility of 8.2 percent in the year following the policy introduction. Extended maternity leave policies that were introduced in 1980s allowed women to comfortably have children earlier in their life and more easily combine family and work life.

2.2.2. Maternity Leave Background

Throughout last century, countries of various sizes and political ideologies have been expanding maternity leave access. The goals of such policies included increasing labor force participation, fertility and gender equality. Among 185 countries studied by the International Labor Organization (ILO), only two countries do not offer paid leave and no country has cut maternity leave duration since 1994. By 2014, 53% of studied countries had at least 14 weeks of leave and only 15% provided less than 12 weeks. Shortest maternity leave with an average of 9.2 weeks was offered in countries of the Middle East, while the longest average leave measured at 27 weeks and was common in Eastern Europe and Central Asia.

[31] Phase I included Northern regions of the country, Siberia, Far East, as well as Vologodskaya, Novgorodskaya and Pskovskaya regions.
[32] Phase II covered 51 of Central (European) regions of Russia (including Moscow and St. Petersburg) as well as Ukraine, Belarus, Moldova and Baltic states.
[33] Kazakhstan, Middle Asian and Caucasus regions received benefits starting November 1, 1983.

Policy expansions have been used to estimate the effects of maternity leave in the past. There are two main directions in the maternity leave research. First includes papers that have evaluated short-term outcomes on infant health and mortality. Research in this area unilaterally suggests positive effects of maternity leave on birth outcomes and infant health. Parental leave in European countries was shown to reduce infant mortality by 2.5% given a 10-week extension (Ruhm 2000). In the United States, 12 weeks of unpaid leave were introduced with the Family and Medical Leave Act of 1993, which was later linked to better birth and infant health outcomes for married and educated women (Rossin 2011). At the time of this research, there is no mandated paid maternity leave in the US.

Second group of papers look at longer term outcomes such as education and wages. Dustman and Schoenberg (2012) look at three consecutive family leave expansions that have occurred in Germany between 1979 and 1992 and have increased paid time off from 2 months all the way to 18 months after birth. Using discontinuity design together with a difference-in-difference approach, they do not find that expansions in leave have translated into better education, wages or probability of full-time employment for affected children. Yet, another study in Norway (Carneiro et al. 2015) suggests that children born to mothers who received an extension from unpaid 12 weeks to 4 months paid and an additional 8 months of unpaid leave starting July 1977 were better off. Those children had lower high school dropout rates and significantly higher wages at age 30. The effect was found to be greater for lower educated mothers, and those mothers who opted out for shorter leave prior to the reform.

Using the same Russian maternity leave policy as in this paper, Malkova (2015) also looks at long-run educational and wage outcomes. She employs aggregate regional Census data and finds a small decrease in college degree completion, but otherwise sees no effect on the

socioeconomic status in the adulthood. In this paper I look at similar labor market outcomes and recreate these results with individual level data.

2.2.3. Maternity Leave and Breastfeeding

Breastfeeding is a natural way of mothers feeding their infant children with breast milk. Women Infant Children (WIC) and World Health Organizations (WHO) currently recommend exclusive breastfeeding for first six months of baby's life. Recent health economics literature finds that maternity leave increases the prevalence of breastfeeding and prolongs breastfeeding duration. Looking at Canadian maternity leave increase in 2000, Baker and Milligan (2008) estimate that women eligible for the policy took 3-3.5 months more time off and subsequently increased their breastfeeding duration by an average of 1 month following the policy. Additionally, they saw a 40% increase in the proportion of mothers who breastfeed exclusively for the first 6 months of baby's life.

In a more recent study, Huang and Yang (2015) used California's paid family leave program to study the impact of maternity leave on breastfeeding behavior. They found 3-5 percentage point increases for excusive breastfeeding and 10-20 percentage point increases for breastfeeding during key development stages of the baby.

Important to the study of this paper, breastfeeding was highly encouraged by Soviet government authorities due to its perceived health benefits for mothers and their babies. In 1980s Russia, newly extended maternity leave and breastfeeding behaviors of family members and friends resulted in almost universal breastfeeding among new mothers. We can confirm this by

looking at rare surveys conducted on Soviet women in the early 1990s. One study (Miner et al. 1994) surveyed rural women in both the US and Russia to obtain breastfeeding rates at the time of hospital discharge. While for Wisconsin mothers breastfeeding initiation rates were about 60%, all of the mothers in a small town northeast of Moscow were breastfeeding within days after birth. Another study (Knapp and Houghton 1999) reports the results of a WIC survey of immigrant mothers with first child born in USSR and last child born in the US. 43 out of 45 (95%) of respondents believed breastfeeding was the most popular way of feeding infants in USSR, while only 10 (22%) said the same about the attitudes in the US. Interestingly, different social attitudes did not sway the women from their breastfeeding; 44 out of 45 mothers breastfed their American-born babies as well.

Medical literature suggests that breastfeeding has positive health effects in the short-run. For example, one study shows that probiotics found in human milk are able to protect gastrointestinal and upper respiratory tracts of babies from infections (Martin 2004, Maldonado et al. 2012). Another meta-study suggests that breastfeeding may prevent the development of pediatric Irritable Bowel Disease (IBD) (Barclay 2009). It is possible that better health in the infancy may lead to fewer health problems twenty or thirty years later, when kids are grown up (as discussed in Jackson and Nazar 2006). Maternity leave policy expansion and access to self-reported health data in this paper provides a unique opportunity to test the hypotheses whether certain chronic diseases in adulthood can be prevented or mitigated by better care during the first years of life.

2.3. Data and Empirical Model

2.3.1. Maternity Leave Participation Data

To study the effects of maternity leave on health outcomes by looking at the policy change, I need to make sure that the 1980s maternity leave program had high participation rates. I employ Survey of Stratification and Migration Dynamics (SSMD) data to help estimate the success of maternity leave policy in 1980s Soviet Union (Gerber, 2006). This dataset comes from a randomized survey conducted in 2001 on Russian adults 16 and over. The survey is comprised of retrospective questions about employment, family and migration of individuals between 1985 and 2001. Each respondent lists up to 16 events in chronological order for each of the three aspects of their life. Therefore, for each individual in the dataset we are able to observe the timing of marriage and childbirth, as well as labor force participation behavior. Employment event categories include entry into the labor force, movement between jobs, unemployment periods and, most importantly, maternity leave start date and subsequent return to work.

While SSMD retrospective data starts at 1985, which is four years before the first wave of maternity leave expansion in 1981, it provides a good proxy for the eligibility and take-up of maternity leave immediately following the expansion. The only other expansion in Russia's maternity leave policy was in 1989, less than two years before the dissolution of the Soviet Union. Therefore, social policy and conditions in the beginning of 1980s were likely similar to those in the mid to late 1980s.

To study the prevalence of maternity leave in 1980s Russia, I select a sample of women who report childbirth between 1985 and 1990. Since our research question in this paper relates primarily to working women and their children, I also limit the sample to births of mothers are currently in the labor force. For my analysis, I am able to obtain a sample of 566 births (Table 2-1-1).

Because I observe employment history, I create a maternity leave eligibility variable equal to 1 if at the time of giving birth a woman has at least 1 year of total employment history. For 496 out of 566 births, or 87.9 percent, mothers were eligible for maternity leave at the time that they gave birth. Meanwhile only 78.8% of mothers reported taking a maternity leave from their job within a year of birth. This corresponds to about 90% participation rate among eligible mothers. Additionally, the data allows me to see exactly when the women started their maternity leave and when they returned to work. The average maternity leave duration in my sample is 608 days, or about 20 months. This corresponds with the 18 month expected leave duration due to the most recent policy and the additional 2 months before the birth that were allowed by an earlier policy.

2.3.2. Health Outcomes Data

Detailed individual level data are obtained through Russian Longitudinal Monitoring Survey (RLMS) of HSE, a project run by University of North Carolina at Chapel Hill Population Center and Demoscope team in Russia. Obtaining a representative sample in a post-socialist society poses unique difficulties. While pilot surveys of Phase I started in 1992, it wasn't until Phase II of the project two years later that the survey design and management allowed for reliable data collection. Follow-up interviews of individual, household and community surveys continue to be conducted annually, which to date produced over 10 years of data for many individuals in the sample.

Households are surveyed based on place of residence. Both children and adults report on their education and employment, health status and health care utilization, nutrition and

expenditures, among other things. Survey includes self-reported relationships within the family, so it is possible to link children to the information on their parents and siblings.

Estimation sample for this paper was selected based on age and complete information on control variables. First, data are pooled across 17 rounds of annual interviews. I eliminate outliers by using families with up to 8 household members.[34] To study the effects of the change in the maternity leave benefits on the outcomes of affected children in the adulthood, I look at individuals born between 1976 and 1987, that is within five years before the first wave of the policy extension in 1981 and five years after the second wave in 1982, and those who are 25 years or older at the time of their interview. I also preserve RLMS-provided survey weights by using individuals with non-missing and non-zero individual weight.

While it would be ideal to have information on the region of birth, RLMS only provides information on whether the current place of residence is the same as birthplace. Hence, I restrict the sample to those individuals with same birthplace and current residence and eliminate all those who are ever-movers. Labor mobility has always been fairly low in Russia, primarily due to household liquidity constraints (Andrienko and Guriev 2004), so for the purposes of this study it is convenient that 64% of surveyed individuals were born in the region of survey.

The treatment variable in this research is identified using birth year and region of birth. Hence it is individual specific and does not vary in time. Inclusion of individual fixed effects, which is possible with longitudinal data and would allow us to control for unobservable heterogeneity, would actually eliminate the policy effect that we are trying to estimate. Hence, the longitudinal nature of this dataset cannot be employed in this paper. Data pooled from 2000-2014 annual surveys contains many repeated interviews of responders, so I randomly select one

[34] Thereby losing about 2% of the observations.

survey per each individual. In the end, there are 3590 unique individual-level observations (Table 2-1-2).

To access the representativeness of my sample in a larger population of the studied country I compare it to the existing aggregated statistics. According to the 2010 Russian Census, urbanization rate was 73.7% (77% in my sample). Looking at 25 to 40 year olds (the age group closely corresponding to my sample aged 25-36), 55.4% of were registered as married, while only 13% were married in my sample. Of 25-40 year olds who reported their education, 21.8% had high school diploma only, 36% received polytechnic university education (PTU) and 34.1% had a university diploma. This suggests that my sample (29% high school, 23% PTU, 35% university) may be less educated than an average population sample. Because I use survey-provided individual weights to account for the relative likelihood of observing each individual in the overall population, this should not pose a problem. Additionally, higher socio-economic status and marriage is often associated with better health, so the estimates of the policy effects based on our sample will be conservative.

2.3.3. Mother's Characteristics Sample

A small portion of the estimation sample of 938 individuals resided with their mothers at the time of the survey. For that group we are able to link information on mother's characteristics to grown-up children's responses. While maternity leave or breastfeeding information is not available, we observe mother's age, education status and number of chronic diseases at the time of survey. These variables could be used in testing for selection into childbearing and potential bias in the regressions that do not include mother's characteristics. I merge mother's age, education and chronic disease information by using the reported intra-family relationships and

unique personal identification numbers. To capture overall health and genetic predispositions, I construct a single variable of total number of chronic diseases for the observed mothers.

Last two columns of table 2-1-2 provide summary statistics on the children in the sample with mothers' characteristics. This smaller sample is more rural; also only 6% of surveyed individuals are married, compared to the main sample average of 13%. Among the surveyed mothers 33% have high school education, 39% also received a technical institution diploma, and 22% pursued a university degree.

2.3.4. Empirical Specification

The effects of the Russian maternity leave expansion are estimated using a difference-in-differences approach. Conventionally, outcome variables are regressed on *Post*Treat*, *Post* and *Treat* indicator variables, control variables and fixed effects. Here, *Post*Treat* indicator is equal to 1 if an individual is born after the policy introduction in their region of birth, and equals 0 otherwise.

Because treatment occurs at a different time for both phases, it is not possible to include single *Post* and *Treat* indicators. Instead, *Post* variable in this specification is replaced by indicator variables for each birth year in the sample, and, similarly, *Treat* is represented by region of birth fixed effects. Separating time trends and regional differences allows for an identification of treatment effect and causal interpretation of coefficient β_1 on *Post*Treat* in equation 1.

$$Outcome_{irty} = const_i + \beta_1 Post * Treat_{iry} + X_i + region_r + year_y + birthy_t + region_r * year_y + \varepsilon_{irty} \quad (1)$$

Elements of equation 1 vary by individuals (i), regions of birth /survey (r), survey (y) and birth years (t). There are three types of variables used in the regressions – household, individual and, for robustness check regressions, mother characteristics (Table 2-1-2). Household variables include household income and urban/rural status. At the individual level we control for sex, educational level indicator variables and income quartiles. All regressions are weighted by survey-provided individual weights to make the estimates representable to the overall population. For all regressions, standard errors are clustered at the regional level.

Mother's characteristics are not available for all observations in the sample. I am only able to link mothers and children if they reside in the same household at the time of survey. Since for my sample kids are already over 25, majority have moved out of their parents' homes, and hence my sample size is reduced to 940 individuals. To preserve sample size, I only use mother's characteristics in robustness check regressions to support my main analysis.

$Outcome_{irty}$ is a regression-specific outcome variable for individual *i* born in year *t* in region *r* and surveyed in year *y*. Chronic outcomes include indicators for current heart, lung, liver, gastro-intestinal tract, kidney, spine and other chronic diseases. Other health outcomes include hospitalization (within last 3 months), health problems (within last month), health evaluation (on a scale from 1 to 5), and an indicator for self-reporting good or excellent health. We also are able to look at health behaviors such as medical check-ups, recent smoking and alcohol consumption. Finally, we look at educational attainment and wages to compare our results to those found in the previous literature.

Table 2-2 compares raw means of outcomes between treated and not treated children. Comparison suggests that those born after the program was introduced in their region of birth are healthier, better educated and have higher wages. 61% children born after the policy reported

being in good or excellent health, while only 53% of those born before the policy said the same. Treated individuals also had 3.1 percentage points fewer recent health problems and lower likelihood of having liver, spinal and other chronic diseases. Raw differences in education and wages are smaller; treated group had 0.5 levels of education more than the untreated.

2.4. Results

Table 2-3 outlines main results for chronic disease outcomes. Panel A shows estimates on Post*Treat variable, which shows the average treatment effect across all phases and regions. Panel B breaks down the treatment effects by Phase I and Phase II, making it possible to see any heterogeneity between the different regions of the country.

Maternity leave expansion has decreased the prevalence of chronic gastro-intestinal diseases by 9 percentage points for the treated children of Phase II regions, which corresponds to about 80% of the control group mean of 11%. We also see a 6.6 percentage point decrease in the prevalence of some other chronic diseases that don't fit into general categories. Despite the intuitively correct negative signs of the estimates, no significant effect can be seen for heart, liver, kidney, spinal or lung chronic diseases.

Regression estimates for other health outcomes and health behaviors are reported in Table 2-4. Children born after the maternity leave expansion do not report to be healthier, and are not less likely to smoke or drink alcohol. There is no effect on recent hospitalizations or medical check-ups either.

Table 2-5 shows educational and wage estimates. The sign and magnitudes of the estimates are similar to those found in the previous literature (Dustman and Schoenberg, 2012). The coefficient on high school education is negative, while the coefficients on higher education

levels of polytechnic and university education are positive. While this suggests that there has been a shift away from high school only to complete technic and university education, the effects are not statistically significant. The magnitude of the education effects is between 7-12% of the control group mean. The coefficient on log wages is negligible and not statistically different from zero. These cognitive effects are in line with findings of earlier work that studied this policy expansion with aggregate Census data (Malkova 2015).

2.5. Robustness Check and Alternative Specifications

To estimate the effect of maternity leave on long-run health outcomes this paper uses a difference-in-differences regression approach on a quasi-experimental policy introduction. The main assumption of using this method is a similarity of the treated and the control groups. Significant differences across the independent variables for the cohorts born before and after the policy introduction would undermine the validity of the analysis. We test the balancing assumption by regressing control variables on $Post*Treat_{iry}$, regional indicators and birth year dummies. Results outlined in Table 2-6 come from equation 2, and suggest that those born 5 years after the maternity leave expansion are not statistically different from those born in the 5 years before the policy.

$$Independent\ Variable_{irty} = const_i + \beta_1 Post * Treat_{iry} + region_r + year_y + birthy_t + region_r * year_y + \varepsilon_{irty} \quad (2)$$

The decrease in GI diseases observed in the main results should not be specific to the chosen sample, and should be persistent across the lifespan. To test that assumption, I estimate

equation 1 on a sample of individuals 30 and older. Column 1 of Table 2-7 confirms that the main effect persists and has an even larger magnitude of 9-12 percentage points. The larger magnitude of the estimate is intuitive, since chronic diseases tend to worsen later in life and are therefore more likely to be reported in a survey.

To confirm that the reduction in GI chronic disease is relevant to the maternity leave policy, I run two falsification tests. In the first test, I include individuals who moved into their place of survey, making their birthplace unobservable. Therefore, treatment and control groups are defined by place of survey instead of place of birth, and are no longer applicable to the policy. Those individuals affected by the policy now mix in with those who may or may not have been affected. Naturally, the effect found earlier with a correct difference-in-difference specification now disappears (Column 2 of Table 2-7). In the second falsification test, I confirm that the identified treatment effects pertain to the 1981-82 maternity leave policy by using a false policy date. I use November of 1983 and 1984 as false treatment dates for Phase I and Phase II regions, respectively, while keeping the treatment and control regions unchanged. Column 3 of Table 2-7 shows that with this alternative specification there is no longer any significant treatment effect for GI chronic diseases.

Previous literature that looked at this particular policy expansion found that it has increased fertility for lower educated and overall disadvantaged women (Malkova 2015), which is a concern for this analysis. While I do not see significant changes in mother's age and education before and after treatment in my sample (Table 2-6), I would still like to test for the presence of this selection problem. I am able to control for mothers' characteristics in a separate regression and see if the main treatment effect persists. As mentioned earlier, I am only able to observe maternal characteristics if grown-up children still reside with their parents, and this is

holds for 940 individuals in my sample. I re-estimate equation 1 with this smaller sample and add maternal education, birth year and number of chronic diseases to the equation. Due to the small sample size, year-region fixed effects are not included in this regression.

$$Outcome_{irty} = const_i + \beta_1 Post * Treat_{iry} + X_i + X_{mother} + region_r + year_y + birthy_t + \varepsilon_{irty} \quad (3)$$

Table 2-8 shows that the significant negative effect persists after controlling for maternal characteristics. Magnitude of the coefficients obtained from equation 1 is larger for this sub-sample, but it does not change when we control for maternal characteristics. The estimates confirm that even if there was selection into childbearing after the policy, this selection is not the driving factor for the decrease in GI chronic diseases. If anything, we would expect a positive effect or an absence of an effect, if disadvantaged mothers were also unhealthier and thus gave birth to unhealthier kids.

Finally, I re-estimate equation 1 with less restrictive specifications of linear trends and fixed effects. Appendix Table 2-A1 shows that the reduction in chronic gastrointestinal diseases is robust to a variety of specifications. Additionally, Table 2-A2 uses the regression specification without the year-region fixed effects to confirm no significant effects of maternity leave on other chronic diseases, health and labor market outcomes.[35]

2.6. Discussion and Conclusion

This paper studies long-run health impacts of the 1980s Russian maternity leave expansion. Children born in the five years following the policy had fewer gastro-intestinal

[35] There is a negative effect for routine medical check-ups in the last 3 months; however, the effect is not robust across other trend and fixed effect specifications.

diseases and fewer reports of other uncategorized chronic issues. The magnitude of the reduction in the prevalence in chronic GI diseases is 8-9 percentage points, which is large relative to the untreated group mean of 11 percent. The prevalence of uncategorized chronic issues was also decreased by 6.5 percentage points, or over 70% of the untreated cohort's mean of 9.3.

Despite large negative estimates on the prevalence of chronic diseases, paid maternity leave had no effect on the self-reported general health, recent health issues, hospitalizations or frequency of medical check-ups in adulthood. Health behaviors such as smoking and alcohol consumption also seem to be unaffected by the maternity leave. Small positive point estimates in the range of 2-4 percentage points were found for education attainment and wages, but they were not statistically significant.

It is possible that chronic gastrointestinal illnesses of children affected by the maternity leave policy expansion were mitigated by breastfeeding, better nutrition and care in the first year of their life. In the previous studies, maternity leave has been shown to increase take-up and duration of breastfeeding (Huang and Yang 2015; Baker and Milligan 2008), and some evidence exists that health in the early childhood contributes to the chronic morbidity in adulthood and late in life (Blackwell et al 2001). An 80% reduction in gastrointestinal diseases found in this paper would significantly reduce hospitalization rates and health care costs. According to Healthcare Cost and Utilization Project (HCUP) report, in 2004 gastrointestinal diseases in the US accounted for 2.5 million hospitalizations, which in turn totaled 20.1 billion dollars.[36] In my sample alone, those with gastrointestinal diseases were more likely to miss work due to illness and also more likely to be hospitalized.[37]

[36] Hospital Stays for Gastrointestinal Diseases, 2004. Statistical Brief #12, September 2006

[37] 40.9% of those with GI chronic diseases (n=376) were hospitalized in the last 3 months, compared to 32.7% of those with no reported GI issues (n=3,199). 6.1% of individuals with GI diseases (n=235) missed work due to illness

There is still a persistent gap in the literature for long-run health outcomes of maternity leave; it stems primarily from lack of longitudinal and multigenerational data with early childcare variables. If in the future we conduct more breastfeeding studies and ask detailed surveys on maternal investments during early childcare, we would be able to conduct better econometric analysis and make more accurate policy suggestions. Evidence on the benefits on maternity leave and breastfeeding is crucial to effectively advocate for mandated paid leave in the US and push for a legislation that would bring this country's maternal support at par with the rest of industrialized world.

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vs 3.9% of those without GI diseases (n=1,846). Difference between the two means is statistically significant at the 10% level.

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Figure 2-1: Maternity Leave and Its Mechanism of Work

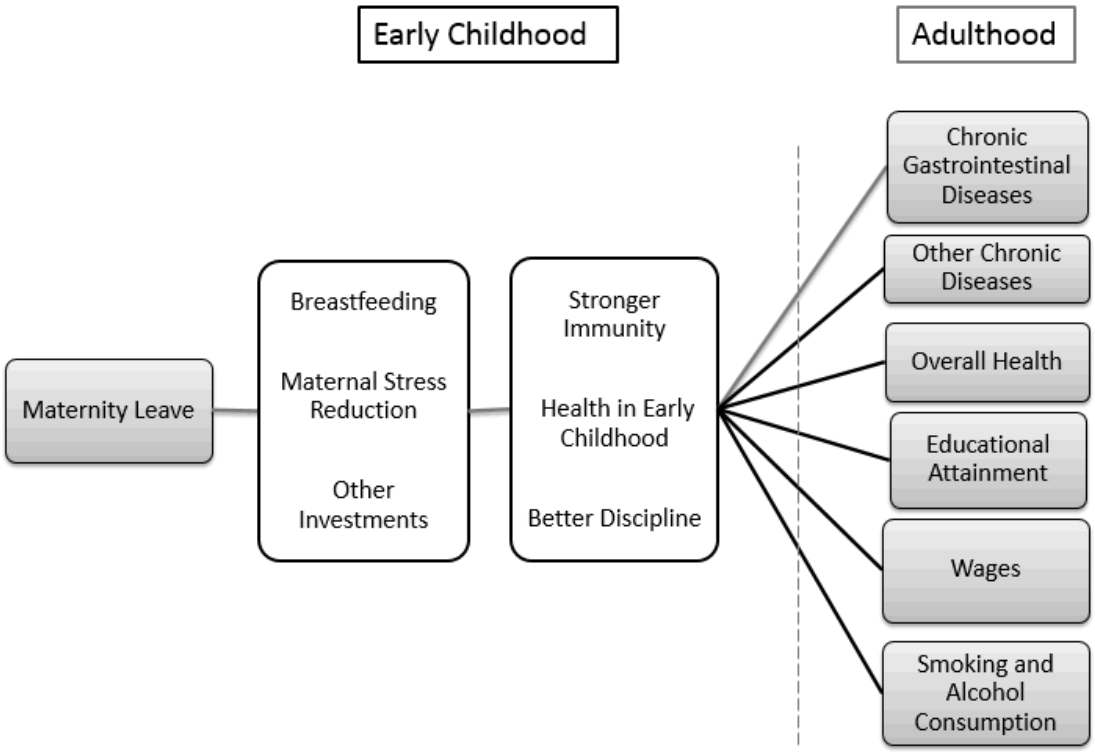

Figure 2-2: Maternity Leave Program Phases and Regions

Note: Light grey area represents less populated areas of the country and corresponds with Phase I of the program in November 1981. Darker Grey areas include Moscow, Saint Petersburg and the most populated regions, and represent Phase II of the program launched in November1982.

Table 2-1-1: SSMD Data Summary Statistics

Variable	Mean	Min	Max	Obs
Age at Childbirth	26.12	16.88	40.13	566
Urban	0.78	0	1	566
High school Diploma Only	0.21	0	1	566
Polytechnic Education	0.5	0	1	566
University Education	0.27	0	1	566
Maternity Leave Eligibility	0.873	0	1	566
Maternity Leave Take-Up	0.788	0	1	566
Maternity Leave Duration (years)	1.66	0	11.25	496

Notes: Data summary at birth level from SSMD sample of working women with births between 1985 and 1990. Maternity leave eligibility was satisfied with total work experience of at least 1 year, maternity leave take-up was self-reported, and maternity leave duration was constructed based on the reported timing of a return to work post maternity leave, transfer within the company or start of a new job.

Table 2-1-2: RLMS Data Summary Statistics

		Main Sample		Mother's Characteristics Sample	
Type	Variable	Obs	Mean	Obs	Mean
Household Controls	Regional Identifier	3,590	93.09	940	93.53
	Survey Year	3,590	2011	940	2010.63
	Individual Survey Weight	3,590	1.09	940	1.10
	Urban	3,590	0.77	940	0.75
	Suburban but not rural	3,590	0.04	940	0.04
	HH Income in Q2 (25-50% range)	3,590	0.23	940	0.21
	HH Income in Q3 (50-75% range)	3,590	0.25	940	0.28
	HH Income in Q4 (75-100% range)	3,590	0.32	940	0.34
Individual Controls	Birth Year	3,590	1981.17	940	1981.88
	Female	3,590	0.51	940	0.50
	Married	3,590	0.13	940	0.06
	Education Level	3,559	17.33	932	17.32
	High school Education	3,559	0.29	932	0.30
	PTU (Tech) Education	3,559	0.23	932	0.21
	University Education	3,559	0.35	932	0.37
Outcomes	Chronic GI Disease	3,576	0.11	936	0.10
	Chronic Heart Disease	3,584	0.03	937	0.04
	Chronic Liver Disease	3,583	0.03	938	0.04
	Chronic Lung Disease	3,583	0.03	938	0.03
	Chronic Kidney Disease	3,582	0.05	938	0.05
	Chronic Spine Disease	3,578	0.07	937	0.07
	Other Chronic Disease	3,540	0.07	922	0.07
	Smoker	3,582	0.43	938	0.42
	Alcohol Consumption (Last 30 days)	2,865	0.72	722	0.71
	Health Problems (Last 30 days)	3,580	0.22	936	0.25
	Hospitalizations (Last 3 months)	3,589	0.04	939	0.04
	Health Evaluation (1=excel, 5=poor)	3,577	2.43	936	2.42
	Excellent or Good Health	3,590	0.56	940	0.59
	Medical Checkup (Last 3 months)	3,587	0.18	940	0.20
Mother Controls	Birth Year	-	-	940	1955.24
	High school Education	-	-	938	0.33
	PTU (Tech) Education	-	-	938	0.39
	University Education	-	-	938	0.22
	Number of Chronic Diseases	-	-	933	1.06

Table 2-2: Mean Comparison for Outcomes

	Post*Treat		Mean Difference	T-stat
	0	1	(1-0)	
Self-Report as Healthy	0.534	0.612	0.0827****	4.91
Health Evaluation (1=excellent)	2.474	2.361	-0.116****	-5.53
Health Problems Last 30 Days	0.236	0.205	-0.0302**	-2.13
Hospitalized Last 3 Months	0.042	0.039	-0.0042	-0.62
Medical Checkup Last 3 Months	0.184	0.174	-0.0116	-0.89
Chronic Gastrointestinal Disease	0.110	0.096	-0.0145	-1.39
Chronic Heart Disease	0.038	0.028	-0.00949	-1.54
Chronic Liver Disease	0.045	0.018	-0.0250***	-4.13
Chronic Lung Disease	0.035	0.025	-0.0116*	-1.94
Chronic Kidney Disease	0.050	0.040	-0.0124*	-1.72
Chronic Spinal Disease	0.074	0.053	-0.0260***	-3.03
Other Chronic Disease	0.093	0.041	-0.0432****	-5.07
Smoker	0.441	0.421	-0.0206	-1.22
Drank Alcohol Last 30 Days	0.720	0.701	-0.0333*	-1.93
Education Level	17.141	17.607	0.472****	3.56
High School education	0.313	0.262	-0.0542****	-3.49
PTU (Tech) education	0.216	0.251	0.0340**	2.37
University Education	0.336	0.375	0.0393**	2.41
Log wages	9.162	9.492	0.248****	6.18
N			3590	

Note: * Difference is statistically significant at 10% level, ** significant at 5% level, *** significant at 1% level, **** significant at 0.1%.

Table 2-3: The Effect of Maternity Leave Policy on Chronic Disease Outcomes

	(1) GI	(2) Heart	(3) Liver	(4) Lungs	(5) Kidney	(6) Spinal	(7) Other
Panel A:							
All Treated	-0.0803**	0.0112	0.0182	0.0380	0.0099	0.0196	-0.0602*
	(0.0380)	(0.0290)	(0.0235)	(0.0318)	(0.0352)	(0.0353)	(0.0317)
Panel B:							
Phase 1 Treated	-0.0622	0.0209	0.0061	0.0217	-0.0101	0.0006	-0.0501
	(0.0504)	(0.0317)	(0.0406)	(0.0250)	(0.0376)	(0.0456)	(0.0420)
Phase 2 Treated	-0.0898**	0.0063	0.0244	0.0462	0.0201	0.0294	-0.0655**
	(0.0439)	(0.0316)	(0.0196)	(0.0367)	(0.0382)	(0.0359)	(0.0320)
Observations	3,545	3,553	3,552	3,552	3,551	3,547	3,509
R-squared	0.225	0.261	0.229	0.198	0.233	0.233	0.348

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies, as well as region and survey year interaction variables.

Table 2-4: The Effect of Maternity Leave on Health and Health Behavior Outcomes

	(1) Smoking	(2) Recent Alcohol Consumption	(3) Recent Health Problems	(4) Hospitalized Last 3 Months	(5) Health Evaluation (1=excellent, 5=poor)	(6) Excellent / Good Health	(7) Annual Check-ups
Panel A:							
All Treated	-0.0089	0.0105	0.0297	-0.0148	0.0012	0.005	-0.0293
	(0.0695)	(0.0653)	(0.0843)	(0.0333)	(0.0887)	(0.0727)	(0.0668)
Panel B:							
Phase 1 Treated	0.0594	0.0782	0.0464	-0.0021	-0.0001	-0.003	-0.0706
	(0.0733)	(0.0662)	(0.104)	(0.0316)	(0.0955)	(0.0783)	(0.0715)
Phase 2 Treated	-0.0439	-0.0286	0.0212	-0.0212	0.0023	0.009	-0.0082
	(0.0784)	(0.0716)	(0.0769)	(0.0356)	(0.0970)	(0.0780)	(0.0676)
Observations	3,552	2,843	3,549	3,558	3,546	3,559	3,556
R-squared	0.421	0.338	0.276	0.266	0.316	0.315	0.270

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies, as well as region and survey year interaction variables.

2-5: The Effect of Maternity Leave on Education and Wage Outcomes

	(1) High School Education	(2) Poly-Technic Education	(3) University Education	(4) Education Level	(5) Log Wages
Panel A:					
All Treated	-0.0385	0.0211	0.0248	0.289	-0.0631
	(0.0871)	(0.0667)	(0.0860)	(0.677)	(0.127)
Panel B:					
Phase 1 Treated	-0.0515	0.0792	-0.0375	-0.0139	0.0181
	(0.106)	(0.0706)	(0.0821)	(0.705)	(0.150)
Phase 2 Treated	-0.0319	-0.0088	0.0567	0.444	-0.108
	(0.0831)	(0.0686)	(0.0880)	(0.677)	(0.125)
Observations	3,559	3,559	3,559	3,559	3,027
R-squared	0.296	0.249	0.271	0.338	0.574

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies, as well as region and survey year interaction variables.

Table 2-6: Balancing of Independent Variables Before and After Maternity Leave Policy

Panel A: Individual Characteristics

	(1) Female	(2) Married	(3) Highschool Education	(4) Technical Education	(5) University Education	(6) 25-50% of Income Distribution	(7) 50-75% of Income Distribution	(8) Top 25% of Income Distribution
Post*Treat	-0.147*	-0.0364	-0.0286	0.0195	0.00645	0.00521	-0.0755	0.0882
	(0.0764)	(0.0371)	(0.0856)	(0.0668)	(0.0841)	(0.0557)	(0.0665)	(0.0607)
Observations	3,590	3,590	3,559	3,559	3,559	3,590	3,590	3,590
R-squared	0.217	0.635	0.291	0.249	0.257	0.292	0.260	0.383

Panel B: Mother's Characteristics

	(9) Birth Year	(10) High School Education	(11) Poly-Technic Education	(12) University Education
Post*Treat	-0.318	0.111	-0.140	-0.0208
	(1.668)	(0.195)	(0.208)	(0.173)
Observations	940	938	938	938
R-squared	0.609	0.497	0.486	0.452

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies, as well as region and survey year interaction variables.

Table 2-7: Chronic GI Diseases - Specification Check

	(1)	(2)	(3)
	30 years and older sample	Sample not restricted to non-movers	Use 1983 / 1984 as treatment
Panel A:			
All Treated	-0.0917*	-0.0442	-0.0220
	(0.0474)	(0.0295)	(0.0375)
Panel B:			
Phase 1 Treated	-0.0398	-0.0202	0.0152
	(0.0506)	(0.0341)	(0.0528)
Phase 2 Treated	-0.122**	-0.0580*	-0.0551
	(0.0547)	(0.0325)	(0.0434)
Observations	1,896	5,307	3,545
R-squared	0.273	0.167	0.224

Note: Robust standard errors in parentheses, clustered at the regional level (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies, as well as region and survey-year interaction variables.

Table 2-8: The Effect of Maternity Leave on GI Diseases: Mother Characteristics Sample

	(1) Individual Characteristics	(2) Mother Characteristics
Panel A:		
All Treated	-0.121*	-0.133*
	(0.0713)	(0.0747)
Panel B:		
Phase 1 Treated	-0.104	-0.104
	(0.0779)	(0.0773)
Phase 2 Treated	-0.128	-0.145*
	(0.0797)	(0.0844)
Observations	928	919
R-squared	0.170	0.199

Note: Robust standard errors in parentheses, clustered at the regional level (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with indicated controls, birth year, survey year and regional dummies.

APPENDIX TABLES

Table 2-A1: Alternative Fixed Effect and Trend Specifications for GI Diseases

	(1) No Time Trend or Fixed Effect	(2) Survey Year Fixed Effect	(3) Survey Year Trend	(4) Survey Year*Region	(5) Regional Linear Trend
Panel A:					
All Treated	-0.0523*	-0.0549*	-0.0520*	-0.0803**	-0.0614**
	(0.0295)	(0.0295)	(0.0293)	(0.0380)	(0.0309)
Panel B:					
Phase 1 Treated	-0.0411	-0.0435	-0.0417	-0.0622	-0.0462
	(0.0386)	(0.0379)	(0.0380)	(0.0504)	(0.0412)
Phase 2 Treated	-0.0581*	-0.0608*	-0.0574*	-0.0898**	-0.0700**
	(0.0328)	(0.0330)	(0.0327)	(0.0439)	(0.0347)
Survey Year FE	no	yes	no	no	yes
Survey Year Trend	no	no	yes	no	no
Observations	3,545	3,545	3,545	3,545	3,545
R-squared	0.050	0.054	0.051	0.225	0.093

Note: Robust standard errors in parentheses, clustered at the regional level (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year and regional dummies.

Table 2-A2: Robustness Check: Less Restrictive Regression Equations

1. Chronic Diseases	(1) GI	(2) Heart	(3) Liver	(4) Lungs	(5) Kidney	(6) Spinal	(7) Other
Panel 1A:							
All Treated	-0.0549*	0.00797	0.0222	0.0338	0.0266	0.0177	-0.0299
	(0.0295)	(0.0229)	(0.0169)	(0.0238)	(0.0258)	(0.0269)	(0.0276)
Panel 1B:							
Phase 1 Treated	-0.0435	0.0177	0.0222	0.0246	0.0159	0.0081	-0.0137
	(0.0379)	(0.0306)	(0.0261)	(0.0213)	(0.0275)	(0.0311)	(0.0369)
Phase 2 Treated	-0.0608*	0.00303	0.0222	0.0384	0.0320	0.0226	-0.0383
	(0.0330)	(0.0231)	(0.0137)	(0.0261)	(0.0274)	(0.0271)	(0.0277)
Observations	3,545	3,553	3,552	3,552	3,551	3,547	3,509
R-squared	0.054	0.051	0.050	0.042	0.057	0.072	0.108

2. Health and Health Behavior Outcomes	(1) Smoking	(2) Recent Alcohol Consumption	(3) Recent Health Problems	(4) Hospitalized Last 3 Months	(5) Health Evaluation	(6) Excellent / Good Health	(7) Annual Check-ups
Panel 2A:							
All Treated	0.00844	0.0337	0.0235	-0.0113	0.0253	-0.0045	-0.0515
	(0.0579)	(0.0547)	(0.0696)	(0.0222)	(0.0735)	(0.0578)	(0.0547)
Panel 2B:							
Phase 1 Treated	0.0242	0.0989	0.0542	-0.0004	0.001	0.0138	-0.0996*
	(0.0627)	(0.0631)	(0.0851)	(0.0234)	(0.0841)	(0.0696)	(0.0590)
Phase 2 Treated	0.000398	-0.00228	0.00793	-0.0168	0.0375	-0.0138	-0.0271
	(0.0626)	(0.0556)	(0.0632)	(0.0230)	(0.0772)	(0.0589)	(0.0546)
Observations	3,552	2,843	3,549	3,558	3,546	3,559	3,556
R-squared	0.282	0.136	0.077	0.054	0.127	0.119	0.079

Note: Robust standard errors in parentheses, clustered at the regional level (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year and regional dummies.

Table 2-A2 (Continued): Robustness Check: Less Restrictive Regression Equations

	(1)	(2)	(3)	(4)	(5)
3. Education and Wage Outcomes	High School Education	Poly-Technic Education	University Education	Education Level	Log Wages
Panel 3A:					
All Treated	-0.0682	0.0229	0.0413	0.228	-0.0867
	(0.0708)	(0.0494)	(0.0642)	(0.511)	(0.0979)
Panel 3B:					
Phase 1 Treated	-0.102	0.0749	0.0131	0.168	0.0118
	(0.0762)	(0.0532)	(0.0588)	(0.525)	(0.132)
Phase 2 Treated	-0.0512	-0.00363	0.0557	0.259	-0.141
	(0.0725)	(0.0513)	(0.0696)	(0.537)	(0.0895)
Observations	3,559	3,559	3,559	3,559	3,027
R-squared	0.107	0.071	0.110	0.147	0.424

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Each column and panel is a separate regression with individual controls, birth year, survey year and regional dummies.

CHAPTER 3:
Two-Stage Estimates of the Effect of Maternal Labor Supply on Child Achievement

3.1. Introduction

Female labor supply has been growing steadily between 1950 and 2000, and has remained above 56% ever since.[38] Labor force participation (LFP) of mothers has been increasing as well; for example, the proportion of those who work among women with pre-school children has increased from 40% in 1975 to over 63% in 2000 (Figure 3-1). More women choose to pursue a career while simultaneously raising their children.[39] Female labor supply is also becoming increasingly independent from the wages of their partners (Blau and Kahn, 2007). This egalitarian social dynamic could decrease the amount of time children spend with their mothers in their infancy and early childhood, and may affect the children's wellbeing later in life. A major obstacle to studying the effects of increased maternal work on child's outcomes is the endogeneity of mothers' decision to participate in the labor market. By looking at the immigrant population, this paper explores gender inequality in the source country as a new instrumental variable for the labor supply of married women.

Mother's decision to work is an endogenous variable in the framework of an economic model for two reasons. First, it is difficult to collect data on all the variables that could shape one's decision to work, especially if the woman's family is financially stable and second income is not necessary. In developed countries like the US, women are free to allocate their time between paid work, unpaid housework and childcare according to their own preference, and their

[38] Federal Reserve Economic Data (FRED), Civilian Labor Force Participation Rate, Women, 1950-2000 (https://fred.stlouisfed.org/series/LNS11300002).
[39] "72% of adults under 30 view the ideal marriage as one in which husband and wife both work and share child care and household duties" *The New York Times* Article by Natalie Angier, "The Changing American Family" (11/25/2013).

decision often depends on uniquely personal reasons. Second, estimating the effect of maternal work on the outcomes of children is especially challenging due to the reverse causality problem. A woman may choose to withdraw from the labor force if her children fall below average in their development. At the same time, a below average development of a child could be a result of lack of parental investments due to maternal work.

In this paper, I employ country-specific gender inequality measure as an instrument for the endogenous female immigrant's labor force participation. After controlling for individual characteristics and immigrant visa types, I find that gender inequality in the source country is positively correlated with women's labor force participation in the US. Using data from the New Immigrant Survey then allows me to estimate the causal effect of female labor force participation on the reading and math scores of their children. Two stage least squares estimates suggest that children aged 3 to 12 whose mothers work for pay score over one standard deviation higher than their counterparts on achievement scores. This result holds for both verbal and quantitative tests.

3.2. Literature and Identification Strategy

3.2.1. Literature Overview

Current literature is interested in both the determinants and the effects of the female labor force participation. One variable that could directly influence a woman's decision to work is the size of her family. However, using infertility to instrument for the number of children in the family, Agüero et al. (2008) does not find this to be the case today. Availability of affordable childcare is another important factor for women that are deciding to come back to work after giving birth (Cortés and Tessada, 2011). A woman's willingness to work may also depend on her ethnic background, cultural norms and the environment of her upbringing. Blau and Kahn (2011)

explore the importance of societal norms by studying immigrants in the US. They use source country characteristics and pre-immigration work history at the time of immigration to separate the effects of culture and human capital on the immigrant's US work hours. Women from countries with higher female labor force participation contribute more annual work hours in the US.

Literature on the effects of maternal labor force participation on children's well being suggests that the effect is heterogeneous depending on the age of the child, child's socioeconomic status and the type of outcome studied. Maternal work during child's infancy seems to have lasting effects. Baum (2003) finds negative effects of maternal work during child's infancy on their cognitive test scores later in life, especially if mothers return to work within the first 3 months after birth. Using OLS and propensity scores models, Berger et al. (2005) also study mothers who return to work within 12 weeks after birth, and find statistically significant reductions in breastfeeding and immunizations, as well as an increase in behavioral problems of the children as a result. Gregg et al. (2005) finds that mother's full-time employment and an informal substitute of care in the first year and a half after birth negatively affects cognitive outcomes of children when they are older, at 4 to7 years of age.

James-Burdumy (2005) uses individual fixed effects models on panel data and finds that children's math scores were lower due to maternal work during the first year of child's life. Meanwhile, children whose mothers worked during the third year of their life had higher math scores later on. Looking at the outcomes of adolescents, Ruhm (2008) finds that maternal work has a positive effect on cognitive development of children from lower socioeconomic classes or disadvantaged otherwise. He also reports a negative effect of maternal work on the development

of children who are relatively better off, which could be due to the reduction of maternal investments in the environment at home.

3.2.2. Source Country Gender Inequality as an Instrumental Variable

I use an instrumental variables approach to identify the causal effect of maternal work on children's achievement in reading and math. The new excluded instrument proposed here is the Gender Inequality Index, which is reported by the United Nations Development Programme[40] (Figure 3-2). The index combines information on relative LFP rates, parliamentary seats, birth mortality rates and other information to construct a measure of gender inequality within a particular country.

Column 2 of Table 3-1 shows GII index values for the countries and regions of world that supply most of the US immigrants. The index ranges from 0 to 1, where 0 means no gender inequality in the society. For example, South Korea with the GII of 0.125 is the most gender-equal country on this list, while Haiti with GII of 0.603 has the most gender inequality.[41] United States has a GII of 0.28, and, therefore, over 75% of source countries on the list have higher GII numbers and hence higher gender inequality.

Gender inequality in an immigrant's source country works as an instrumental variable because it does not directly affect children living in the US, but it is likely to influence woman's decision-making on the specialization within her household. Previous research on culture and female immigrant labor supply predicts that women from more gender-equal societies tend to work more in the US, which confirms the relevance of source culture on the job market behavior

[40] United Nations Development Programme, Human Development Reports (http://hdr.undp.org/en/content/gender-inequality-index-gii). Index is time invariant and is calculated for the year 2015.

[41] For the overall list of countries on the UNDP website, country with the least gender inequality is Switzerland (GII=0.04), and country with the greatest gender inequality is Yemen (GII=0.767).

in the US (Blau and Kahn 2011; Blau and Kahn, 2015). The GII would also be excluded from the regression of children's test scores on their mother's labor supply, because they would only be impacted by the source country GII indirectly through their mother's time investment decisions.

Because GII is a more comprehensive measure of inequality than the relative LFP rates, the direction of the relationship between a woman's source country GII and her attitudes toward market work is theoretically ambiguous. On one hand, women's beliefs about time investments in family and paid work may align with the societal norms that women are born into, causing her to continue her employment pattern post-migration. On the other hand, immigrants represent a group that has self-selected to leave their country of birth to live and work in the United States. One of the reasons to immigrate could be the woman's unwillingness to comply with her cultural norms. Therefore, it is an empirical question whether there is a positive or a negative relationship between her US labor force participation and source country GII.

3.3. Data and Empirical Model

3.3.1. Data Sources

Data for this paper comes from the New Immigrant Survey (NIS)[42], a nationally representative panel of new immigrants in the US. The US Immigration and Naturalization Service (INS) provided the administrative data on new green card holders for the year 2003, who were then reached out to and asked to participate in the survey. In Round 1, the project looked at 8573 adult immigrants (69% response rate), their spouses and children, as well as 810 child immigrants (64.8% response rate) between 2003 and 2004. Round 2, a follow-up survey, was

[42] Jasso, Guillermina, Douglas S. Massey, Mark R. Rosenzweig and James P. Smith. "The New Immigrant Survey 2003 Round 1 (NIS-2003-1) Public Release Data." March 2006. Retrieved {June 2016}. Funded by NIH HD33843, NSF, USCIS, ASPE & Pew. http://nis.princeton.edu.

conducted in 2007 to 2009. The NIS collected detailed individual and household variables, including pre-migration experiences and language proficiency, education, employment history, income, health insurance and health utilization. For surveyed child immigrants and immigrant children the project conducted a separate child interview and tests of memory and learning achievement (Digit Span and Woodcock Johnson Assessment).

To study the effects of maternal work on the outcomes of children, I select two samples from Round 1 of the NIS. First sample is of married and cohabitating female adult immigrants that are no more that 65 years old. I only include immigrants who are currently in the US and not interviewed while overseas. The second sample is that of children who took the Woodcock Johnston tests of achievement and who were also present in the households of surveyed immigrant women. Children in this sample could be either biological, adopted, stepchildren or co-residents of the female immigrants. I link the adult and the child samples by using the survey-provided personal and household identification numbers. In the end, my sample consists of 527 married women and their 777 dependents.

Summary statistics for immigrant mothers, their spouses and children are outlined in Table 3-2. Forty one percent of all mothers in the sample are employed and work for pay. As an additional measure of labor supply, I use annual work weeks and weekly work hours to construct an annual US work hours variable, which has an average of 674. Average age for mothers in the sample is 35.8 years old. Looking at the source region of married female immigrants, 49% are from European countries (including Eastern Europe) and 27% come from Asian countries. Women in this sample obtained their US permanent residency primarily through marriage to a US citizen (21% of sample), employment sponsorship (17%) or diversity visas (16%).

Main differences between working and non-working married women are in the immigration reasons and time since migration. Mothers who are in the labor force have been in the US longer, and were more likely to obtain permanent residency through their employer. No significant differences in women's age, schooling or region of origin are observed between the working and non-working groups.

Table 3-2 also lists children's outcomes of interest, the scores for Woodcock-Johnson III tests of achievement. Scores for tests 1 and 9 reflect child's letter-word identification and passage comprehension ability, while tests 5 and 10 relate to mathematical calculations and quantitative reasoning skills.

3.3.2. Estimating the Effect of Gender Inequality Index on Mother's LFP

The empirical approach to obtain unbiased estimates of mother's LFP on children's outcomes would be to use Two Stage Least Squares (2SLS). First stage of the Two Stage Least Squares model is a regression of the endogenous variable LFP on the excluded and included instruments. The regression model largely follows the approach of modeling US work hours of female immigrants by Blau and Kahn (2011).

$$LS_{icrs} = const + \alpha * GII_c + X_i + Xsp_i + region_r + state_s + \varepsilon_{icrs} \quad (1)$$

Labor supply LS is regressed on a variable capturing pre-immigration cultural experience, individual and spouse controls, immigration visa type, as well as world region and US state fixed effects. I test three pre-immigration variables indicative of immigrant's culture and pre-disposition to work in the US: source country GII, a ratio of spouse source country GII to own GII, and work hours prior to immigration to the US. Individual variables include female immigrant's age and squared age, total years of schooling, years and squared years since

migration. Spouse variables include age, age squared and total years of schooling. Regional fixed effects are dummy variables for immigrants' source regions of the world, and include Asia, Latin America, Africa and Middle East. State fixed effects include indicators for states of residence and capture state labor market heterogeneity.

3.3.3. Estimating the Effect of Mother's LFP on Child Outcomes

Second stage of the 2SLS estimation is regressing outcomes of interest on the predicted value of the endogenous variable obtained in the first stage and all the exogenous controls included in the first stage. Equation 2 outlines the second stage of 2SLS model.

$$Scores_i = const_i + \beta_1 * \Pr(\mathrm{LS_i}) + X_i + Xsp_w + region_r + state_s + \varepsilon_{icrs} \quad (2)$$

Woodcock-Johnson III assessments conducted for the NIS include achievement tests 1, 5, 9 and 10. Tests 1 and 9 are on letter-word identification and passage comprehension, respectively, and tests 5 and 10 are on math calculations and applied math problems. Coefficient β_1 in equation 2 is the 2SLS estimate of the causal effect of maternal work on child's test score. In addition to the variables in the first stage model, the second stage regression includes child age and age squared, since raw achievement tests results should be compared to the peer age group.

3.4. Results

3.4.1. First Stage

The determinants of labor supply of married immigrant mothers as estimated by equation 1 are presented in Table 3-3. Work for pay is the dependent labor supply variable in columns 1 and 2, and annual work hours are used for columns 3 and 4.[43] Three excluded instruments tested

[43] Regressions of annual work hours include mothers who do not work for pay and have zero work hours.

here are the immigrant's source country work hours (pre-immigration human capital) and source country gender inequality index (culture).

It is estimated that an immigrant woman with an additional 1000 annual work hours in her home country has 3.2 percentage points higher probability of working in the US. The estimate is significant at 10%. Another positive relationship is revealed between the choice to work and the source country patriarchy, as measured by the Gender Inequality Index. A one standard deviation increase in country GII (which is an increase in country's inequality) increases the likelihood of female work in the US by 7.8 percentage points. If we instead look at the US work hours, the direction and significance of the first stage does not change. An additional 1000 annual work hours prior to immigration increases the US annual work hours by 78.7, and a one standard deviation increase in the home country GII increases US annual work hours by 113.08.

Among other variables that affect mother's labor supply are years since migration, length of their current marriage, and immigration path. The estimates in table 3-3 suggest that GII is the only relevant instrumental variable for both immigrant women's LFP and their annual work hours in the US. To test the excludability assumption of this IV, I check if GII is correlated with any of the control variables. To do so, I perform a balancing test of the covariates by regressing my controls on the inequality index. Table 3-4 shows that none of the coefficients on the GII are significant at the 5% level. In the next section, I use GII as an excluded instrument for all the two-stage least squares regression specifications.

3.4.2. Two-Stage Least Squares: Work for Pay

Columns 1-4 of Table 3-5 show coefficients from regressions of achievement test scores on the maternal labor supply indicator. Each consecutive column adds more independent variables and fixed effects. For example, Column 1 estimate comes from a simple linear regression, while Column 4 regression includes maternal and paternal characteristics, immigration region and state fixed effects. After controlling for parental characteristics, OLS regressions show small and mostly non-significant coefficients from regressions of child WJIII scores on mother's labor supply. Estimates suggest that maternal work increases verbal and quantitative skills of children by no more than 0.3 to 2.2 points. The only significant effect in the least squares estimation is a 1.9-point increase in the scores for quantitative reasoning, which is a 0.14 standard deviation increase relative to the mean score of 22.51.

Estimation results for Two Stage Least Squares are outlined in columns 5-8 of Table 3-5. The estimates are larger compared to those obtained with least squares, and many are now statistically significant. Children with working mothers score an estimated 61.6 points higher on four of the major WJIII achievement tests combined. Most prominent effect of maternal work is on child's reading skills. Estimates suggest that children with working mothers score on average 35.5 points higher on letter-word identification, which is an effect equal to 1.55 standard deviations from the mean. Children of this group also score 12 points (0.96 standard deviations) higher on the passage comprehension test. Scores for quantitative reasoning test are also 15.2 points (1.16 standard deviations) higher for children of working moms; however, no effect was found on computational math skills.

3.4.3. Two Stage Least Squares: Work Hours

Table 3-6 summarizes point estimates from least squares and IV regressions of children's achievement scores on annual work hours of mothers. OLS model estimates that an additional 1000 work hours a year (about 19 hours/week) would increase quantitative reasoning scores by 1.1 points. Estimates for other types of tests are also small and not significant at 5% level.

In contrast, IV estimates show large effects for both math and verbal achievement tests. An additional 1000 maternal work hours a year increases the letter-word identification scores by 24.3 points, or 1.06 standard deviations. Same amount of maternal work increases child's quantitative reasoning scores by 10.4 points, or by 0.8 standard deviations.

3.5. Discussion and Conclusion

First stage estimation results confirm findings of the previous literature that suggest source country culture is an important determinant of the immigrant woman's choice to work. However, lower inequality in the home country no longer predicts higher activity in the US job market. The fact that women who come from higher inequality countries are more likely to be working in the US could be an indicator of their self-selection into immigration. Women who do not conform to the culture of their own country could be moving to US because it provides more social acceptance and opportunity for working women.

Using GII as an exogenous instrumental variable also allowed me to evaluate the effect of the immigrant women's increased labor market supply on the outcomes of their co-resident children. Children of married immigrant women who work have on average higher reading and math standardized test scores than children of stay-at-home mothers. The findings are in line with the literature studying the development of children in the age group of 3-12 (James-Burdumy 2005; Ruhm 2008). Several potential mechanisms could result in a positive effect of

maternal work on children. First, while they may spend less time with their children (Cawley and Liu, 2012), the time that working moms allocate towards children could be more productive than the time allocated by other mothers.[44] To test if maternal labor supply impacts certain parental behaviors, I use 319 child interview responses available for my sample. Children were asked if their parents participate in various school activities or help them with decisions regarding their curriculum.

$$PI_i = const_i + \beta_1 * \text{Pr\_LF}_{\text{w}} + X_i + X\_sp_i + region_r + state_s \quad (3)$$

Table 3-7 outlines 2SLS estimates from regressions of various parental involvement variables on maternal labor supply. Each parental investment measure is an indicator variable, which is set to 1 if the child indicates it occurs frequently. The results suggest that working mothers are more likely to visit their children's classes and go to school meetings. It seems that knowing what their children learn in school may be increasing the effectiveness of parental help with school assignments and tutoring.

Second, working mothers could be better role models for their children. Given that immigrant children are somewhat disadvantaged relative to native children, previous literature suggests that maternal work would improve upon their cognitive development (Ruhm 2008). Similar effect is observed here for achievement scores. Children may be more motivated in school if they see both their parents pursuing their careers as a societal norm. Finally, greater assimilation of parents may be beneficial for the children in other unobservable ways. For example, substitute types of childcare and tutoring are some of the factors that are not observed in the context of this study.

[44] Cawley and Liu (2012) use ATUS to find that working mothers spend less time on cooking and spending time with children; only 15% of that time is offset by their spouses and partners.

Findings in this paper shed light on the relationship between maternal labor supply and child achievement. Contrary to the common belief that mother's work and longer work hours would reduce the time spent with children and hence be detrimental to their development, children of working mothers perform better in both math and reading tests. Because estimation results are based on a limited sample of immigrant families, more research is needed to evaluate the true effects of maternal work. An extension of this study would be using the IV approach on a larger sample of both natives and immigrants. Particularly, studies based on native samples could use Gender Inequality Index as a proxy for ethnic culture and social attitudes.

3.6 References

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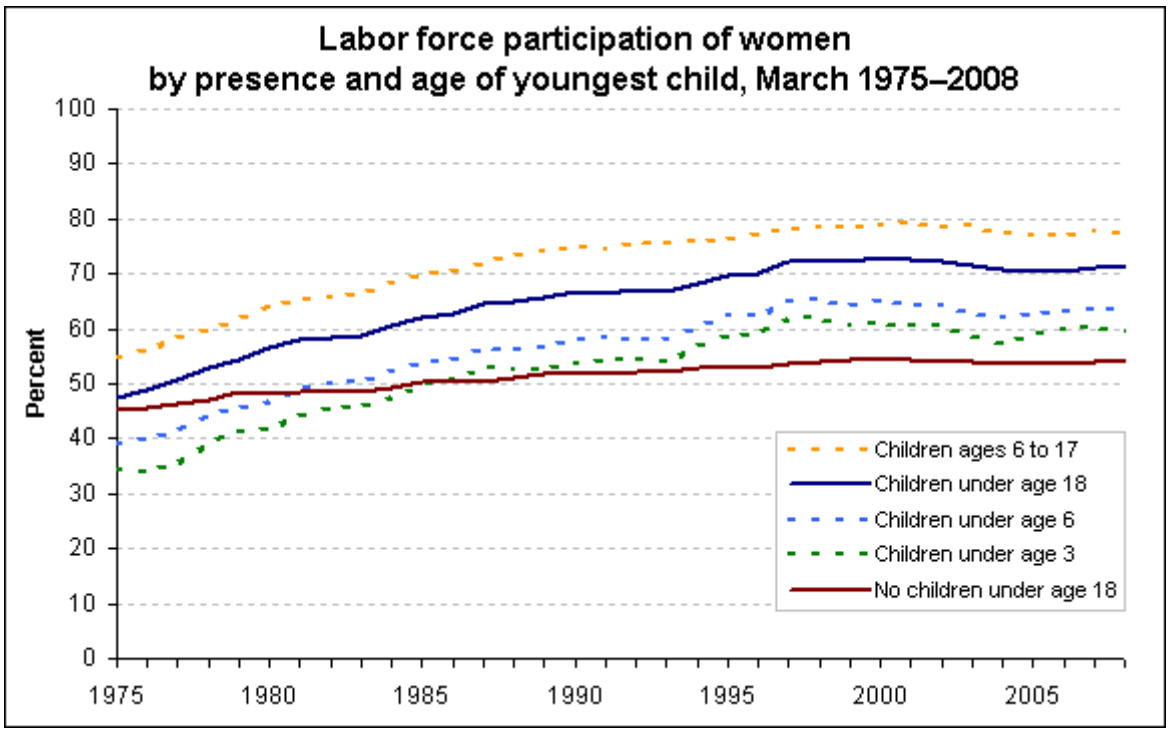
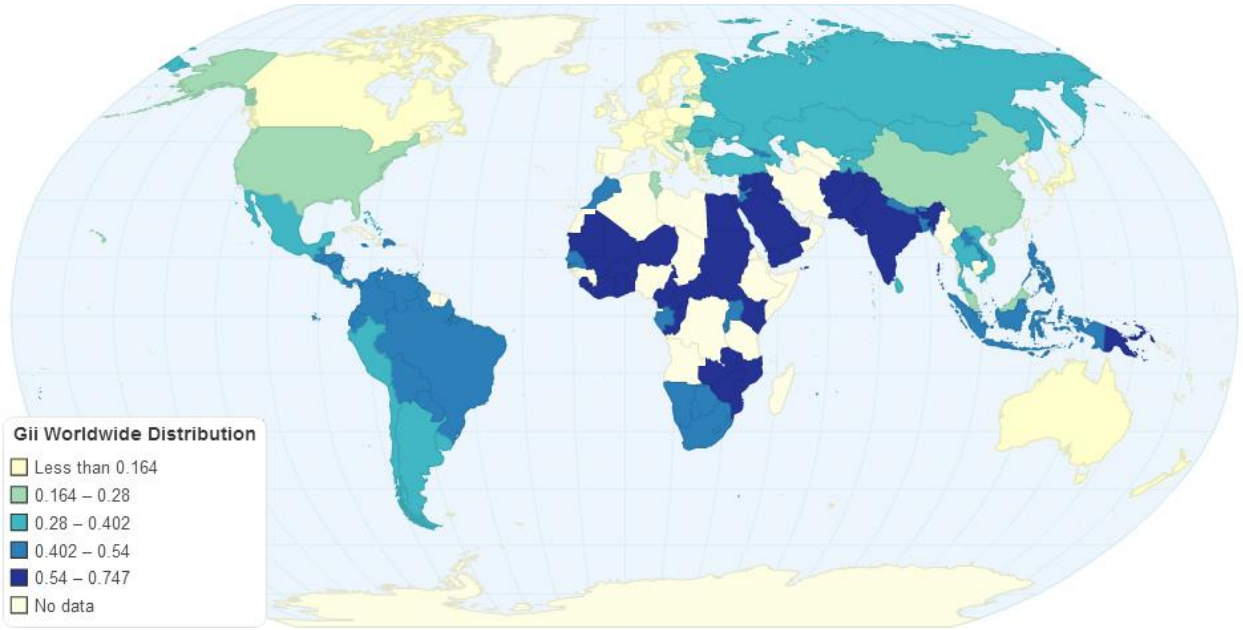
Figure 3-1: Labor Force Participation of Women by Age of their Children, 1975-2008



Notes: Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, Labor force participation of women and mothers, 2008 on the Internet at https://www.bls.gov/opub/ted/2009/ted_20091009.htm

Figure 3-2: Gender Inequality Index (GII)



Notes: Gender Inequality Index ranges from 0 to 1, with larger numbers indicating greater societal inequality between men and women. GII index is developed and reported by the United Nations Development Programme (Map Source: Gender Inequality Index (GII) Worldwide Distribution, ChartsBin.com, http://chartsbin.com/view/23499).

Table 3-1: Gender Inequality Index for NIS Countries and Regions

Country	GII	Number of Immigrants in the Sample
Canada	0.129	10
China	0.191	18
Columbia	0.429	11
Cuba	0.356	12
Dominican Republic	0.477	8
El Salvador	0.427	76
Ethiopia	0.558	3
Guatemala	0.533	26
Haiti	0.603	4
India	0.563	56
Jamaica	0.43	5
Korea	0.125	18
Mexico	0.373	180
Nigeria	0.575	9
Peru	0.406	10
Philippines	0.42	42
Poland	0.138	22
Russia	0.276	4
Ukraine	0.286	18
United Kingdom	0.177	1
United States	0.28	0
Vietnam	0.308	24
Europe	0.3	82
Asia	0.328	53
Latin America	0.415	45
Africa	0.575	18
Middle East	0.388	19
Oceania	0.403	3
N		777

Notes: Data for GII taken from United Nations Development Programme (http://hdr.undp.org/en/content/gender-inequality-index-gii).
Data on immigrants is from NIS sample for this paper.

Table 3-2: Summary Statistics for Mother Controls and Child Outcome Variables

Category	Variable	Mean	Std. Dev.	Min	Max
Mother's Labor Supply	Work for pay	0.408	0.49	0	1
	Annual US Work Hours	674.66	926.4	0	3380
	Annual Pre-US Work Hours	1045.89	1131.73	0	5096
Mother Controls	GII index	0.38	0.11	0.13	0.60
	Age	35.75	5.86	19	60
	Years of Schooling	12.15	4.21	2	24
	Years Since Migration (YSM)	7.85	7.34	0	41
Mother Country of Origin	Asia	0.27	0.45	0	1
	Africa	0.04	0.19	0	1
	Middle East	0.18	0.38	0	1
	Latin America	0.02	0.15	0	1
	Europe	0.49	0.50	0	1
Mother Immigration Category	Spouse of US Citizen	0.21	0.40	0	1
	Spouse of US LPR	0.10	0.31	0	1
	Parent of US Citizen	0.01	0.10	0	1
	Family Fourth Preference	0.07	0.26	0	1
	Employment	0.17	0.38	0	1
	Diversity	0.16	0.37	0	1
	Refuge	0.06	0.24	0	1
	Legalization	0.16	0.37	0	1
Father Controls	Age	38.76	6.70	23	67
	Years of Schooling	12.10	4.70	1	28
	Years Married	11.73	6.12	0	36
Children's Outcomes	Age	7.38	2.91	3	12
	WJ Sum of Test Scores	81.61	54.37	0	217
	WJ Test 1 – Letter Word Identification	33.79	22.84	0	76
	WJ Test 5 – Computational Skills	11.20	9.67	0	43
	WJ Test 9 - Passage Comprehension	14.11	12.48	0	47
	WJ Test 10 – Quantitative Reasoning	22.51	13.08	0	59
N		777			

Table 3-3: Determinants of Mother's Labor Force Participation

VARIABLES	Work for Pay		US Work Hours	
	(1)	(2)	(3)	(4)
Pre-US Work Hours	0.000032*		0.0787**	
	(1.61e-05)		(0.0367)	
Gender Inequality Index (GII)		0.705***		1,028**
		(0.245)		(459.1)
Years of Schooling	0.006	0.006	4.117	5.658
	(0.008)	(0.008)	(15.45)	(14.76)
Years Since Migration	0.025**	0.026**	53.45***	54.11***
	(0.009)	(0.0096)	(18.04)	(18.75)
Years Married	0.019***	0.018***	37.70***	35.50***
	(0.005)	(0.005)	(12.26)	(11.96)
Spouse of US Citizen	-0.153	-0.140	-212.2	-191.3
	(0.095)	(0.094)	(157.0)	(167.8)
Spouse of LPR	-0.296***	-0.294***	-513.1***	-514.4***
	(0.084)	(0.082)	(172.3)	(175.2)
Parent of US Citizen	-0.240**	-0.259**	-370.6	-406.8
	(0.110)	(0.0990)	(307.4)	(287.4)
Family Fourth Preference	-0.337***	-0.338***	-470.3	-466.0
	(0.117)	(0.0997)	(322.2)	(290.1)
Employment	-0.012	0.006	127.8	162.5
	(0.105)	(0.102)	(211.9)	(214.8)
Diversity	-0.157	-0.122	-144.7	-88.20
	(0.106)	(0.0995)	(148.5)	(160.3)
Refuge	0.0186	0.0557	183.2	248.0
	(0.122)	(0.124)	(238.6)	(242.8)
Legalization	-0.156*	-0.178**	-213.9	-251.1
	(0.091)	(0.083)	(179.7)	(178.3)
N	777	777	777	777
R-squared	0.158	0.168	0.169	0.170

Notes: Other controls that were included in the regressions but are not listed to conserve space: age and age squared, child age and age squared, years since migration squared, world region of origin indicators, spouse age, spouse age squared, spouse years of schooling. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 3-4: Balancing Test of the Control Variables

INDEP. VARS	GII	St. Error	R-squared
Child Age	1.131	(1.019)	0.017
Child Age Squared	12.95	(14.81)	0.013
Age	2.431	(3.602)	0.026
Age Squared	176.7	(257.7)	0.023
Years of Schooling	-4.713	(3.413)	0.145
Years Since Migration	6.939	(4.942)	0.098
Years Since Migration Squared	182.5*	(102.8)	0.058
Spouse Age	7.277*	(3.852)	0.031
Spouse Age Squared	603.5*	(308.2)	0.027
Spouse Years of Schooling	-3.538	(4.246)	0.122
Years Since Migration	0.458	(2.655)	0.010
Spouse of US Citizen	0.000473	(0.186)	0.128
Spouse of LPR	0.0882	(0.133)	0.067
Parent of US Citizen	0.0368*	(0.0208)	0.023
Family Fourth Preference	0.104	(0.327)	0.022
Employment	-0.127	(0.563)	0.135
Diversity	-0.710	(0.439)	0.186
Refuge	-0.243*	(0.131)	0.156
Legalization	0.635	(0.428)	0.159
Asia	-0.0475	(1.078)	0.055
Africa	0.637	(0.417)	0.200
Middle East	0.00959	(0.0535)	0.022
Latin America	1.094	(0.781)	0.284
N	777		

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table 3-5: The Effect of Maternal Work on the Achievement Scores of Children

	OLS				2SLS			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Sum of Scores	8.011**	7.932**	4.573	4.801	108.1	61.13**	63.11**	61.64***
	(3.733)	(3.720)	(3.345)	(3.440)	(129.0)	(27.77)	(24.90)	(23.88)
Letter Word Identification	3.681**	3.509*	2.154	2.195	75.62	36.98***	36.38***	35.51***
	(1.762)	(1.845)	(1.678)	(1.682)	(84.56)	(13.05)	(12.75)	(12.28)
Computational Skills	0.465	0.451	0.364	0.302	-9.983	-0.725	-1.010	-1.135
	(0.562)	(0.530)	(0.560)	(0.574)	(24.04)	(3.450)	(2.298)	(2.233)
Passage Comprehension	1.102	1.180	0.271	0.374	24.47	11.16*	12.27**	12.04**
	(0.791)	(0.794)	(0.669)	(0.705)	(33.33)	(6.183)	(5.381)	(5.145)
Quantitative Reasoning	2.762**	2.793***	1.784**	1.929**	17.95	13.71*	15.47**	15.21**
	(1.023)	(0.984)	(0.783)	(0.850)	(24.74)	(7.790)	(6.205)	(5.995)
Child Controls	Y	Y	Y	Y	Y	Y	Y	Y
Mother Controls	N	N	Y	Y	N	N	Y	Y
Father Controls	N	N	N	Y	N	N	N	Y
World Region FE	N	Y	Y	Y	N	Y	Y	Y
US State FE	N	Y	Y	Y	N	Y	Y	Y
Observations	777	777	777	777	777	777	777	777

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3-6: The Effect of Mother's Annual Work Hours on the Achievement Scores of Children

	OLS				2SLS			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Sum of Scores	0.00458***	0.00461***	0.0028**	0.003**	0.0046***	0.0448*	0.0435*	0.0423**
	-0.0014	-0.00141	-0.0013	-0.0014	-0.0014	-0.0259	-0.0223	-0.0208
Letter Word Identification	0.00215***	0.00209***	0.0014**	0.0014*	0.0022***	0.0271**	0.0250**	0.0243**
	-0.0007	-0.0007	-0.0007	-0.0007	-0.0007	-0.0122	-0.0113	-0.0106
Computational Skills	0.0003	0.0003	0.0002	0.0002	0.0003	-0.0005	-0.0005	-0.0008
	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0025	-0.0014	-0.0014
Passage Comprehension	0.0007*	0.0007*	0.0003	0.0003	0.0007*	0.0082	0.0083*	0.0083*
	-0.0004	-0.0004	-0.0003	-0.0004	-0.0004	-0.0055	-0.0045	-0.0043
Quantitative Reasoning	0.0015***	0.0015***	0.001***	0.0011***	0.0015***	0.0101	0.0106*	0.0104**
	-0.0004	-0.0004	-0.0003	-0.0004	-0.0004	-0.0071	-0.00573	-0.0053
Child Controls	Y	Y	Y	Y	Y	Y	Y	Y
Mother Controls	N	N	Y	Y	N	N	Y	Y
Father Controls	N	N	N	Y	N	N	N	Y
World Region FE	N	Y	Y	Y	N	Y	Y	Y
US State FE	N	Y	Y	Y	N	Y	Y	Y
Observations	777	777	777	777	777	777	777	777

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 3-7: 2SLS Estimates for the Effect of Maternal Labor Supply on Parental Investments

	(1) Involved in Course Selection	(2) Involved in School Activities	(3) Involved in Things Studied	(4) Attended School Meetings	(5) Speak with Teachers	(6) Visit Classes	(7) Attend School Events	(8) Volunteer at School
Work for Pay	0.0396	0.691	0.254	0.335*	0.146	0.543***	-0.0327	-0.0409
	(0.279)	(0.425)	(0.242)	(0.200)	(0.196)	(0.199)	(0.183)	(0.180)
Annual	2.33E-05	0.0004*	0.0002	0.0002*	8.57E-05	0.0003***	-1.92E-05	-2.40E-05
Work Hours	-0.0002	-0.0002	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
Sample Mean	0.30	0.483	0.608	0.755	0.646	0.705	0.517	0.332
Observations	319	319	319	319	319	319	319	319

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

CURRICULUM VITAE

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Education

Ph.D. Economics, Lehigh University, Expected May 2017
Fields: Health (primary), Labor, Applied Econometrics
Thesis: Three Essays in Health and Labor Economics
Advisor and Dissertation Chair: Shin-Yi Chou
Dissertation Committee: Alex Nikolsko-Rzhevskyy, Thomas Hyclak, Mengcen Qian

B.A. Financial Economics and German, Moravian College, 2007–2011
With Honors, *summa cum laude*
Thesis: East German Privatization Process during the German Unification

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Work Experience

2016 – Present	Adjunct Professor Lehigh University, Department of Economics
2015–2016	Online Course Instructor Lehigh University, Department of Economics
2013–2014	Graduate and Research Assistant Lehigh University, Department of Economics
2012–2016	Teaching Assistant Lehigh University, Department of Economics
2011–2012	Customer Service Representative Wells Fargo Bank, Hellertown, PA
2009–2011	Fund Manager, Amrhein Investment Club Moravian College, Bethlehem, PA

Publications

Articles under Review

1. "Social and Economic Impacts of International Marriages in Europe," with Shin-Yi Chou and Alex Nikolsko-Rzhevskyy, submitted December 2016.

Working Papers

1. "Maternity Leave and Long-Run Health Outcomes of Children"
2. "Maternal Labor Supply and Children's Outcomes"

Professional Activities

Conference Presentations

1. 6th Biennial American Society of Health Economists Conference: "Maternity Leave and Long- Run Outcomes of Children," Philadelphia, PA, June 2016. Poster Session.

2. 42nd Annual Eastern Economic Association Meeting: "Maternity Leave and Long-Run Health Outcomes of Children," Washington, DC, February 2016. Presenter.

3. 41st Annual Eastern Economic Association Meeting "International Marriage in Europe: Labor Market and Family Outcomes in Presence of Endogeneity," New York,00 NY, February 2015. Presenter.

Conference Participation

1. 42nd Annual Eastern Economic Association Meeting, Washington, DC, February 2016: Assistant to the Conference Organizer, Professor Shin-Yi Chou.

2. 42nd Annual Eastern Economic Association Meeting, Washington, DC, February 2016: Session
Chair.

3. 42nd Annual Eastern Economic Association Meeting, Washington, DC, February 2016: Discussant.

4. National Bureau of Economic Research Summer Institute, Health Economics Session, Cambridge, MA, July 2015: Invited Attendee.

5. 41nd Annual Eastern Economic Association Meeting, New York, NY, February 2015: Discussant.

Teaching

Graduate Course Instructor
MBA-1 Quantitative Methods: January 2017
Masters of Management Excel Mastery: Summer 2016

Undergraduate Course Instructor
Statistical Methods: Fall 2016 – Spring 2017
Principles of Economics (Online): Summer 2015, Summer 2016

Teaching Assistant
Money, Banking and Financial Markets: Fall 2014 – Spring 2016
Principles of Economics: Fall 2012 – Spring 2014

Service Activities

Economics Department
2016 Quinquennial Economics Department Review, Ph.D. Student Representative

Referee for Professional Journals
Journal of Labor Research

Professional Societies and Affiliations
Eastern Economic Association
American Society of Health Economists
Omicron Delta Epsilon (National Honor Society for Economics and Business)
Pi Mu Epsilon (National Mathematics Honor Society)
Phi Sigma Iota (International Foreign Language Honor Society)

Awards and Honors

Spring 2015	Warren York Dissertation Fellowship, Lehigh University
May 2011	Alumni Award for Achievement in Social Sciences, Moravian College

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Qualifications

Certificates	Teaching Development Program, Level I and II (Lehigh University, Spring 2014)
Skills	Stata, SAS, Microsoft Office, Blackboard, QuickBooks, LATEX
Languages	English (fluent), German (proficient), Russian (native)