The Consequences of Male Seasonal Migration for Women Left Behind:

The Case of Rural Armenia

by

Arusyak Sevoyan

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Graduate Supervisory Committee:

Victor Agadjanian, Chair
Scott Yabiku
Steven Haas

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ABSTRACT

Despite the extensive research on the consequences of migration, little is known about the effects of seasonal migration on fertility, contraception and sexually transmitted diseases in the countries of former Soviet Union, that have undergone vast demographic changes in the last two decades. Using cross-sectional data from two surveys conducted in Armenia in 2005 and 2007, this dissertation is exploring the effects of seasonal migration on reproductive behavior and outcomes, as well as sexual health among women left-behind. The dissertation is constructed of three independent studies that combined draw the broad picture of the consequences of seasonal migration in this part of the world. The first study, "Seasonal migration and fertility in low-fertility areas of origin" looks at the effect of seasonal migration on yearly pregnancy rates, lifetime fertility, and fertility preferences among women and their husbands. The models are fitted using discrete-time logistic regression, and random-intercept logistic regression for negative binomial and binary outcomes, correspondingly. The findings show that seasonal migration in low-fertility settings does not further disrupt fertility levels in a short-, or long-run, contradicting to the findings from high-fertility settings. However, the study provides some evidence that seasonal migration is associated with increased fertility preferences among migrant men. The second study, "Seasonal migration and contraception among women left-behind", examines the associations between migration and modern contraceptive use, by looking at current contraceptive use and the history of abortions. A series of random-intercept logistic regression models reveal that women with migrant

partners are significantly less likely to use modern contraceptives, than women married to non-migrants. They also have higher rates of abortions; however this effect is moderated by the socioeconomic status of the household. The third study, "Seasonal migration and risks of sexually transmitted diseases (STDs) among women left-behind", looks at the effects of seasonal migration on the diagnosed STDs in the last three years, and self reported STD-like symptoms in the last twelve months. The results of random-intercept logistic regression for negative binomial and binary outcomes provide strong evidence of increased STD risks among migrants' wives; however, this effect is also moderated by the household income.

I dedicate this dissertation to the most important people in my life - to my parents Grigor and Silva Sevoyan, my sister Hermine Sevoyan and to my husband Hrayr Matevosyan for all their love, support and encouragement in all my endeavors.

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Chapter 1

INTRODUCTION

The purpose of this dissertation is to understand the consequences of seasonal labor migration for the reproductive behavior and sexual health of women left behind in rural Armenia. Although some studies have been conducted to explain the effects of seasonal migration on the left-behind, the literature from the areas of origin has been scarce. Even less is known about the migration trends and its consequences in the countries that once constituted the Soviet Union, where the collapse of the socio-political system has resulted in vast demographic changes. This dissertation helps to fill the gap in the literature by adding evidence on the consequences of migration in Armenia, one of the former Soviet countries. The data for this dissertation come from two surveys conducted in Armenia in 2005 and 2007. The dissertation consists of three independent studies, which together draw the broad picture of the consequences of seasonal migration for the left-behind women and for the country.

This chapter introduces the reader with the theories of international migration, the literature on the consequences of migration, country background of the research setting, data used in the study, and the descriptive statistics of the sample population.

Chapter 2, “Seasonal migration and fertility in low-fertility areas of origin”, studies the effects of seasonal migration on the yearly pregnancies, lifetime fertility, and future fertility preferences. The aim of this study is to understand how seasonal labor migration affects fertility rates in the country, and

to add to the research on migration and fertility by adding evidence from a country with below-replacement level of fertility.

Chapter 3, “Seasonal migration and contraception among women left-behind”, looks at the effect of seasonal labor migration on modern contraceptive use. The study employs two approaches: using the information on current contraceptive use, and abortion histories as an indirect measure of previous contraceptive use. The results of this study will contribute to the literature on seasonal migration and contraceptive behavior in the areas of origin, as well as help understand the role of contraceptive use in the associations between migration and fertility in low-fertility settings.

Chapter 4, “Seasonal migration and risks of sexually transmitted diseases (STDs) among women left-behind”, studies the effect of seasonal labor migration on the STD risks of left-behind women. The study uses two approaches: diagnosed STDs and self-reported STD-like symptoms. This study contributes to the scant research on STD risks of migrants’ partners, as well as adds to our understanding of the role of migration in the spread of STDs in Armenia, which is considered to be at high risk of HIV epidemic.

Chapter 5 summarizes the findings from the three studies, elaborates the meaning of these results in the country context and the perspectives for the future research. Each chapter presents a review of relevant literature, the current situation in Armenia, methodology, results and discussion of the results.

International Migration and its Consequences

International migration, including temporary, as well as permanent migration, has been in the focus of social research for many years. Various socio-economic theories were developed to explain how international migration waves start and what keeps them flowing. The theories of international migration can be divided into theories of migration initiation and theories of migration perpetuation, as conceptualized by Massey et al. (1993; 1994). Among the first group of theories are the macro and micro theories of neoclassical economics. On the macro level, this theory suggests that international migration is caused by geographic differences in the supply of and demand for labor. On the micro level, individuals make a rational choice to migrate expecting positive net returns, after calculating the costs and benefits related to migration. Another economic theory – the new economics of migration – suggests that individuals do not make decisions in isolation from their families or households, and that the decisions to migrate are not only directed to maximization if income, but also to minimization of risks. Dual labor market theory argues that international migration is not caused by individual decisions of rational actors, but rather by the labor demands of modern industrial societies. Another macro approach is Wallerstein's world systems theory, according to which, capitalism expands from its core in Western countries and incorporates growing shares of human population into world market economy.

In contrast to economic theories of migration Massey et al. (1993, 1994) offer the social theories of migration perpetuation. The social theories are:

institutional theory; cumulative causation theory; and network theory (which is included in the theory of social capital in Massey, 1999). Institutional theory assumes that after international migration has started institutions and voluntary organizations arise to help balance between the large number of people who want to migrate and the limited opportunities for migration. Cumulative causation theory suggests that each act of migration alters the social context within which additional migration is more likely to occur.

The core assumption in the social network theory is that networks make international migration more likely, as they lower the risks and costs related with the movement and increase the expected benefits from migration. Massey et al. (1993) define migrant networks as "… sets of interpersonal ties that connect migrants, former migrants, and non-migrants in origin and destination areas through ties of kinship, friendship, and shared community origin" (p. 448), which have been one of the main reasons for the critique of migrant network theory. The argument developed by a few authors is that migrant networks consist of many other types of networks that expand beyond the personal kinship and friendship ties of the migrants in their areas of origin (Boyd, 1989; Krissman, 2005). These networks include such interconnected agents of the migration process, as employers, labor smugglers (Krissman, 2005), and economic and political ties between sending and receiving countries.

To be able to fully understand migration processes and the factors associated with the start and continuation of it, they cannot be studied from the perspective of only one theory. Each of these theories offers an explanation of

migration from a different point of view and includes only some of the determinants of migration processes. Only looking at migration by using these theories together will give us a comprehensive understanding of the process.

The consequences of migration have been thoroughly studied; however most of this research has focused on the destination rather than the origin countries. The studies looking at the migration effects on the origin areas are heavily focused on the economic consequences of migration on the family, community, and country level. The research on economic effects of seasonal migration has found that migration both positively and negatively affects the development of local economies. On the one hand migrant remittances were found to be a significant source of income for many families (Boyle et al. 2003; Conway and Cohen, 1998; Osaki, 2003) and an important factor in the economic development of the developing countries (Taylor, 1993; Cohen, 2005). However, on the other hand it has been argued that sending communities benefit from migrant remittances only on the short run, while the brain drain of the skilled professionals and the outflow of labor and capital from the countries of origin negatively affect the development of the country in the long run (Bracking, 2003).

The socio-cultural consequences of international migration have also been widely discussed in the literature. Migrants are believed to transfer the western culture and capitalistic values through the exchange of everyday practices into their local communities facilitating the globalization process (Orozco, 2002). Migration is also found to affect changes in behavior and preferences for age at marriage and number of children in the sending countries (Cohen, 2005). As a

result of this socio-cultural exchange between the sending and receiving countries through migrants, researchers have observed changes in the family structure, gender roles and autonomy of women left behind (Brink, 1991; Dogu, 2004; Hadi, 2001). In the societies with distinguished traditional gender roles, male migration resulted in a shift in these roles, obligating women to new responsibilities that would have been performed by men in the absence of migration. The economic benefits of migration often result in creating nuclear families, allowing the families to afford living separate from parents (Brink, 1991). The role of migration in the demographic transition in many countries has been acknowledged by various researchers (Vallin, 2002; Demeny, 2003; Lesthaeghe and Surkin, 2007); however the focus has mostly been the receiving countries.

The demographic consequences of migration for the sending communities have been less studied. Zachariah et al. (2001) in their study of migration in Kerala found that migration directly affects the population structure, by changing the age and sex distribution of the local population. As a result of migration, the proportion of working population decreases, while the proportion of the elderly increases. Migration is also affecting the population dynamics in the sending countries decreasing the fertility rates in the country. On the one hand, the long-time separation of the spouses decreases the chances of conception, on the other hand, among other innovative behaviors and knowledge, migrants gain and transfer new information and behaviors of contraception (Zachariah, Mathew and Rajan, 2001).

However, the effects of migration on the reproductive health, behavior and outcomes among those left behind remain understudied. Less attention has also received the influence of seasonal type of migration on the origin countries. The existing studies looking at the associations between male seasonal migration and fertility, contraception, and sexually transmitted diseases among women left behind is limited and is mostly focused on the settings with high rates of fertility and HIV. There is limited research looking at the consequences of migration for the left behind in the countries that once constituted the Soviet Union – countries with high rates of seasonal migration, that had to go through dramatic social, political and economic changes since the collapse of the U.S.S.R.

The setting: Armenia

Armenia, a nation of some three million residents and a Gross National Income per capita estimated at $3,100 (The World Bank, 2011), gained independence after the dissolution of the USSR in 1991. The collapse of the Soviet rule and the war with neighboring Azerbaijan in the early 1990s led to a severe socioeconomic crisis that affected, among other things, the scope and patterns of international migration.

The processes of international migration in Armenia cannot be explained from the perspective of one single theory. The change in the volume and type of migration in Armenia over time has been determined by the various socio-political and economic processes in the country. The history of labor migration to Russia and other parts of the Soviet Union goes back to the Soviet era. Armenians

were among the ethnic groups in the former Soviet Union that had the highest rates of mobility in the area (Lewis et al., 1976, cited in Mitchneck and Plane, 1995). The seasonal labor of Armenian men during this period mostly involved work on the virgin lands in the south eastern region of the former Soviet Region. During this period, all migration processes were strongly controlled by the state to regulate the processes of urbanization, labor and population distribution in the Soviet area. However, the events of the late 1980s and early 1990s have significantly changed the migration trends in the country.

Following the devastating earthquake in December of 1988, one of the largest flows of emigration was recorded in Armenia: about 150 thousand people were displaced to other USSR countries, and another 70 thousand left on their own (Poghosyan, 2003). This type of massive out migration caused by natural disasters is not explained by any of the economic theories of migration. However, even in the environmental approach, population displacement due to natural disasters is usually explained through a combination of political, economic and demographic factors that are usually involved in the process along with the environmental factors.

The collapse of the Soviet rule two years after this large wave of outmigration, caused severe socio-economic depression in the country, resulting in the second large wave of migration (Yeganyan and Shahnazaryan, 2004). According to Poghosyan's (2003) estimations, about 700 thousand Armenians were drove out of the country in the beginning of 1990s. The collapse of the Soviet Union was followed by the war with Azerbaijan, which drove the country

into worse socio-economic situation, and resulted in forced out migration of ethnic Azerbaijanis residing at the border and immigration of Armenians from the Azeri land. According to Heleniak (2008) about 1.5% of the Armenian population has permanently left the country since the dissolution of U.S.S.R.

As the economic situation in the country stabilized and then started to improve since the mid-1990s, permanent emigration began to subside while temporary labor migration began to rise again. The national statistics of the last decade show that net migration[1] rose from -10.4 in 2000, to -7.8 in 2005, and further to -3.9 in 2009, due to the decrease in the number of emigrants (National Statistical Service of the Republic of Armenia (NSS RA), 2005; 2010). These numbers are considered to be underestimating migration rates in the country, since they are based on the information on the cancellation of the registration in the passport. A large number of migrants leave the country on the permanent bases or at least for indefinite periods of time, without cancelling their registration in the local addresses, therefore not being registered as migrants.

Today, two main international migration patterns can be distinguished: permanent emigration from Yerevan, Armenia's capital city and by far the largest city, to Europe and the U.S., and seasonal labor migration from rural areas to Russia and, to a lesser extent, other countries of the Soviet Union (Gevorkyan, Mashuryan and Gevorkyan, 2006). Current migration processes can largely be

[1] Net migration rate is the difference between in-migrants and out-migrants of an area in a year per 1,000 inhabitants. A positive value indicates more people coming to an area than leaving it, while a negative value means more people leaving than coming

explained by the economic and social approaches in migration theories. On the one hand, the economic depression following the independence of the country, have resulted in labor shortage, while the successors of the former Soviet Union – Russia, Ukraine, Kazakhstan etc. – have supplied labor for the newly independent countries of CIS[2], representing an example for macro level neoclassical economics theory of migration. On the other hand, the choice of the individuals to engage in seasonal migration in this area has been a family strategy to cope with the economic hardships of the country, representing an example for the theory of new economics of migration. Dual labor theory can also explain the migration processes in this region, as the drastic changes in the demographics of Russia and Ukraine have resulted in shrinking of the working age population, creating the need for migrant labor.

The social theories of migration also help understand the processes of international migration in the country. Although, the initial economic factors driving the migration flows have not subsided in the rural areas of Armenia, the social factors also help the migration flows sustain. As suggested by migrant network, institutional and cumulative causation theories, the long history of migration in the area has reached the level, where additional migration flows are fueled by the migrant networks, previous migration experience of others in the same community and institutionalized migrant labor agents who provide the new and returning migrants with information at the origin and labor opportunities at the destination. However, as suggested by Krissman (2005), in this case under

[2] The Commonwealth of Independent States (CIS) is a regional organization that includes most of the former Soviet Republics

migrant networks should be considered not only the individual connections of migrants themselves, but also the economic and political ties between Armenia and the receiving countries, a bright example of which is the lack of visa requirements for Armenians in the former Soviet countries.

National statistics on the scope of seasonal migration in Armenia are rare. A few studies provide estimations of seasonal migration rates in the country based on nationally representative data. Ivakhnyuk (2006) reported that in the early 2000s, based on the national estimates, the number of Armenian migrant workers abroad was about 800-900 thousand, out of which, about 650 thousand where working in Russia. According to Minasyan et al. (2007), the share of the households involved in labor migration in Armenia was estimated to be around 8-9 percent between 2002 and 2007, the absolute majority of which (about 81 percent) reported having only one member of the household working abroad, and about 17 percent having two and more seasonal migrants in the household. The 2007 distribution of labor migrants by urban/rural residency showed significant change from the distribution of migrants by urban/rural residency in 2005 (Minasyan and Hancilova, 2005). While in 2005, the percent of migrants from urban areas was almost twice higher than those from rural areas, in 2007 the percent of households involved in migration was higher in rural areas. Minasyan et al. (2007) note that these changes were due to the improved economic situation in urban areas, particularly in the capital city of Yerevan, resulting in decreased labor migration rates from urban settings.

In the same study the distribution of seasonal migrants by the destination areas showed that about 93 percent of seasonal migrants chose Russia and other CIS countries for work. This large percent of labor migrants to former Soviet countries is explained by the knowledge of the language, lack of visa requirements, and relatively low travel costs. Among the remaining migrants, the most popular destination areas are the countries of European Union followed by the United States (Minasyan and Hancilova, 2005, Minsayan et al., 2007). It was also found that the majority of seasonal migrants in the CIS countries was from rural areas, meanwhile those in Europe and the US, were mainly from urban areas.

The duration and seasonality of labor migration was also studied by Minasyan et al. (2007). They report, that over 75 percent of migrants leave by the end of spring, with the number of departures peaking in March. The majority of them (78%) return between October and December, with the number of returns peaking in the month of December, closer to the New Year. The majority of migrants in their study stayed abroad between 5 to 10 months, the average duration of labor migration being about 8 months. Similar seasonality of labor migration in Armenia is observed by Heleniak (2008), who notes that there is a well developed seasonal pattern of migration mostly to Russia, whereby people leave from January to August for seasonal work in construction and agriculture and return between the months of September and December.

The socio-demographic background of seasonal migrants and their employment history before migration draws the following picture. About 93.5

percent of migrants were men, compared to only 6.5 percent of women in 2005-2006. The age-specific migration rates show that migration is most prevalent among economically active population of ages 21-55, peaking at the ages above 40 years. Compared to 2005 data, Minasyan et al. (2007) find an increased rate of migration among the 21-25 age group between the years of 2005 and 2006. The majority of migrants (76%) were married in 2005-2006. The distribution of seasonal migrants by education shows that about 47 percent of labor migrants had secondary education or less, 33 percent had vocational and about 20 percent had higher education. This study also shows that about 41 percent of migrants were employed in Armenia prior to migration, out of which about 52 percent had a permanent job, which reflects the fact that the income generated from this employment was not enough to sustain the family needs. Minasyan and Hancilova (2005), based on the data on income prior to migration also find, that seasonal migrants in Armenia come from households with average income, rather than from low or high income households.

Although permanent outmigration has been decreasing in the country, according to national statistics, seasonal migration is expected to grow. Based on the 2007 data on migration attitudes and desires, Minasyan et al. (2007) predicted an increase in the potential permanent and labor migration from Armenia. Another study of migration in Armenia, showed that 36 percent of respondents wanted to leave for labor migration, about 43 percent of which preferred Russia for that reason, compared to only 22 percent of those preferring USA. Meanwhile,

17.3 percent in the study wanted to leave the country on a permanent basis (Zhakevich, 2008).

Due to the enduring economic hardships in the rural areas, seasonal labor migration has remained a common occurrence in Armenia, well rooted in the livelihoods of both urban and rural residents. While the families and communities have found a way to cope with the seasonal absence of the economically and reproductively most active male population, the consequences of it have no doubt left a significant footprint in the socio-demographic profile of the country and the everyday life of the households.

Data

The dissertation uses combined data from two surveys of married women in rural Armenia. The choice of the data on married women for studying the consequences of seasonal migration for the women left behind is associated with the marriage and courtship trends in the country. Although, having sexual intercourse before marriage is not uncommon among men, women, especially in rural areas, usually experience their sexual debut after marriage. Armenia DHS in 2005 reported that women's age at marriage and age at first intercourse correspond almost exactly, which was not the case for men. This indicates that the percent of not married women who might be exposed to pregnancy and sexually transmitted diseases is very small. Single or married men usually engage in sexual intercourse outside of marriage with women providing sexual services for pay. Intercourse among unmarried women is not non-existent, but it is comparatively

rare and usually remains unreported. Therefore, the consequences of seasonal migration on fertility outcomes and sexual health of women can be observed mostly among married couples, which include civil (or by church) and officially registered marriages.

First survey on Migration, Social Capital, and Reproductive Behavior and Outcomes in Armenia was conducted in 2005. The survey was carried out in 52 villages of two provinces (marzes). One of the marzes, Ararat[3], is located close to the capital city of Yerevan, and can be described as a more prosperous marz of the two. Tavush, the other marz, located at the border with Georgia and Azerbaijan, has been influenced by the military conflict between Armenia and Azerbaijan and is among the poorest regions in the country. In each village twenty households (1040 households in total) with women 18 to 45 years old, married to migrants and non-migrants, were selected randomly through a random walk algorithm. If a household included more than one married woman with required characteristics (age and husband's migration status), the woman with the closest birthday was interviewed. This sampling procedure was designed to assure a balanced representation of women from migrant and non-migrant households. However, smaller villages did not have enough eligible or available women with migrant husbands; in such cases, additional women married to non-migrants were interviewed from the same village, to assure that the sample size in each village was the same. As a result, the number of non-migrant households exceeded the

[3] The political map of Armenia is presented in Appendix A.

number of migrant households in the 2005 survey: 384 migrant households vs. 656 non-migrant households.

The survey instrument included questions on household structure and individual socio-demographic characteristics; marriage and husband's characteristics, including husband's migration history; health and reproductive history; social capital and community; household economic characteristics and living conditions; and gender attitudes.

The second survey on "Labor Migration and STD/HIV Risks" was conducted in the summer of 2007, at the height of the migration season, in rural areas of Gegharkunik province. A three-stage sampling procedure was used to select a sample of 1,240 married women aged 18 to 45 years. At the first stage, 31 villages were selected with a probability proportional to village population size. The second stage included identification of eligible households in the village. At this stage, village administrative journals that contain information about each household's composition were used to identify households with at least one married woman aged 18-45. For each of those households, the migration status of the woman's husband—labor migrant or not—was established with the help of village administrators. Based on the husband's migration status, the households were assigned to two lists. Each of the lists was used as a separate sampling frame for the last stage of sample selection. At that stage, twenty households from each list were randomly selected using a random numbers algorithm. If a household included more than one married woman with required

characteristics (age and husband's migration status), the woman with the closest birthday was interviewed.

This sampling procedure was also designed to assure a balanced representation of women from migrant and non-migrant households. Similarly, several smaller villages did not have enough eligible or available women with migrant husbands; in these cases, women from the non-migrant household list were added to the village sample to assure that the sample size in each village was the same. As a result, the number of non-migrant households exceeded the number of migrant households in 2007 survey as well: 543 migrant households vs. 697 non migrant households. It should be stressed that the sampling procedure used in both surveys was not meant to produce a province or village-level representative sample of women married to migrants and non-migrants but rather to afford sound comparisons between the two types of rural women.

The survey instrument included questions on household structure and individual socio-demographic characteristics; marriage and husband's characteristics including husband's migration history; health and reproductive history, detailed history of STDs; social capital and community; household economic characteristics and living conditions; and gender attitudes.

Using the combined data from both surveys, coming from three distinct regions of the country, provides a better chance for understanding the migration effects on the women left behind and making conclusions on the country level. The fact that the survey tools were similar up to the level of question wording lowers the bias from combining the data from two surveys. However, a few

differences must be acknowledged. First, the sampling procedure was different in two surveys, although the goal was the same: to assure balanced representation of migrant and non-migrant households. Second, in 2007 survey, the selected interviewers were local residents of the region, which could have contributed to better understanding of local women during the interviews. In 2005 survey, on the other hand, the interviewers were from the capital city, although they were prepared through a more detailed instruction process. And thirdly, the surveys are two years apart, during which time, some socio-economic and political shifts might have occurred in the country affecting both the migrant and non-migrant households equally. Considering these differences, appropriate controls will be included in the analyses to minimize the error in the results of the study.

The Description of the Sample Population

The descriptive statistics of the main socio-demographic characteristics of women for each survey and for the combined data, distributed by husband's migration status, are presented in Table 1-1. The table shows that the average age of women in 2005 survey is slightly higher than in 2007 survey, and age of women married to migrants is slightly higher than that of women married to non-migrants in both surveys. On average, women married to migrants were about 34 years old, and women married to non-migrants were 32. Woman's age at marriage was also slightly lower in 2007 compared to 2005 women, in the total averaging at about 19 years. The age difference between husband and wife is higher in 2007 by almost one year, than in 2005 survey. In both years, the age difference was

higher among migrant couples than among non-migrant couples. The average age difference between husband and wife was five years in both surveys combined.

The distribution of education for both women and their husbands differ between the two surveys. While the percent of those with vocational and higher education is higher among migrants and their wives in 2005 survey, the picture is reversed in 2007 survey. The percent of those with vocational and higher education is lower among migrants and their wives in 2007. The percent of more educated women and their husbands is also higher in the total 2005 sample compared to that of 2007 sample by about 10 percent. The percent of women working at the time of the survey is very low in both surveys combined. The percent of working women is higher among those with non-migrant husbands than among those married to migrants in both surveys, however, the difference is much more visible in 2007 survey. On average, higher percent of women were working in 2005, than in 2007 survey. The difference is about 6 percent.

The average household income is presented in US dollars. The conversion of Armenian drams to US dollars was done according to the exchange rate at the time of the survey (1USD=460 AMD in 2005, and 1USD=350 AMD in 2007).The average household monthly income is significantly different between the two years. However, to compare the actual incomes between the two years, more complicated economic calculations are required to account for inflation rates, et. c, which is not in the scope of this dissertation. What we can compare according to Table 1-1, is the average income levels between the households of seasonal migrants and non-migrants. In both years, the average monthly income

was higher among seasonal migrants' households than in non-migrants' households by about 50 US dollars.

The distribution of reproductive characteristics also shows some differences between the migrant and non-migrant households and between the two survey years. The average number of pregnancies is higher among women with migrant husbands than among those with non-migrant husbands in both surveys, but the average number of pregnancies is higher in 2007 than in 2005 survey by about one pregnancy. The average number of births is also slightly higher among migrants' partners compared to non-migrants wives, but the difference between the survey years is almost unnoticeable. In the combined data, the average number of births per woman was about 2.6 among migrants' wives, compared to 2.4 births per woman among non-migrants wives. Much bigger differences exist in the abortion statistics between migrant and non-migrant couples, and between the two years. The percent of women who have had at least one abortion in their lifetime was about 45 percent among women with migrant partners, compared to about 39 percent among women with non-migrant partners in 2005. In 2007 the distribution is 61 vs. 58 percent, correspondingly. Combined, about half of the women in the sample have had at least one abortion in their lifetime. Among them, the mean number of abortions was about 2.8. This number is higher in the 2007 survey, however in both years, the average number of abortions among women who have had at least one abortion is higher among migrants' partners than among non-migrants' partners.

And finally, the percent of non-migrants in each survey exceeded the percent of non migrants in both years, as mentioned before. The migrant households were from bigger villages, than the households of non-migrants, and the 2007 survey included bigger villages than the 2005 survey on average.

Table 1-1 The distribution of the main socio-demographic characteristics of women by husband's migration status in 2005 and 2007 surveys and in the combined data.

	2005 survey			2007 survey			Combined data		
	Migrant husband	Non-migrant husband	Total	Migrant husband	Non-migrant husband	Total	Migrant husband	Non-migrant husband	Total
Average age of the woman	36.6	33.0	34.4	31.8	31.0	31.4	33.7	32.0	32.7
Average age difference between husband and wife	4.5	4.6	4.6	5.4	5.2	5.3	5.0	4.9	5.0
Average age of the woman at marriage	19.7	20.2	20.0	18.6	19.0	18.9	19.1	19.6	19.4
Woman's education (%)									
Secondary and less	47.4	54.4	51.8	71.8	64.1	67.5	61.7	59.4	60.4
Vocational and higher	52.6	45.6	48.2	28.2	35.9	32.5	38.3	40.6	39.7
Husband's education (%)									
Secondary and less	52.3	62.4	58.7	74.6	64.7	68.9	65.3	63.5	64.3
Vocational and higher	47.7	37.7	41.3	25.4	35.3	31.0	34.7	36.5	35.7
Percent of women currently working	16.2	16.9	16.6	7.7	12.8	10.6	11.2	14.8	13.3
Average household monthly income (in USD)	164	118	135	232	176	200	203	148	170
Average number of births per woman	2.7	2.4	2.5	2.5	2.4	2.4	2.6	2.4	2.5
Average number of pregnancies per woman	4.0	3.5	3.7	4.7	4.4	4.5	4.4	3.9	4.2
The percent of women with at least one abortion	44.5	39.3	41.3	61.0	58.3	59.4	54.2	49.1	51.1
Average number of abortions among woman with at least one abortion	2.4	2.1	2.2	3.2	2.9	3.0	2.9	2.6	2.8
Average number of households in the village	700	638	661	1186	988	1074	980	818	886
Percent in the total	36.9	63.1	100	43.8	56.2	100	40.7	59.3	100

Chapter 2

SEASONAL MIGRATION AND FERTILITY IN LOW-FERTILITY AREAS OF ORIGIN

Theoretical Background

The associations between migration and fertility have received a proper attention in the literature. Initially, most of the research was focused on the effect of permanent migration on fertility levels in the areas of destination. Later, seasonal migration and areas of origin started to attract more attention from the researchers, however, most of the research has been conducted in the areas with high fertility levels. The effect of seasonal migration on below-replacement level fertility is understudied. This study adds to the literature by looking at the associations between seasonal migration and fertility in Armenia, a low-fertility, high-migration country.

The literature on fertility divides the factors affecting fertility into proximate and intermediate determinants. The socio-economic, cultural and environmental factors that positively or negatively affect fertility are identified as proximate determinants. The biological and behavioral factors through which proximate determinants affect fertility are known as intermediate determinants (Davis and Blake, 1955; Bongaarts, 1978). The latter include contraception, induced abortion, lactational infecundability, sterility and the frequency of intercourse. Migration-associated changed socio-economic environment, cultural values and preferences, and spousal separation shape migrants' fertility by

affecting fertility preferences, the knowledge, availability and use of contraception, and frequency of intercourse.

In theory, four main hypotheses have been proposed to explain the association between migration and fertility. These hypotheses are based on the processes of socialization, adaptation, selection and disruption. Socialization hypothesis suggests that fertility of migrants is similar to that of non-migrants in origin areas, as the fertility behavior of migrants reflects the preferences and behavior dominant in their childhood. The adaptation hypothesis suggests that migrants gradually adapt to the fertility behavior dominant in the destination due to new socio-economic and cultural environment. The selection hypothesis argues that migrants are a special group of people whose fertility preferences are more similar to the preferences of people at destination than at origin. Finally, the disruption hypothesis suggests that immediately following migration, migrants show particularly low levels of fertility due to the disruptive factors associated with the migration process.

Most often, migration is found to negatively affect fertility. Although some studies find evidence for the negative association, but are not able to establish the mechanisms through which migration negatively affects fertility (Myers and Morris, 1966; Macisco et al., 1970), many others have been able to explore these mechanisms, testing the four main hypotheses of fertility-migration association. There has been little evidence in the literature supporting socialization hypothesis. Hervitz (1985) found that migrants from the least

developed parts of Brazil show no reduction in fertility for at least one generation. However, this evidence was true only for migrants in rural destinations.

Full or partial support for adaptation hypothesis was found in several studies (Bach, 1981; Kulu, 2005; Chattopadhyay, et al. 2006; Lindstrom and Saucedo, 2002; Jensen and Ahlburg, 2004). Lindstrom and Saucedo (2002), for example, find that migration experience in the US negatively affects the fertility of first-generation Mexican immigrants. Jensen and Ahlburg (2004) suggest that it is more plausible, that migration-associated fertility decline is the result of changed opportunity costs of childbearing for couples. The study by Hervitz (1985) also supported adaptation hypothesis, however, it suggested that the effect of adaptation showed after the disruption effects of migration had disappeared.

The evidence for selectivity hypothesis is also inconsistent. While some studies support it (Chattopadhyay, et al. 2006; Goldstein and Goldstein, 1981), others find no evidence for it (Kulu, 2005; Hervitz, 1985). The disruption effect of migration seems to be supported with strong evidence, however, it is either visible in a short period following migration and does not have long lasting effects on fertility (Chattopadhyay, et al. 2006), or affects most but not all migrant categories (Hervitz, 1985). Goldstein and Goldstein (1981) on the other hand, suggest that once the fertility has been disrupted, it is unlikely for the couples to reach the completed family size similar to non-migrants at destination.

The theory and most studies on migration and fertility have focused on the effects of permanent migration on fertility levels at the destination areas. The research on temporary migration and fertility in the areas of origin is scarce.

Computer simulations of the effect of seasonal migration on conception rates have shown that spousal separation can significantly reduce fertility (Menken, 1979; Millman and Potter, 1984; Potter and Kobrin, 1982). In this simulations the importance of the length of separation and its overlap with postpartum amenorrhea is stressed, since spousal separation affects fertility the more its duration increases, and the less it overlaps with lactation periods (Potter and Kobrin,1982; Millman and Potter, 1984). In addition, Potter and Kobrin (1982) also report that the impact of spousal separation is greater for healthy, fecund populations, especially early in their reproductive careers, while separations that occur later in marriage have less impact on fertility.

Findings from population studies are consistent with the results of these simulations (Agadjanian, Yabiku and Cau, forthcoming; Lindstrom and Saucedo, 2002; Lindstrom and Saucedo, 2007; Massey and Mullman, 1984). The study of Mexican migrants by Massey and Mullan (1984) shows that temporary migration depresses fertility among couples with seasonal migrants and disrupts the normal age pattern of fertility. This effect was more pronounced among legal migrants, since they were absent on more regular basis than illegal migrants. Massey and Mullan's (1984) study also found that migration altered the socioeconomic situation of the family and their fertility preferences, supporting the adaptation hypothesis; however this was true only for legal migrants. Agadjanian et al. (forthcoming) along with disruptive effects of short term migration found that male migration positively affected fertility preferences among their wives, providing better economic conditions and guarantee for stability.

Findings from a study on Mexico-US returned migration suggest only short-term disruptive effect of migration on fertility (Lindstrom and Saucedo, 2007; Lindstrom and Saucedo, 2002). In the long term, it was found that couples were able to adjust their fertility after returning, and that migration did not affect completed fertility. In their 2007 study, Lindstrom and Saucedo also conclude that not only fertility is affected by migration, but also migration is initiated and postponed as a consequence of fertility. Increased rate of migration associated with the number of children was also reported in another study of Mexico-US migration, by Massey and Espinosa (1997). They found, that male migration rates were higher among families with more and younger children, because of increased burden on the household, and that the frequency of migration decreased with time as the children grew older.

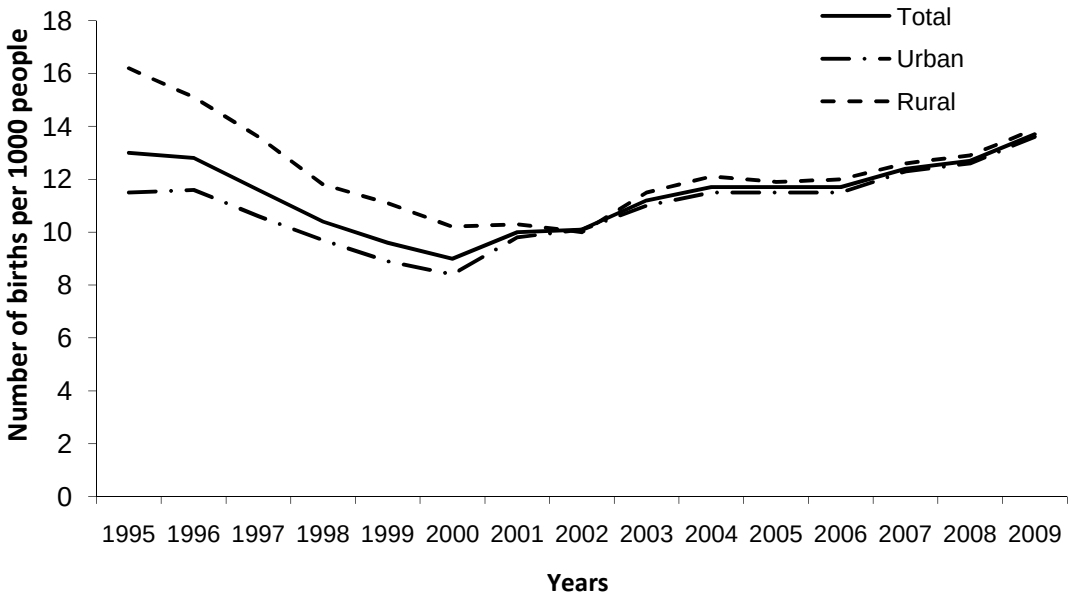
The studies looking at the associations between seasonal migration and fertility have mostly focused on high-fertility areas of origin. The question, whether or not seasonal migration has similar disruptive effects on childbearing in low-fertility settings, remains unanswered.

Fertility in Armenia

Armenia is among the countries in Eastern Europe and Asia that have recently seen a dramatic fertility decline to below-replacement levels (Billingsley, 2008). Total fertility rate in Armenia declined from 2.6 in 1990 to the lowest point of 1.2 in 1999, which is among the lowest levels in the world; and has slightly increased up to 1.35 in 2006 (UNICEF Innocenti Research Centre, 2008). According to national statistics the decline of crude birth rate (CBR) in rural areas was much bigger than in urban areas between mid 1990's and early 2000s (Figure 2-1). Moreover, CBR in urban areas has recovered and even increased to levels higher than it used to be before the start of the decline. In rural areas, on the other hand, CBR has only been able to increase to urban levels, although it used to be much higher than urban CBR in the early 1990's.

Armenia Demographic and Health survey (ADHS) (2005) reports that there was a decline in rural total fertility rate (TFR) from 2.1 in 2000 to 1.8 in 2005, while there was no change in urban TFR between these years. The difference in numbers between ADHS and National Statistical Service (NSS) are considered to be mostly computing differences (ADHS uses *de facto* population, while NSS uses *de jure* population). Billingsley (2008) did not find support for contraceptive revolution or the second demographic transition to be the explanation of the fertility decline in Armenia. Instead, the author argued that fertility decline in this region was due to the collapsing socio-economic household conditions and uncertainty about the future in the early 1990s.

Figure 2-1 Crude birth rates (number of births per 1000 people) by urban and rural settings in Armenia from 1995 to 2009.



Source: NSS Yearbook 2001, 2005 and 2010.

To explore the consequences of large scale male labor migration for fertility levels in low-fertility areas and to add to the research on the associations between seasonal labor migration and fertility in the settings of origin, this study is looking at the effects of men's labor migration on fertility and fertility preferences in rural Armenia. First, the effect of seasonal migration on yearly pregnancies is explored. Considering high rates of seasonal migration in rural Armenia and the disrupting effects of migration on fertility, the possibility of disruptive effect of migration on fertility levels, particularly in rural areas, cannot be denied; however it is less probable. It is expected that seasonal migration will not have a similar disruptive effect on yearly pregnancies among rural women in Armenia, as found in high-fertility settings. Since labor migration keeps men

away from home only about half of the year, couples may be able to adjust their fertility upon migrants' return even in a short term.

To test the long-term effect of seasonal migration on fertility the associations between husband's migration status and lifetime fertility are explored. On the one hand, seasonal migration is not expected to be negatively associated with lifetime fertility, since couples should be able to adjust their fertility. This is because husband is away only a short period of time, and also completed fertility is very low in this setting. On the other hand, it is possible that the effect of seasonal migration on lifetime fertility might be positive, especially among those who have had longer experience of seasonal migration, since labor migration provides better economic conditions for childbearing.

This study also looks at whether or not seasonal migration affects the couple's fertility preferences in the future. It is expected that migration will be positively associated with higher fertility preferences, because drastic fertility decline in Armenia was caused by unfavorable socio-economic conditions, and labor migration is likely to improve household wellbeing.

Data and Methods

For this study data from both 2005 and 2007 surveys is used in order to have a reliable sample size and be able to make sound comparisons. Both surveys include complete histories of women's pregnancies, future fertility preferences and husband's migration status going back 5 years from the survey date.

Migration and yearly pregnancies. To test the effect of husband's seasonal migration on left-behind women's pregnancies event-history approach is

employed. The discrete-time logistic regression model predicts the hazard of getting pregnant in a given year, with husband's migration status in the same year as the main predictor[4]. Husband's migration status is a time-varying variable measured for each year of risk exposure. Since the collected data on the history of husband's migration goes back five years preceding the survey date or the year of their marriage if they married in less than five years before the survey, we can only look at the events that occurred in this time period. This is acknowledged as a limitation of the study, however the events that have occurred recently are usually reported more accurately, which adds to the reliability of the findings.

This model controls for both time-varying and time-invariant factors. Time-varying factors include woman's age, the number of prior births and woman's work experience outside of household. Time-invariant are considered age difference between husband and wife; woman's age at marriage; woman's and her husband's education (coded 1, if has vocational and higher education; coded 0, if has secondary and less education)[5].

Following the fast decline in fertility in the beginning of independent years in the country, Meslé et al. (2007) have noticed a drastic increase in sex-ratios at birth in Armenia and neighboring countries. In their work they tried to study whether the reason for the increase in the sex ratio at birth were prenatal

4 A model with migration effect lagged a year is also tested. However, the results are identical and therefore not presented here.

5 By the time both men and women marry in rural Armenian settings, they usually have completed their education. For this reason, education in this study can be considered time invariant. Only about one percent of women reported to be studying at the time of the survey, and they were already in the highest category for education.

scans and sex-selective abortions. Although their data didn't allow them to come to a definitive conclusion, it showed some evidence of son-preference in Armenia. According to Meslé et al. (2007), between 1985 and 1999, the probability of birth was about 57% if it the previous two births were girls, compared to only 33 to 38 percent probability of birth, following two boys, or a boy and a girl. In addition, they report that the frequency of abortions was higher after two female births, if the third child was male, rather than female. These findings suggest that fertility in Armenian setting may be affected by son-preference. Therefore, to control for this factor, the number by sex composition of previous children is included in the analysis. It is measured through the following series of dummy variables: no previous children, only one boy, only one girl, two and more girls only, two and more boys only, two and more children of both sexes.

The economic variables include household asset index per person, built on the series of questions whether the household owns in working condition a color TV, stereo system, video or DVD player, refrigerator, gas or electric stove, fixed line phone, and a car (values range 0-6); and number of rooms used for sleeping per person[6]. Although household asset index and number of rooms used for sleeping are time-invariant variables, they are considered to be less likely to have changed significantly over the five years under observation, unlike income. Household assets are accumulated slowly over years, while house size and the number of rooms take even longer to be expanded. Thus, these variables are chosen over household monthly income as a proximate measure of household

[6] To adjust for the change in the number of household members over time, the children born after the given pregnancy were not included in the denominator.

economic wellbeing in the event history model. This is acknowledged as a limitation of the study, and the effect of economic wellbeing on yearly pregnancies should be interpreted with caution.

The model also controls for village level wellbeing, which can be measured by the number of households in the village. The level of socio-economic development is directly linked to the population size in rural Armenian settings. Larger villages usually have more advanced health care units, more developed infrastructure and economy than smaller villages. The model also controls for marz (region) which can be considered a control for the differences between two surveys, as well as for regional differences (reference is Tavush marz, which is one of the regions in 2005 survey, as well as the poorest region among the three, included in both surveys).

To account for village clustering and to protect against deflated standard errors that might bias the hypothesis testing, random-intercept models were fitted. Therefore, GLIMMIX procedure for binary distribution in SAS was used to allow the intercept of the outcome to vary randomly by village (Schabenberger, 2009). It can be specified through the following equation:

$$\log\left(\frac{P_{it}}{1-P_{it}}\right) = \alpha_t + \beta_{0k} + \beta_1 x_{it} + \beta_2 z_i \,, \qquad (1)$$

where P_{it} is the probability that the individual i will have a pregnancy in year t, α_t is the baseline hazard, β_{0k} is the intercept that varies randomly by village, β_1, β_2 are the vectors of coefficients, x_{it} is the vector of time varying covariates and z_i is the vector of time-invariant covariates.

Seasonal migration and lifetime fertility. The long-term effect of seasonal migration on fertility is tested using the number of children born to the woman at the time of the survey as the outcome. Two alternative models are tested, where first, husband's migration status at the time of the survey is the main predictor and second, husband's cumulative migration experience in the last five years is the main predictor. Using partial migration history in the second model is acknowledged as a limitation. However, men who have been engaged in seasonal migration for more than 3 years are likely to be involved in it for much longer. Therefore, measuring migration experience using a series of dummy variables – no experience, less than two years of experience and three and more years of experience – might be helpful for substituting this limitation.

The set of controls include women's age, her age at marriage, age difference between husband and wife, woman's and her husband's education (coded similarly as in the models predicting pregnancies), and woman's current employment status (coded 1 if she is currently working; coded 0, if otherwise). The economic wellbeing of the household is controlled through three variables: household asset index per person and the number of rooms used for sleeping per person, measured similarly as in the models predicting pregnancies, and household monthly income in US dollars (logged to smooth the distribution). The village economic wellbeing is measured through the population size of the village. The models also include a control for marz which stands for the differences between the surveys and the regions.

Again, to control for village clustering, random-intercept models are fitted. Considering the outcome is a count variable with non-normal distribution, GLIMMIX procedure for negative binomial distribution was used for this analysis. The equation for negative binomial regression, with an intercept varying randomly across the villages can be specified in the following way:

$$\text{Log}\ (\lambda_i) = \beta_{0k} + \beta_i X_i + \sigma\varepsilon_i\ , \qquad (2)$$

where log (λ_i) is the log of the expected number of children ever born for individual i, X_i is a vector of predictors, β_{0k} is the intercept randomly varying by village, βi is a vector of regression coefficients, and $\sigma\varepsilon_i$ is the error term.

Migration and fertility preferences. To test the effect of seasonal migration on fertility preferences this study looks at how husband's migration status affects woman's and her husband's desire for more children, net of other factors. Since the number of childless couples, who wouldn't want any children in the future would be almost 0, the women who have no children at the time of the survey are excluded from the analysis. Two dichotomy outcomes are used: whether or not the woman wants to have more children in the future (coded 1 if she does, and coded 0 if otherwise); and whether or not she knows if the husband wants to have more children (coded 1, if she knows he wants to have more, and coded 0 if she knows he doesn't want more children or she is not sure). The predictors and controls for both models are exactly the same.

The main predictor is husband's migration status at the time of the survey[7]. The controls include the following socio-demographic factors: woman's age, the age difference between husband and wife, woman's and her husband's education, woman's current employment status, and the number by sex composition of children, to control for possible son-preference. The economic controls include household monthly income (logged), household asset index and number of rooms used for sleeping per person, the village level economic wellbeing (measured through the population size), as well as marz.

Considering the dichotomous nature of the outcome variable and the clustering of the data, random intercept logistic regression for binary outcomes is used. The equation for random-intercept logistic regression can be described in the following way:

$$\text{Logit}(p) = \beta_{0k} + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_i X_i, \qquad (3)$$

where logit(p) it the probability of wanting to have more children (for woman, or her husband), β_{0k} is the randomly varying intercept, $\beta_1, \beta_2, \ldots \beta_i$ are the regression coefficients and $X_1, X_2, \ldots, X_i$ are the independent variables.

[7] The effect of husband's cumulative migration experience has also been used in this analysis, however, as the results are similar to those of current migration status, they are not presented here.

Results

Migration and yearly pregnancies. The results of discrete-time event history models are presented in Table 2-1. The results are presented in odds ratios, meaning a value above unity signifies a positive effect, whereas a value below unity means a negative effect. To test the hypothesis on seasonal migration and yearly pregnancies first the effect of husband's migration status in a given year, along with the baseline hazard is tested, when no other factors are controlled for (Model 1, Table 2-1). In Model 2 (Table 2-1) basic socio-demographic and economic controls and the number by sex composition of children born prior to that year are added. As can be seen from Model 1, husband's migration status in a given year decreases the odds of a pregnancy happening in the same year by about 2 percent; however, this effect is not statistically significant. This result is consistent when the controls are added to the model. Having a migrant husband decreases the odds of a pregnancy in a given year by about 4.5 percent, however this effect is not statistically significant. Therefore, the rate of yearly pregnancies is not significantly different between migrants' and non-migrants' wives, net of other factors.

Among other socio-demographic determinants significantly affecting the rate of yearly pregnancies in rural Armenia, are the following. Each year increase in woman's age at marriage significantly increases the odds of pregnancy in a given year by about 6 percent, while woman's higher education is associated with a lower rate of pregnancy in a given year.

Table 2-1 Discrete-time hazard models of yearly pregnancy rates (presented in odds ratios).

Independent variables	Model 1	Model 2
Woman's age (baseline hazard)		
Under 25 (ref.)	1	1
25 -29	0.514 **	0.625 **
30-34	0.249 **	0.325 **
35-39	0.171 **	0.217 **
40 and over	0.034 **	0.044 **
Husband's migration status (tv)		
Non migrant (ref.)	1	1
Migrant	0.984	0.955
Age difference between husband and wife		0.986 †
Woman's age at marriage		1.057 **
Woman's education		
Secondary and less (ref.)		1
Vocational and higher		0.812 **
Husband's education		
Secondary and less (ref.)		1
Vocational and higher		0.959
Woman's work (tv)		
Not working (ref.)		1
Working outside of home		0.993
Number by sex composition of births		
No prior birth		1.265 *
One boy		2.378 **
One girl		3.439 **
2 and more boys only		1.073
2 and more girls only		1.391 **
2 and more children of both sexes (ref.)		1
Household asset index (per person)		0.960
Number of rooms used for sleeping (per person)		0.895
Number of households in the village (in 100s)		1.005
Marz (region)		
Tavush (ref.)		1
Ararat		0.987
Gegharkunik		1.791 **
Person years	11990	11978
-2 Res Log Pseudo-Likelihood	59939.9	60254.9

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(tv) – Time varying, (ref.) – the reference category

The strongest effect on pregnancy rates has previous fertility history. Compared to having two and more children of both sexes, not having any children, having one child of either sex, and having two or more girls significantly increase the odds of a pregnancy happening in a given year; among them having one girl has the strongest effect on yearly pregnancies in reference to having two and more children of both sexes, increasing the odds of a pregnancy in a given year about 3.4 times. Having two and more boys only, although positively associated with the odds of pregnancy, is not significantly different from the effect of having two and more children of both sexes.

Household and community level measures of economic wellbeing do not show any significant effect on the yearly pregnancy rates. Living in Gegharkunik marz, in reference to living in Tavush marz, has a significant effect on the odds of getting pregnant in a given year. This effect might represent the differences between the surveys, and survey years in particular, but also it might show the differences between the regions. The positive effect of living in Gehgarkunik marz, compared to living in Tavush marz may be associated with the better socio-economic state of the region. However, since living in more prosperous Ararat marz compared to Tavush marz does not show significant effect, it is more likely that the significant positive effect of living in Gegharkunik marz is associated with other differences between the survey years.

Table 2-2 Negative binomial regression results of lifetime fertility (presented in incidence rate ratios).

Independent variables	Model 1-1	Model 1-2	Model 2-1	Model 2-2
Husband's current migration status				
Non migrant (ref.)	1		1	-
Migrant	1.072 **		0.979	-
Husband's cumulative migration experience				
No experience (ref.)		1	-	1
1-2 years		1.029	-	0.967
3 and more years		1.094 **	-	0.994
Woman's age			1.036 **	1.036 **
Woman's age at marriage			0.965 **	0.965 **
Age difference between husband and wife			1.002	1.002
Woman's education				
Secondary and less (ref.)			1	1
Vocational and higher			0.974	0.975
Husband's education				
Secondary and less (ref.)			1	1
Vocational and higher			1.034	1.035
Woman's work				
Not working (ref.)			1	1
Working outside of home			1.010	1.012
Monthly household income (logged)			1.037 *	1.036 *
Household asset index (per person)			0.818 **	0.816 **
Number of rooms used for sleeping (per person)			0.658 **	0.660 **
Number of households in the village (in hundreds)			0.998	0.998
Marz (region)				
Tavush (ref.)			1	1
Ararat			0.979	0.980
Gegharkunik			1.014	1.014
Number of cases	2280	2280	2273	2273
-2 Res Log Pseudo-Likelihood	2977.4	2982.6	2816.9	2821.5

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

Seasonal migration and lifetime fertility. Table 2-2 shows the results of random-intercept negative binomial regression of lifetime fertility with husband's migration status as the main predictor. The results are presented as incidence rate ratios, indicating changes in the predicted number of children associated with a unit increase (or being in a category relative to a reference category) of the corresponding predictors. Model 1-1 and Model 1-2 in Table 2-2 show the effect of migration on lifetime fertility not controlling for other factors, and in Model 2-1 and Model 2-2 socio-demographic controls are added to the analysis. As the results show, being a seasonal migrant is associated with 7 percent increased odds of having an additional child, not controlling for other factors, and this effect is statistically significant (Model 1-1, Table 2-2). Similar results are achieved if husband's cumulative migration experience is used. However the positive effect is only significant for those with 3 or more years of migration experience (Model 1-2, Table 2-2). Having a husband who has been a migrant for three and more years increases the odds of an additional child by about 9 percent, compared to women married to non-migrants.

When the controls are added to the analysis in Model 2-1, 2-2, it is revealed that the positive effect of migration on the number of births was mostly attributable to woman's age. In both models, each year increase in woman's age significantly increases the odds of an additional child by about 4 percent, net of other factors. Meanwhile, having a migrant husband decreases the odds of an additional child by about 2 percent, however this effect is no longer statistically significant, controlling for other factors. The same is true when using the

cumulative measure of migration experience (Model 2-2). Women married to migrants with less than 3 years of experience, compared to those married to non-migrants, have lower odds of having an additional child by about 3.3 percent, and having a husband with 3 and more years of migration experience, compared to having a non-migrant husband, decreases these odds by less than one percent; however, the effects of migration experience are not statistically significant controlling for other factors. It is possible that because migrants and their wives are slightly older on average, they have had a longer history of fertility than their non-migrant counterparts. It cannot be denied though, that this association might be a result of reverse causation: households with more children are more likely to turn to seasonal labor migration to be able to make a living for them. However, since the full history of migration is not available in the data, the reverse causation in this association cannot be established.

Among other controls, woman's age at marriage and economic controls are the factors that significantly affect lifetime fertility. Interestingly, though, household monthly income has positive, while household asset index per person and the number of rooms used for sleeping per person have negative effect on the number of births. It is possible that income increases the household ability to afford more children, while the association between the measures of long-term economic conditions and lifetime fertility reveal the reverse causation between the two: the households with fewer children are able to cumulate more assets and have more room to sleep, than those with more children.

Seasonal migration and fertility preferences. To explore the associations between seasonal migration and woman's and her husband's fertility preferences as reported by the wife two outcomes are used. Table 2-3 shows the results of logistic regression of woman's fertility preferences with husband's migration status at the time of survey as the main outcome and Table 2-4 shows the same results for husband's fertility preferences, presented in odds ratios. Model 1 in each table shows the effect of seasonal migration on fertility preferences when not controlling for other factors, and Model 2 the same effect, net of other controls.

As can be seen from Table 2-3, husband's seasonal migration decreases the odds of a woman wanting another child in the future by about 16 percent, however, this effect is only marginally significant. When controls are added to the analysis (Model 2), it is revealed that the negative association of seasonal migration with fertility preferences was mostly due to woman's age. Each additional year in woman's age significantly decreases the odds of wanting another child in the future by 13 percent, while husband's migration status increases these odds by about 15 percent, but not statistically significant controlling for other factors. The results for husband's fertility preferences are similar to those for woman's preferences, however, in Table 2-4 we can see that the positive effect of husband's migration status is statistically significant, net of other factors, Thus, the odds of reporting a husband wanting more children in the future is 42 percent higher among women with a migrant husband, than among women with non-migrant husband.

Both woman's and her husband's fertility preferences are also highly impacted by the number and sex composition of already born children. As expected, having only one child of either sex, or having two and more girls only, compared to having two and more boys only, significantly increases the odds of wanting another child in the future, while having two and more children of both sexes compared to having two and more boys only, significantly decreases the woman's and her husband's preference for more children by about 40 and 30 percent respectively. Household asset index is positively associated with fertility preferences, but it is statistically significant only for woman's preferences. Also, compared to Tavush marz (the least developed region), living in Ararat and Gegharkunik increases the odds of wanting more children in the future 1.7 and 1.8 times respectively. Husband's fertility preferences are also positively affected by woman's age at marriage. Husband's of women who married at older ages are more likely to want to have another child in the future. Woman's age at marriage is not statistically significant for woman's preferences.

Table 2-3 Random intercept logistic regression results for woman's fertility preferences (presented in odds ratios).

Independent variables	Model 1	Model 2
Husband's current migration status		
Non migrant (ref.)	1	1
Migrant	0.836 †	1.146
Woman's age		0.870 **
Age difference between husband and wife		0.962 *
Woman's age at marriage		1.043
Woman's education		
Secondary and less (ref.)		1
Vocational and higher		0.957
Husband's education		
Secondary and less (ref.)		1
Vocational and higher		1.124
Woman's work		
Not working (ref.)		1
Working outside of home		1.301
Number by sex composition of births		
2 and more boys only (ref.)		1
One boy		5.998 **
One girl		6.861 **
2 and more girls only		4.507 **
2 and more children of both sexes		0.604 **
Monthly household income (logged)		1.039
Household asset index (per person)		1.710 **
Number of rooms used for sleeping (per person)		0.960
Number of households in the village (in hundreds)		0.988
Marz (region)		
Tavush (ref.)		1
Ararat		1.783 **
Gegharkunik		1.815 **
Number of cases	2197	2190
-2 Res Log Pseudo-Likelihood	10041.2	11400.5

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

Table 2-4 Random intercept logistic regression results for husband's fertility preferences (presented in odds ratios).

Independent variables	Model 1	Model 2	
Husband's current migration status			
Non migrant (ref.)	1	1	
Migrant	0.978	1.418	**
Woman's age		0.872	**
Age difference between husband and wife		0.963	**
Woman's age at marriage		1.067	**
Woman's education			
Secondary and less (ref.)		1	
Vocational and higher		1.217	
Husband's education			
Secondary and less (ref.)		1	
Vocational and higher		1.108	
Woman's work			
Not working (ref.)		1	
Working outside of home		1.330	†
Number by sex composition of births			
2 and more boys only (ref.)		1	
One boy		4.122	**
One girl		4.580	**
2 and more girls only		3.050	**
2 and more children of both sexes		0.707	*
Monthly household income (logged)		0.969	
Household asset index (per person)		1.102	
Number of rooms used for sleeping (per person)		1.219	
Number of households in the village (in hundreds)		0.983	
Marz (region)			
Tavush (ref.)		1	
Ararat		1.658	*
Gegharkunik		1.454	†
Number of cases	2101	2094	
-2 Res Log Pseudo-Likelihood	9051.7	9812.9	

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

Discussion

The literature on migration and fertility has established that migration in general, and seasonal migration in particular, has disruptive effects on fertility. It was found that, especially in a short run, seasonal migration decreases the rates of conception due to spousal separation. In some cases it was found, however, that in a long run couples are able to adjust their fertility (e.g. Lindstrom and Saucedo, 2007), while others think that once the fertility has been disrupted it can never recover up to the fertility levels of non-migrants (Goldstein and Goldstein, 1981). However, most of the previous research has been conducted in high-fertility areas. This study contributes to the previous research by adding evidence on the associations between seasonal migration and fertility in low-fertility settings.

The post-independence economic crisis in Armenia, from which the rural areas of the country were not able to recover, has highly affected fertility levels of the country. In these areas below-replacement fertility levels do not seem to be further disrupted by seasonal migration neither in short-, nor in long-term. Two possible explanations are suggested. First, considering the below-replacement levels of fertility in the country, it is believed that some kind of contraception is being employed, and therefore seasonal migration might act as a substitute for it. In high or natural fertility settings the role of contraception is usually overlooked or considered non-existent. Due to data limitations on the contraceptive use history, it could not be included in the event history analysis of yearly pregnancies in this study. However, Chapter 2 will be looking at the associations between seasonal migration and contraception separately. Second explanation is that in the

context of low fertility and comparatively short periods of seasonal migration, the timing of conception can easily be adjusted to match the return period of migrants during the year.

The results of this study also suggest that the lack of effect of seasonal migration on fertility can possibly be explained by the older age of migrant couples. As Potter and Kobrin (1982) have noted, seasonal migration is likely to affect younger and reproductively active populations more than the older and less active populations. Nationally representative data on seasonal migration in Armenia have shown that migration is the most widespread among men above 40 years old (Minasyan et al., 2007). Therefore, the older average age of migrants in this study is less likely to be due to a selection bias, but rather to be due to the characteristics of seasonal migration in the country.

The role of age in the association between migration and fertility also suggests that it is possible for seasonal migration to be triggered by higher fertility in this setting. It is possible, that men engage in seasonal migration at older ages because of higher fertility, which creates greater economic pressure on the household, sending the breadwinners of the household to seek alternative sources of income. The possibility of reversed causation between migration and fertility was also suggested in a few previous studies (Lindstrom and Saucedo, 2007; Massey and Espinosa, 1997). However, data limitations do not allow for testing the reverse causation between migration and fertility in this low-fertility setting.

In regard to fertility preferences, seasonal migration seems to affect couple's preference for more children. Both men and women desire to have

another child if the husband is involved in labor migration, however the effect of migration is significant only in case of men's preferences. These findings support the evidence from African settings, where it was found that the promise of better economic conditions following migration increases couple's fertility preferences for the future (Agadjanian, et al., 2007). Therefore, it can be concluded, that in a low-fertility setting, deprived by poor economic conditions, seasonal migration does not further disrupt fertility, but rather increases the preference for higher fertility by promising a better future. However, more data is needed to fully understand the complex associations between migration and fertility in this setting. Future research on seasonal migration and fertility in low-fertility settings will need detailed histories of contraceptive use and full migration histories of the husband, including the onset of migration initiation, as well as include in the analysis data from the population with completed fertility.

Chapter 3

SEASONAL MIGRATION AND CONTRACEPTION AMONG WOMEN LEFT-BEHIND

Theoretical Background

Contraception is one of the most important determinants of fertility that directly affects the number and timing of births. It is also one of the mechanisms through which migration affects fertility. The research on migration and fertility mostly involves high-fertility origin areas where contraceptive use is either considered non-existent (e.g. Potter and Kobrin 1982; Millman and Potter, 1984) or is not included in the analysis either due to low prevalence or to data restrictions. However, in low-fertility settings, where some kind of contraception is being practiced to limit the number of births, the role of contraception in the association between migration and fertility must be studied thoroughly. In the previous chapter, it was found that, unlike high-fertility areas, seasonal migration does not seem to disrupt the pregnancy rates and lifetime fertility among the left behind. One of the explanations of the fact that pregnancy rates are not different between non-migrant couples and couples with a migrant partner is that in the absence of migration fertility is probably being controlled by contraceptive use. In this chapter, the associations between migration and contraceptive use will be explored in more detail.

The research on the associations between migration and contraception is extremely scarce. The few that exist, have mostly studied this association in the

context of fertility decline. The assimilation hypothesis, explaining the lower fertility among migrants, suggests that migrants' fertility is similar to that of non-migrants in the destination area, because they incorporate new values on family size, acquire new knowledge on contraception methods and report increased contraceptive use. The studies that have found evidence to support assimilation hypothesis, indirectly support the association between migration and increased contraceptive use, regardless whether the reason is the new economic constrains on childbearing and increased cost of living, or increased knowledge and availability of contraceptive methods (Bach, 1981; Kulu, 2005; Chattopadhyay, et al. 2006; Lindstrom and Saucedo, 2002; Jensen and Ahlburg, 2004).

Few studies have directly looked at the association between migration and contraception. Moreno (1994) found migration to be associated with increased contraceptive use in Brazil. Lindstrom and Munoz-Franco (2005) find urban migration experience to be associated with increased contraceptive knowledge in Guatemala. They also find some evidence for increased contraceptive use among migrants, however they conclude that the positive association between migration and contraceptive use is contributable to the diffusion of information on contraceptive methods. Lindstrom and Hernandez (2006) also find positive associations between migration and contraceptive knowledge and use in Guatemala City, however it highly depends on the duration of migration and the type of destination. They explain that rural migrants arrive in urban areas with less knowledge and less ability to control fertility. However, with time they

acquire more information about the modern methods and their availability (Lindstrom and Hernandez, 2006).

It needs to be noted however, that these studies look at permanent migration. Spousal separation due to migration of one of the partners has been found to be negatively associated with contraceptive use. DeVanzo and Goldstein (1979), for example, in their study of female migrants find that migrants are significantly less likely to use contraception, although they are more likely to use modern contraception. They explain this negative association by the fact that migrant women in Thailand are more likely to be separated from their spouses before and after migration. In their study of Guatemalan migrants, Lindstrom and Munoz-Franco (2005) also find that women separated from their husbands due to migration (or for other reasons) are less likely to be using any contraceptive methods then those who are not separated. Evidence from South Africa also supports the negative impact of men's temporary migration on women's contraceptive use. Kaufmann (1998) explains that on the one hand women are less likely to use birth control because of lower coital frequency and therefore lower risk of pregnancy. On the other hand, he explains that the absence of men may increase the demand for children among women in unstable relationships as an insurance of labor and support in the future. A different explanation of lower use of contraceptives among migrants' partners has been offered by Hughes et al. (2006). They found that women were less likely to communicate about contraceptive methods with their spouse the less frequently they saw them. This kind of sexual communication can be an important determinant of contraceptive

use in the settings where women socially and economically depend on their husbands.

The research on migration and contraception remains very limited. Even less is known about the associations between migration and contraception in the former Soviet countries, which can be described as high-migration and low-fertility areas, with conservative views on birth control.

Contraception in Armenia

The reliable data on contraception prevalence in Armenia is limited and mostly come from the Demographic and Health Surveys (DHS). The 2005 Armenia DHS (ADHS) collected detailed information on contraceptive knowledge, current and previous use, attitudes towards contraception and the reasons for not using. According to 2005 ADHS the knowledge of contraceptive methods is very high in the country: although slightly lower in rural areas, about 97 percent of women have heard of at least one modern method, and on average currently married women know at least six methods. However, contraceptive use remains extremely low. While about 40 percent of married women have ever used a modern contraceptive method, only 19 percent of them are currently using (16% for the rural residents). The most widely used method among married women is IUD (9.4%), followed by male condom (8.1%).

More than one third of married women in the country are relying on traditional methods to control births, among which withdrawal is the most widespread. About 47 percent of married women are not doing anything to prevent pregnancies, and half of them do not intend to use anything in the future.

Among them the percent of those who would like to have more children is very low. Infecundity is the most often reported reason for not intending to use anything in the future, and about 16 percent mention opposition to use as their main reason. The motivations for contraceptive use are also explored in 2005 ADHS. It appears from the data that most women start using contraception to limit and less often to space their births. Less than two percent of all women reported starting contraceptive use before their first child.

The low prevalence of modern contraceptive methods and the widespread use of withdrawal as the main method for birth control result in high rates of induced abortions in the country. According to 2005 ADHS about 37 percent of all women have had at least one induced abortion in their lifetime, and the mean number of abortions per woman is about 2.6 on average. Abortion rates are much higher in rural than in urban areas, although for the youngest and oldest cohorts urban abortion rates are higher compared to rural abortion rates. Based on 2000 ADHS, it was found that more than half of women who had an abortion reported using traditional methods before the conception of their last aborted pregnancy, and only 9 percent reported using modern method (Westoff et al., 2002). This reveals that more than half of abortions were due to the failure of traditional birth control methods, and withdrawal in particular. Westoff et al. (2002) also reported that male condom failure rate was about 5 percent, while the reported failure rate for IUD was slightly over one percent. Similar to contraception, abortions are used mainly to limit fertility, and less often to space births. According to 2005

ADHS, percent of abortions before the first birth is only 0.6, and about 21 percent after the first birth, while more than 64 percent of abortions happen after 2 births.

The general attitudes toward abortion seem to be negative among majority of women in Armenia; however half of them would terminate their pregnancy if they became unintentionally pregnant. Two-thirds of women would prefer contraception to abortion, but at the same time, attitudes towards contraception are also negative due to health concerns, reliability of the modern methods and side effects (Westoff, et al., 2002).

Despite the detailed information on the contraceptive use and the implications of the lack of it, the consequences of male seasonal migration on contraceptive use have not been explored in DHS reports. To add to the research on migration and contraception, and to contribute to the literature on contraception in Armenia, as well as be able to understand the absence of the disruptive effect of seasonal migration on fertility in this part of the world, this study is looking at the effect of male seasonal migration on current contraceptive use and abortions history in rural Armenia. First, the effect of seasonal migration on current use of condoms and other modern contraceptive methods will be studied. Based on the previous research, we can expect women married to migrants to consider themselves at lower risk of getting pregnant than those married to no-migrants. On the other hand, couples with a seasonal migrant have less time in a given year for conception in order to reach preferred family size, therefore might have less motivation to prevent pregnancies than those not separated. It is also possible, that women with migrant partners will have less

power to negotiate birth control with their husbands than those married to non-migrants. Therefore, it is expected that husband's seasonal migration will be negatively associated with the use of modern contraceptive methods and positively associated with abortion rates.

Data and Methods

Both data from 2005 and 2007 surveys will be used in this study. Both surveys included information on current contraceptive use and complete history of pregnancies and pregnancy outcomes, as well as husband's migration history dating 5 years back from the survey.

Two approaches will be employed to test the hypothesis. First, husband's migration effect on woman's current modern contraceptive use will be explored. Second, woman's fertility history will be used to study the effect of husband's migration experience on previous contraceptive use. Since abortions in this setting have been shown to result from the lack of modern contraceptive use, rather than the failure of it, the history of abortions can be used as a proxy for studying the effect of husband's migration history on previous contraceptive use.

Women who were pregnant at the time of the survey will be excluded from the analysis of current contraceptive use. Since the rate of contraceptive use is extremely low before the first birth (ADHS 2005), only women with more than one birth will be included in this analysis. Similarly, since the rate of abortions was shown to be less than one percent before the first birth, only second and higher order pregnancies will be included in the analysis of abortions.

Migration and current contraceptive use. To test the hypothesis on the effect of husband's migration on woman's current contraceptive use random-intercept logistic regression is used. The analysis of modern contraceptive use will be divided into two parts. On the one hand, male condom use depends more on the husband, and can easily be continued to be used after long separation of the spouses, therefore it will be studied separately from other modern contraceptives. On the other hand, IUD, birth control pills or injections depend more on women and require continuous use even when the spouses are separated for some time during the year. These methods will be referred to as long-term contraceptives further in the paper. Therefore, two alternative outcomes will be used in this analysis: whether or not the woman reported condom use as her current birth control method (coded 1 if yes, and coded 0 if no); and whether or not the woman currently uses long-term contraceptives for controlling her fertility (coded 1 if yes, and coded 0 if otherwise). The main predictor in both models is husband's migration status in the year of the survey.

The models include the following socio-demographic controls: woman's age, age difference between husband and wife, woman's age at marriage, woman's and her husband's education, whether or not the woman is currently working outside of the household, whether or not she would like to have more children in the future (coded 1 if she does, and coded 0 if otherwise), and the number by sex composition of born children; economic variables, including monthly household income, household asset index per person, and number of rooms used for sleeping per person; and community level variables including the

number of households in the village and marz. The description of the measurement of control variables is presented in detail in the previous chapter.

The models are fitted using GLIMMIX procedure for random-intercept logistic regression in SAS, allowing the intercept of the outcome variables to vary randomly by village, to adjust for the village clustering. Equation (3) in Chapter 1 describes the logistic regression function for binary outcomes. In this analysis, logit(p) represents the probability of using modern contraception.

Migration and abortions. To test the effect of husband's seasonal migration on previous contraceptive use, random-intercept logistic regression is used as well, predicting the probability of a pregnancy ending in abortion. Thus, the unit of analysis here is the pregnancy. The dependent variable is a dichotomy, coded 1, if the given pregnancy ended in abortion, and coded 0, if otherwise. As mentioned before, only second and higher order pregnancies will be used in this analysis. The number of pregnancies is further narrowed down to the ones that have occurred within 5 years preceding the survey, if the marriage happened earlier than that. The reason for this is that migration history of the husband is available only for this period of time. This is acknowledged as a limitation of the study, however, it is also known that the latest events are likely to be more accurate. The main predictor is the husband's migration status in the year of pregnancy.

The control variables in this analysis include both time-varying and time-invariant variables: woman's age in the year of pregnancy, age difference between husband and wife, woman's age at marriage, woman's and her husband's

education, whether or not the woman was working in the year of pregnancy, and number by sex composition of children born before the given pregnancy. The economic variables include the household asset index per person and the number of rooms used for sleeping per person: the number of persons in the denominator for these two variables excludes the births that have occurred after the given pregnancy. On the community level, the controls include the number of households in the village and marz. In the process of analysis, the interaction term between migration status and the household wellbeing, measured through household asset index, was also added to the model. GLIMMIX procedure for binary outcomes is used here as well; here it allows the intercept of the outcome variable to vary randomly not only by village but also by woman, since the pregnancies are also clustered within women.

Results

Before presenting the results for multivariate analysis, it is worth mentioning the distribution of the outcome variables by husband's migration status, as well as the comparison of the contraception and abortion rates with 2005 ADHS nationally representative data, presented in Table 3-1. It shows that the percent of women reporting male condom or withdrawal as their current methods of contraception is much lower among women married to migrants, than among women married to non-migrants, which can be explained by the absence of the husband at the time of the survey. Thus, the share of women reporting male condom use is about 4 percent among women married to migrants and about 12 percent among women married to non-migrants. Despite the possible

underreporting among women with migrant husbands, the percent of those using male condoms in the survey is about the same as in 2005 DHS data (8.7 vs. 8.1 correspondingly). The percent of women reporting withdrawal as current method is also underreported in the survey, resulting in 12 percent, compared to about 28 percent reported in 2005 Armenia DHS data. The percent of those using IUDs is also much lower among migrants' wives than among non-migrants' wives, and the percent in the total survey is lower than the percent of IUD use in 2005 DHS survey (8.2 vs. 9.4 percent). Despite a few differences, close similarities can be detected between the contraceptive use in the survey and DHS survey. The distribution of abortion prevalence and mean number of abortions is also similar in the survey and 2005 DHS data. Consequently, the percent of women who have had at least one abortion and the mean number of abortions among those who have ever had one, is higher among migrant's wives than non-migrant's wives.

Table 3-1 The distribution of current contraceptive use by the type of method used in current study and in 2005 ADHS (in percentages unless noted otherwise).

	Combined 2005 and 2007 survey results			2005 ADHS
	Migrant husband	Non-migrant husband	All women	All married women
Male condom	3.9	11.9	8.7	8.1
IUD	5.8	9.8	8.2	9.4
Pills	0.9	2.0	1.5	0.8
Withdrawal	3.5	18.4	12.4	27.7
Have had an abortion	54.1	49.1	51.1	54.5
Mean number of abortions[a]	2.9	2.6	2.7	2.6

a- among those women who have had at least one abortion

Migration and current contraceptive use. The results of the analysis of migration and current contraceptive use are presented in Table 3-2. Model 1 shows the effect of migration on each of the outcomes of current contraceptive use, not controlling for other factors. It can be seen that husband's migration is significantly lowering the odds of currently using male condoms by about 70 percent, and the odds of using IUD, pills or injections by about 48 percent. The strong negative effect of migration on contraceptive use remains after adding the socio-economic variables to the analysis in Model 2. The results show that, compared to non-migrant's wives, the odds of using IUD, pills, or injections to control fertility are lower among migrant's wives by about 61 percent, net of other factors. Meanwhile, the odds of condom use are lower by about 67 percent, if the husband is a seasonal migrant, controlling for other factors. The results for both outcomes support the hypothesis, that seasonal migration negatively affects modern contraceptive use.

Among other significant determinants of modern contraception it is noteworthy that each additional year in woman's age decreases the odds of any modern contraceptive use by about 5 percent, net of other factors. This outcome could be expected, since older women in Armenia, especially in rural areas, have been used to relying on traditional methods of birth control, and may reject or find it more difficult to switch to modern methods than younger women. It is also possible, that at older ages, women consider themselves at lower risk of getting pregnant, and therefore underestimate their need for using contraception.

Tables 3-2 Random-intercept logistic regression results predicting current use of modern contraceptive methods (presented in odds ratios).

	Model 1		Model 2	
Independent variables	Long-term contracept.	Condom use	Long-term contracept.	Condom use
Husband's current migration status				
Non migrant (ref.)	1	1	1	1
Migrant	0.523 **	0.292 **	0.394 **	0.327 **
Woman's age			0.956 **	0.947 **
Age difference between husband and wife			1.000	1.008
Woman's age at marriage			1.004	1.002
Woman's education				
Secondary and less (ref.)			1	1
Vocational and higher			1.083	1.227
Husband's education				
Secondary and less (ref.)			1	1
Vocational and higher			1.497 **	1.513 *
Woman's work				
Not working (ref.)			1	1
Working outside of home			1.030	1.322
Number by sex composition of births				
2 and more children of both sexes (ref.)			1	1
One boy			0.720	1.103
One girl			0.443 *	0.618
2 and more boys only			1.073	0.978
2 and more girls only			0.999	1.574 †
Woman wants to have more children				
No (ref.)			1	1
Yes			0.790	0.967
Monthly household income (logged)			0.986	0.922
Household asset index (pp)			1.248	0.920
Number of rooms used for sleeping (pp)			1.208	0.606
Number of households in the village (100s)			0.963 **	1.001
Marz (region)				
Tavush (ref.)			1	1
Ararat			0.998	0.944
Gegharkunik			0.719 †	0.525 **
Number of cases	2104	2104	2072	2072
-2 Res Log Pseudo-Likelihood	10946.7	11376.7	10015.1	11421.9

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

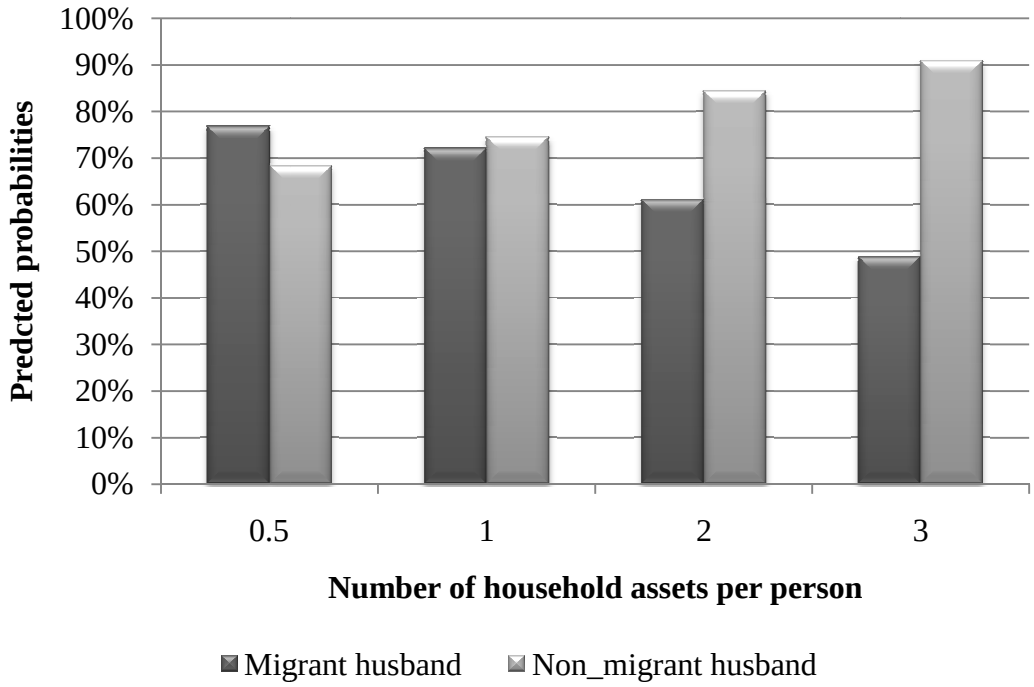
Migration and abortions. The results of the analysis of migration and abortions are presented in Table 3-3. Model 1 presents the baseline model, showing the effect of husband's migration on the odds of a pregnancy ending in abortion when no other variables are controlled for. The results show that the odds of a pregnancy ending in abortion increase by about 24 percent if the husband is a seasonal migrant in the year of pregnancy, not controlling for other factors. However, the effect is only marginally significant. The effect of husband's migration on pregnancy outcome is highly affected when the socio-economic variables are added to the analysis in Model 2. A detailed analysis revealed that the effect of husband's migration is mostly affected by the economic variables, and particularly by the household asset index.

To understand the interrelationships between migration, economic status and abortions, an interaction term between husband's migration status and household asset index was added to the analysis in Model 3. It appears that the effect of husband's migration on the odds of a pregnancy ending in abortion is moderated by household wellbeing. The results in Model 3 show that the main effect of husband's seasonal migration on the odds of an abortion is positive: the odds of a pregnancy being terminated through abortion is higher by more than 2.5 times for migrants' wives, than for non-migrants' wives, net of other factors. The main effect of household asset index (which is now the household wellbeing effect for non-migrants' wives) is also positive at a statistically significant level. The effect of the interaction term, on the other hand, is negative: each unit

increase in the household asset index in migrant households decreases the odds of a pregnancy ending in abortion by 67 percent.

For better understanding the interrelationships between migration, household wellbeing and abortion rates Figure 3-1 shows the predicted odds of a pregnancy ending in abortion by husband's migration status for selected low, average and high levels of household asset index. It can be observed that at the lowest end of household wealth the probability of abortion is higher among migrant's wives; however with increase in household wealth in migrant households the predicted probability of a pregnancy ending in abortion decreases, while the increase in household wealth in non-migrant households results in increased probability of a pregnancy being terminated through abortion.

Figure 3-1 Predicted probabilities of a pregnancy ending in abortion by husband's migration status at selected low, average and high levels of household wealth.



The odds of a pregnancy ending in abortion are also significantly affected by several socio-demographic factors. The pregnancies among women of older ages are more likely to be terminated through abortions, which could probably be explained by their lower use of modern contraceptives and more reliance on traditional birth control methods, which have higher failure rate. Age at marriage also appears to be a significant predictor of abortion rates. The negative association between age at marriage and odds of an abortion could be explained by the fact that women getting married at older ages have had less time to achieve the preferred number of children, and therefore their pregnancy is less likely to be unplanned or unwanted. The number by sex composition of children, unlike in the models predicting current contraception use, are significant determinants of abortions. Compared to having two and more children of both sexes, which is probably the most desired family size and sex composition of children for most couples, the pregnancy is significantly less likely to be aborted if it was preceded by only one child of either sex, or two and more girls only, although the negative effect is much stronger in case of having one child. At the same time, the effect of having two or more boys is not significant, most probably because it is also considered a desired completed fertility, similar to the reference category - having two and more children of both sexes. These results provide evidence that abortions are mostly used to limit fertility, probably after enough boys have been born, rather than space the births.

Table 3-3 Random-intercept logistic regression results predicting the pregnancy being terminated through abortion (presented in odds ratios).

Independent variables	Model 1	Model 2	Model 3
Husband's current migration status			
Non migrant (ref.)	1	1	1
Migrant	1.242 †	0.994 *	2.686 *
Woman's age		1.080 *	1.077 **
Age difference between husband and wife		0.986	0.983
Woman's age at marriage		0.923 *	0.925 *
Woman's education			
Secondary and less (ref.)		1	1
Vocational and higher		0.961	0.952
Husband's education			
Secondary and less (ref.)		1	1
Vocational and higher		1.080	1.057
Woman's work			
Not working (ref.)		1	1
Working outside of home		1.655 †	1.641 †
Number by sex composition of births			
2 and more children of both sexes (ref.)		1	1
One boy		0.019 * *	0.018 **
One girl		0.021 *	0.020 **
2 and more boys only		0.894 *	0.891
2 and more girls only		0.171 *	0.164 **
Household asset index (per person)		1.458 †	1.848 **
Number of rooms used for sleeping (per person)		0.641	0.703
Migrant*Assets PP		-	0.329 **
Number of households in the village (in hundreds)		1.023 †	1.024 *
Marz (region)			
Tavush (ref.)		1	1
Ararat		1.562 *	1.485
Gegharkunik		2.015 *	1.907 **
-2 Res Log Pseudo-Likelihood	8990.8	9989.8	10012.1
Number of pregnancies	2055	2053	2053

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

The effect of village size on the odds of abortion is positive, mirroring the negative effect on contraceptive use in Table 3-2. It was expected that in larger villages women might have better access to modern contraceptives, than in smaller villages, lowering the rates of abortions, which does not seem to be the case. It is possible, that in larger villages, the widely accessible health centers providing abortion services profit from it and fail to consult women on modern contraceptive methods or make contraceptives accessible for them. Whereas, in smaller villages, the health posts are not equipped to provide abortion services, but may offer family planning consultations and methods; therefore modern contraceptive use might be an easier option of birth control for women living in smaller villages.

Discussion

The research on migration and fertility has shown that in many cases permanent migrants from high fertility areas adopt new knowledge on modern contraceptive methods, form new values toward smaller family size and practice increased contraceptive use, assimilating to the fertility behavior in the areas of destination. The role of temporary migration, on the other hand, has been shown to be disruptive in contraceptive behavior. Either due to lower perceived risk of pregnancy, or desire to adjust for the lost conception time during husband's absence, seasonal migration was found to be negatively associated with contraceptive use among women left behind. However, the research exploring this association has been very limited. This paper contributes to the literature, by

adding evidence to the discussion on the association between seasonal migration and the use of modern contraceptive methods.

The results of this study agree with the previous research, finding strong evidence for a negative association between seasonal migration and modern contraceptive use. The negative impact is even stronger for condom use. While in case of long-term contraception it can be justified by regular spousal separations, the lower odds of condom use require different explanation. Migrants' wives might avoid the trouble of using long term contraceptives, since they are not going to need it for half of the year, during which the husband is away. Moreover, since the conception period is limited for couples with a seasonal migrant, migrants' wives may need to be able to get pregnant during husband's return period, if they desire to have more children. However, even lower use of male condoms, shows that more complex social dynamics are involved. It is possible, that migrants' wives are less likely to negotiate protected sexual intercourse with their husbands, either because they have less power as suggested by Hughes et. al (2007), or to show their trust in husband's fidelity or on the contrary, to prove their fidelity to the husband. For the sake of proving their fidelity or showing their trust in their wives, migrant men may also be less prone to using condoms during the intercourse with their wives, than non-migrant men.

More data is needed to understand the reasons behind it, however this study provides strong evidence that contraceptive use is much lower among migrant's wives than among non-migrants' partners. These results also shed more light on the findings from the previous chapter. Unlike the evidence from high-

fertility areas, no short- or long-term disruptive effects of seasonal migration on fertility in rural Armenia were found in the previous chapter. The negative association of contraceptive use among couples with seasonal migrants shows that the rates of yearly pregnancies are not significantly different between migrants' and non-migrants' wives probably because seasonal migration limits the number of pregnancies through limiting the exposure to conception, substituting what among couples with no seasonal migrants is being achieved by modern contraception.

The results of this study also add an interesting finding to the research on migration and contraception/abortions. There is evidence that the association between husband's migrant status and abortion rates is moderated by household wealth. Although causal links are not possible to establish through cross-sectional data, it was found that at lower end of household wealth abortion rates are higher among migrants' than non-migrants' wives. However, as the wealth increases, abortion rates decrease among migrants' and increase among non-migrants' wives. These results should be interpreted with caution, because the household wealth was measured at the time of the survey, while the history of abortions goes back for at least five years. Although household wealth is usually accumulated over long periods of time, and is not very likely to have changed significantly during the five years under observation, definite conclusions cannot be made based on this data. To understand these complex interrelations between wealth, migration and abortions, more data will be needed to be able to create causal links

between them. For now, these findings offer a new area in the research on migration and abortions or contraception.

While the findings from this study offer some explanations for the association between migration and fertility in low-fertility settings, they also raise other issues for concern. Migrants have been considered a high-risk group for HIV and other sexually transmitted diseases (STDs). Considerably lower use of condoms between migrants and their spouses raise the issue of making the left-behind women more vulnerable to STDs/HIV. Chapter 3 will be exploring this issue in more detail, by looking at the associations between male seasonal migration and the risk of sexually transmitted diseases among women left-behind.

Chapter 4

SEASONAL MIGRATION AND STD RISKS AMONG WOMEN LEFT BEHIND

Theoretical Background

The connections between migration and the spread of sexually transmitted diseases (STDs) have long attracted the attention of scholars and policymakers. Migrant populations are often reported to have higher prevalence of STD/HIV than non-migrant populations (De Schryver and Meheus, 1990; Mabey and Mayaud, 1997; Yang, 2004; He et al., 2005). Research on the association between migration and HIV/AIDS, one of the most often studied STDs, has long looked at migration as a link between high and low HIV prevalence regions, tracking the transmission of HIV infection from areas of migrant labor concentration to migrant labor reserve areas (Hunt, 1989; Quinn, 1994). However, studies have also suggested that geographic connectivity alone cannot explain the spread of HIV epidemic. Particularly, Decosas et al. (1995) suggested that the spread of the HIV was fueled mostly by certain types of migration, such as seasonal labor migration, female migration (often leading to transactional sex), and rural-to-urban migration.

A large body of literature has focused on migrants' STD/HIV risks. Some studies have found that migrants are more likely to engage in high-risk behavior, such as commercial sex, multiple partnerships or IV drug use than are non-migrants (Anarfi, 1993; Brockerhoff and Biddlecom, 1999; Lagarde et al., 2003; Coffee et al., 2005; Yang, 2004; Li et al., 2004; Liu et al., 2005; He et al., 2005;

Mtika, 2007; Yang et al., 2007; Agadjanian and Avogo 2008; Yang and Xia, 2008). Such elevated risks stem from the changes associated with migration—splitting of established sexual partnerships, relaxed social control, removal of many social taboos, as well as social isolation and marginalization of migrants in host communities (Matteelli and Signorini, 2000; Yang et al., 2007). Moreover, evidence from China suggests that migrants are more likely to engage in risky sexual behaviors when they become better off and their life becomes more stable in destination areas (Liu et al., 2005). He et al. (2005) also found higher prevalence of STDs among migrants with higher income and higher status and attributed this to greater opportunities for extramarital and commercial sex among more successful migrants.

A few dissenting studies have argued that migrants are, in fact, less likely to engage in risky behavior than non-migrants (e.g., Collinson et al., 2006; Mundandi et al., 2006; Yang and Xia, 2008). Thus Collinson et al. (2006) have found that migrants, compared to non-migrants, have higher perceptions of HIV risks, which makes them more careful in their sexual behavior. Yang and Xia (2008) observed that the higher level of risky sexual behavior among temporary migrants as a whole appears to be mainly attributable to female migrants' elevated proclivity toward risky sexual behavior. Male temporary migrants in their study actually scored lower on the risky sexual behavior index than did male non-migrants.

More recently, the focus in research on migration and STD/HIV has been expanded from migrants to their partners left behind. The nature of left-behind

partners' vulnerabilities and the mechanisms through which STDs/HIV spread among the partners of migrants are open to debate. Kishamawe et al. (2006) found that in couples, men and women who were resident and had a long-term mobile partner both reported more sexual risk behavior and also showed higher HIV prevalence than people with resident or short-term mobile partners. However, another study in South Africa showed no significant association between women's HIV status and their partners' migration (Lurie et al., 2002). That study found that the risks of women left behind were related to the number of their partners rather than to their partners' migration status. A further analysis of their data revealed that both migrant men and non-migrant women were more likely to get infected outside of marriage, irrespective of husband's migration status (Lurie et al., 2003). Moreover, the authors found that in one-third of discordant couples, non-migrant females were the ones to carry the virus. Likewise, Coffee et al. (2007) modeled the impact of migration on the HIV epidemic in South Africa to come to a conclusion that migration increases prevalence of HIV by increased high-risk sexual behavior among both migrants and their non-migrant partners.

These findings add an interesting nuance to the emerging debate on the association between STD risks and the gendered division of power and resources, as well as the issues of sexual negotiation between migrant men and their partners left behind. Women in general are biologically more susceptible to STDs/HIV, and their excessive vulnerability is often amplified by the social-cultural environments in which they live. In the settings where women are stigmatized for seeking or discussing information about sexual risks, women lack knowledge

about prevention and treatment of STDs/HIV (Gupta, 2000). Women's STD/HIV risks are often increased due to an unequal gender division of labor and power. Studies have found that women often are not able to negotiate safe sex practices or to refuse having sexual intercourse with high STD/HIV-risk partners because they depend on them economically and socially or are physically abused by them (Gupta, 2000; Weiss et al., 2000; Wingood and DiClemente, 2000). The gendered division of labor and power can be even stronger among couples with a migrant male partner. Hughes, Hoyo and Puoane (2006) found that women married to migrants in South Africa had higher risks of STDs as a result of reduced power for sexual negotiation, especially in cases of long separation. In their study, women who saw their husbands less frequently were less likely to communicate with them about STDs, HIV/AIDS, and contraception. Although these studies show that women with migrant husbands have increased risks of STDs/HIV, more research is needed to understand the mechanisms through which men's migration affects the spread of STDs among their non-migrant partners.

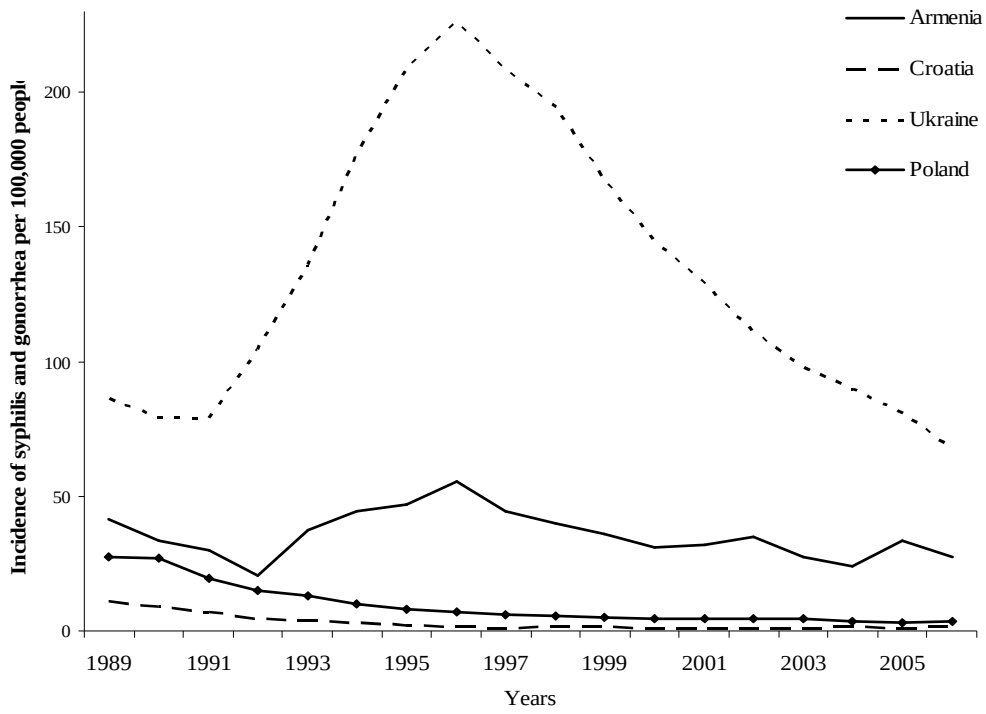
Overall, research on migration and STD/HIV has come to a relative consensus that risky sexual behavior triggered or facilitated by migration is the key factor in the spread of STDs/HIV. However, this consensus is based mostly on research in high HIV prevalence southern African settings. The rapid spread of the HIV/AIDS epidemic in southern Africa is believed to be largely explained by high rates of concurrent partnerships compared to other settings (Morris and Kretzschmar, 1995; Morris and Kretzschmar, 1997; Epstein, 2007). Differing patterns of sexual partnerships and of gender inequalities, therefore, can help

explain the levels of severity of the HIV/AIDS epidemic (Halperin and Epstein, 2007). These cultural and social dynamics exacerbate the vulnerabilities created by large numbers of young people, rapid urbanization, increasing mobility, and lack of STD prevention programs, diagnostic facilities, and effective treatment (Piot and Tezzo, 1990; Mabey, 1996). However, relatively little is known about how these factors play out in the spread of STDs and HIV in transitional countries that once constituted the Soviet Union. These countries have high rates of STDs (Kelly and Amirkhanian, 2003) and growing prevalence of HIV (Buckley, 2008). Some of these countries, especially those located in Central Asia and the Caucasus, have also experienced mass labor out-migration in the last two decades (Heleniak, 2008). Given the role of migration in the spread of HIV in other parts of the world and that migration from these countries is directed primarily to Russia and Ukraine, two countries with rapidly growing HIV prevalence, research on the connections between migration and STD/HIV risks in post-Soviet Eurasia is of utmost importance.

Sexually Transmitted Diseases in Armenia

Although HIV levels in Armenia still remain relatively low, Buckley (2009) reports that HIV incidence there and in the neighboring countries has been rising rapidly in the last few years. It has also been observed that increasingly more new HIV cases in the country are attributed to heterosexual transmission, expanding beyond core risk groups such as commercial sex workers and intravenous drug users (Buckley, 2008). Prevalence and incidence of sexually transmitted diseases other than HIV/AIDS in Armenia has been among the highest in Eastern Europe and Eurasia. Figure 4-1 presents the trends in incidence of syphilis and gonorrhea in Armenia between 1989 and 2006. For comparison purposes, Figure 4-1 also depicts trends in incidence of these STDs in selected East European countries. As shown in the figure, incidence of STDs in Armenia is lower than in Ukraine but higher than in Poland and Croatia (where incidence rates are similar to those in Western Europe). Notably, the incidence rates of the two diseases in Armenia increased greatly in the early years of independence, likely due to the socioeconomic collapse and resulting crisis in the healthcare system. Though the STD incidence rates have decreased gradually since then and are now close to the rates in pre-independence years (about 30 cases per 100,000 residents), they are high by the European standards.

Figure 4-1 Incidence of sexually transmitted diseases in selected countries for the years between 1989 and 2006 (newly registered cases of syphilis and gonorrhea per 100,000 people)



Source: Trans MONEE, 2008, Innocenti Research Center, UNICEF.

There is a dearth of scholarly literature on gender relations, sexual culture and marital partnerships in the country to help understanding the risks of STDs/HIV among Armenian men and women. A general picture can be drawn based on limited statistics. According to the 2005 Armenia Demographic and Health Survey (ADHS), knowledge of HIV prevention methods among men and women age 15-49 was 79.9 and 68.4 percent respectively. About 72 percent of women mentioned condom use as an HIV prevention method they knew; however, only 8 percent reported currently using condoms. The DHS also showed that multiple partnerships are not common among women. The share of women who reported more than one partner in the twelve months preceding the survey

was 0.1 percent, and this number mostly accounts for women's partnerships in the capital city. In contrast, men reported much higher numbers of multiple partnerships. Thus more than 12 percent of men reported having two and more partners in the past 12 months and only 76 percent reported condom use at last high-risk intercourse (with a non-marital partner). The average number of lifetime partners among men was 5.6, compared to only one partner among women on average (it is, of course, possible that women underreported their partnerships while men overreported theirs). Despite a considerably higher number of partners among men, women reported having much higher number of STDs and STD symptoms than did men (NSS RA et al., 2006). The ADHS also found that about 35 percent of women with diagnosed STDs or STD symptoms did not seek treatment, echoing the literature that stresses limited health care resources for testing and treating STDs, especially in rural areas (Buckley, 2009; Papoyan, Arakelyan and Bakshinyan, 2005).

Gegharkunik *marz* (province), where the data used in this study were collected, is one of the poorest provinces of Armenia. Gegharkunik's soil and climatic conditions, unfavorable for agriculture, and shortage of non-agricultural employment have long pushed its men to look for jobs elsewhere, primarily in Russia. As a result the province has one of the highest rates of labor migration in the country (Yeganyan and Shahnazaryan, 2004). Gegharkunik is also believed to have among the highest STD/HIV incidence and prevalence levels in Armenia (Papoyan, Arakelyan and Bakshinyan, 2005; NSS RA et al., 2006). According to the 2005 ADHS, Gegharkunik had by far the highest share of women with STD or

STD symptoms—19.8% percent (compared to 14.0% in the second highest region). In addition, the share of men reporting multiple partnerships and high-risk intercourse in the twelve months preceding the survey was also among the highest in Gegharkunik, whereas no woman there reported having had more than one partner during the same period (NSS RA et al., 2006).

Although some data on STDs in Armenia exist, the associations between male seasonal migration and STDs among women left behind remain understudied. This study adds to research on risks of STDs among women left behind in rural Armenia, and more broadly, contributes to our understanding of how migration shapes socioeconomic and health vulnerabilities in developing and transitional settings. This study poses two main questions: 1) Is male labor migration associated with increased STD risks among women left behind in rural Armenia?; and 2) How does household income affect the relationship between husbands' migration and the STD risks of their left-behind wives?

Though the literature is inconclusive, most studies, as shown in the review above, tend to conclude that labor migration is associated with elevated risks of STDs among migrants and, by extension, the risks of STDs among migrants' wives, relative to women whose husbands do not migrate. Hence, it is expected that women married to migrants will have significantly higher STD risks than women married to non-migrants, net of other factors. Several studies reviewed above also suggest that STD risks among migrants are positively associated with their socioeconomic status. Again, because migrants' risks are assumed to translate into their non-migrating partners' risks, it is expected that STD risks

among women will increase with rising incomes in migrants' households. Conversely, it is not expected to find a similar effect of household income on women's STD risks in non-migrant households.

Data and Methods

Information on women's sexual health and the history of STD diagnosis was only collected in 2007 survey. Therefore only 2007 data will be used in this study. It might be considered a limitation compared with the studies from previous chapters, where data from different regions was included in the analysis. However, the region covered in 2007 survey was strategically selected due to its higher STD and seasonal migration rates compared to other regions of the country. This provides us with better chance to detect any association between male seasonal migration and STD prevalence that would have been more difficult in other parts of the country.

To assess the exposure to STD risks among the survey respondents, two outcomes are used based on respondents' reports. The first outcome is whether or not a woman reported having been diagnosed in the three years preceding the survey with at least one of the following STDs: gonorrhea, trichomoniasis, chlamydia, syphilis, and HIV/AIDS. If the woman had been diagnosed with at least one of these diseases, the variable is coded 1, otherwise it is coded 0. The second outcome is the number of STD symptoms in twelve months preceding the survey reported by respondents. To construct this variable a syndromatic approach is used, i.e., an approach that relies on symptoms reported by individuals rather than on the results of STD tests. This approach was first

introduced by the World Health Organization in 1991, as a more cost-effective method for identifying and treating STDs in developing countries (WHO, 1991). Despite the continuing debate around this approach, it has been shown to be an effective method for STD identification and treatment in resource-poor settings. The main symptoms used in this approach include: pain during urination, ulcers or sores in the genital area, itching in or around the vagina, vaginal odor or smell, vaginal bleeding, and abnormal discharge from the vagina. However, the algorithm based on vaginal discharge has been shown to be a poor predictor of STDs (Bosu, 1999; Pettifor, et al., 1999). Thus, the second outcome is the number of the STD symptoms listed above, excluding abnormal vaginal discharge, that women reported having in the twelve months preceding the survey.

The two outcomes therefore approximate STD risks differently both in terms of definition and in terms of time period. Although the first outcome is a more accurate measure of STDs as it refers to diagnosed diseases, it may under-represent incidence of STDs. To be diagnosed with a disease women need professional health care intervention. Due to limited health care facilities in the region, lack of knowledge about STDs and stigma associated with them, women may be unable or unwilling to go to a health facility to get tested for STDs. In contrast, the syndromatic approach may more fully capture the cases of untested STDs but, at the same time, may overestimate the incidence of STDs as some of the reported symptoms may be STD-unrelated. These issues are acknowledged as limitations of the study.

The different specification of the two outcomes also calls for different estimating approaches. Thus to model the reported diagnosed STDs, a dichotomous outcome, logistic regression is used. The second outcome is a count variable and it is modeled using negative binomial regression[8].

The main predictor in both models is the husband's migration status. Because having been diagnosed with an STD refers to the previous three years, husband's migration status for this outcome is measured as a cumulative number of years spent in migration during those three years. The possible value range is therefore from 0 to 3. For the next outcome – the number of STD symptoms in the twelve months preceding the survey – the husband's migration status is operationalized as whether or not the husband was a migrant in the year 2007.

The second predictor of interest is household economic wellbeing. In the analysis predicting the number of symptoms three variables are used to control for household wellbeing: Household monthly income, household asset index per person and number of rooms used for sleeping per person. In the model predicting being diagnosed with an STD only the last two are used, since, the outcome variable is measured over the three years, and household income was measured at the time of the survey only. Although household index and number of rooms for sleeping were also measured at the time of the survey, they represent the cumulative wealth of the household over a few years. To smooth and normalize its distribution household income is logged. The log-transformation of income

[8] Negative binomial regression is preferred over Poisson regression due to the overdispersion of the outcome variable.

results in a continuous variable with values ranging between 2 and 9. In addition to modeling main effects of the husband's migration status and household wellbeing, to test the second hypothesis the effect of the interaction between the two predictors on the outcomes of interest is also studied. In the model predicting the number of symptoms, the interaction between husband's migration status and household income is tested, and in the model predicting diagnosed STDs, the interaction between husband's migration status and household asset index is tested.

The models include several individual-, household-, and community-level characteristics as control variables. The individual characteristics are woman's age, age difference between husband and wife, woman's age at marriage, woman's and her husband's education, whether or not woman is working in the time period under observation (in 2007 for the symptomatic model and in the last three years in the diagnosed STD model), and the total number of children under age 18. The models also control for past abortions. Abortion can be associated with STD symptoms in a variety of ways: it can follow a pregnancy resulting from unprotected intercourse with an infected permanent or casual partner or lead to an infection if done outside a proper medical setting. Post-abortion complications can also be confounded with STD symptoms. The variable is coded 1 if the woman ever had an abortion, and 0 if otherwise.

To account for village clustering, these models are fitted using the GLIMMIX procedure for binary and negative binomial distributions in SAS. The equation for the binary outcome is similar to Eq. (3) described in Chapter 1,

where logit(p) will be the probability of having been diagnosed with an STD in the last three years. The equation for the negative binomial regression is described in Chapter 1 (Eq. (1)), where $\log(\lambda_i)$ in this model will be the expected number of STD symptoms for individual i.

Results

Table 4-1 shows the results of logistic regression models of diagnosed STDs and Table 4-2 the negative binomial regression models of reported STD symptoms. Both tables present exponentiated regression coefficients. For the STD diagnosis model, the presented results are odds ratios and should be interpreted as increase or decrease in the odds of having been diagnosed with an STD associated with a unit increase in the continuous independent variable in question or, for categorical variables, with being in a given category relative to a reference category. The results for the negative binomial regression of the number of reported STD symptoms presented in Table 4-2 are incidence rate ratios, which indicate changes in the predicted number of reported symptoms associated with a unit increase (being in a category relative to a reference category) of the corresponding predictors. The results of both tables provide support for the first hypothesis. Model 1 in each table is the baseline model, with the husband's migration status as the only predictor.

Table 4-1 Random-intercept logistic regression results predicting being diagnosed with an STD in the last 3 years (presented in odds ratios).

Independent variables	Model 1	Model 2	Model 3
Husband's cumulative migration years	1.969 **	2.069 **	2.083 **
Woman's age		0.996	0.996
Age difference between husband and wife		0.976	0.976
Woman's age at marriage		1.078	1.079
Woman's education			
Secondary and less (ref.)		1	1
Vocational and higher		0.618	0.618
Husband's education			
Secondary and less (ref.)		1	1
Vocational and higher		0.898	0.898
Woman's work			
Not working (ref.)		1	1
Working outside of home		2.298 †	2.096 †
Number of children under age of 18		0.863	0.863
Ever had an abortion			
No (ref.)		1	1
Yes		2.387 *	2.386 *
Household asset index (pp)		1.135	1.147
Number of rooms used for sleeping (pp)		0.426	0.427
Migrant*Assets PP		-	0.992
Number of households in the village (in 100s)		0.863 *	0.863 *
-2 Res Log Pseudo-Likelihood	8122.13	8554.32	8554.70
Number of cases	1240	1233	1233

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

The results for Model 1 in Table 4-1 (STD diagnosis) indicate that each additional year of the husband's migration in the three years preceding the survey increases the odds of a woman having been diagnosed with at least one STD in the same time period by 96 percent ($p \leq 0.01$). In the case of the number of STD symptoms (Model 1 in Table 4-2), being married to a current migrant increases the predicted number of reported symptoms by about 16 percent ($p \leq 0.05$). The results are essentially the same when the husband's migration status a year earlier is used as the predictor (not shown). After the control variables are added to the analysis (Model 2 for each table), the effects of the husband's migration status remain statistically significant: net of other factors, a year increase in husband's migration experience in the past three years twice increases the likelihood of having been diagnosed with an STD during the same period at a statistically significant level (Model 2, Table 4-1); being married to a current migrant significantly increases the odds of reporting an additional STD symptom in the past twelve months by about 15 percent (Model 2, Table 4-2). The variables of household wellbeing show no significant effect on either outcome, net of other factors.

To test our hypothesis about the difference in the effect of household income on STD risks between migrants' wives and non-migrants' wives, the interaction between husband's migration status and household wellbeing is added to both the diagnosed STDs and STD symptoms models. The interaction term between husband's cumulative migration experience and household asset index in the diagnosed STD model shows no significant association (Model 3, Table 4-1).

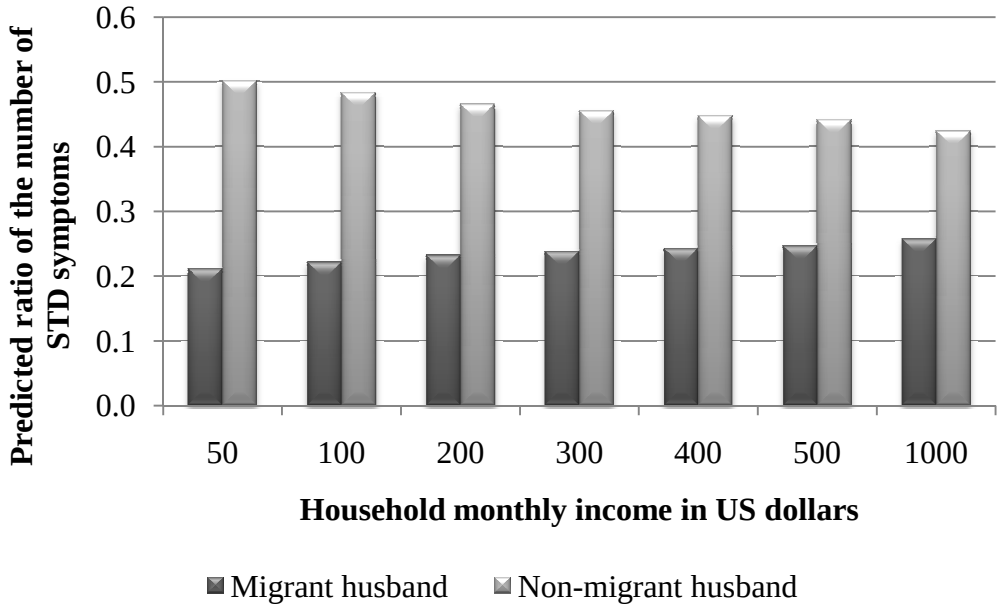
Table 4-2 Random-intercept negative binomial regression results predicting the number of STD symptoms in the last 12 months (presented in log-odds).

Independent variables	Model 1	Model 2	Model 3
Husband's current migration status			
Non migrant (ref.)	1	1	1
Migrant	1.164 *	1.149 *	0.127 **
Woman's age		1.016 **	1.016 **
Age difference between husband and wife		1.004	1.005
Woman's age at marriage		0.965 *	0.968 *
Woman's education			
Secondary and less (ref.)		1	1
Vocational and higher		0.939	0.953
Husband's education			
Secondary and less (ref.)		1	1
Vocational and higher		1.015	1.026
Woman's work			
Not working (ref.)		1	1
Working outside of home		0.913	0.916
Number of children under age of 18		0.970	0.976
Ever had an abortion			
No (ref.)		1	1
Yes		1.397 **	1.382 **
Monthly household income (logged)		0.954	0.787 **
Household asset index (pp)		0.910	0.906
Number of rooms used for sleeping (pp)		0.789	0.789
Migrant*Income			1.549 **
Number of households in the village (in 100s)		0.977 *	0.976 *
-2 Res Log Pseudo-Likelihood	4097.4	4105.9	4088.3
Number of cases	1240	1233	1233

Notes: Significance levels ** $p<0.01$, * $p<0.05$, † $p<0.1$
(ref.) – the reference category

However, the effect of husband's migration experience on being diagnosed with an STD in the last three years shows that the odds are twice as high for migrants' partners as for non-migrants' partners, controlling for other factors. When the interaction term between husband's migration status and household income is added to the model predicting the number of STD symptoms (Model 3, Table 4-2), an instructive pattern emerges. The main effect of husband's migration status on the predicted number of symptoms is now negative: being married to a migrant decreases the predicted number of STD symptoms by about 87 percent. The main effect of income (which now represents the income effect for wives of non-migrants) is negative and statistically significant. Each unit increase in the logged monthly income is associated with 21 percent lower incidence rate ratio of STD symptoms, controlling for other factors. The effect of the interaction term is positive and also statistically significant: each unit increase in migrant household's logged income increases the predicted number of STD symptoms by about 55 percent, net of the main effect of income and other factors. Figure 4-2 presents the graphic illustration of the predicted incidence rate ratios of STD symptoms by husband's migration status for selected levels of household monthly income for better understanding of the associations between husband's migration status, household income and woman's STD risks. The increase in the predicted number of STD symptoms for migrants' wives and the decrease in the number of STD symptoms for non-migrants' wives with increase in monthly household income is clearly visible on Figure 4-2.

Figure 4-2 Predicted ratio of the number of STD symptoms by husband's migration status for selected levels of household monthly income.



The effects of other variables included in the models should also be mentioned. As anticipated, having had an abortion, an indicator of unprotected sexual intercourse or a possible cause for the STD-like symptoms, exerted a significant positive effect on the predicted number of symptoms. Woman's age and age at marriage were also significant determinants of STD symptoms, but had no effect on the diagnosed STDs. Working outside of the household shows positive effect on diagnosed STDs, but the effect is only marginally significant. It is possible, that working women have larger social networks, where they can obtain information about STDs and STD care. For both outcomes, living in larger communities shows significant negative effect. On the one hand, it is possible that women living in larger communities have better access to health care facilities, so they maintain better sexual health. On the other hand, the village size might stand for some unobserved differences that affect women's STD outcomes.

Discussion

This study makes a contribution to the scant literature on STD/HIV risks among women with migrant partners. These findings agree with those studies that suggest that women with migrant partners have higher risks of STD/HIV than those with non-migrant partners (e.g., Hughes, Hoyo and Puoane, 2006; Kishamawe et al., 2006). Indeed, studies that have not detected such a relationship and instead have found that women's STD/HIV risks were associated with multiple partnerships regardless of their partners' migration status were done mainly in sub-Saharan settings (e.g., Lurie et al., 2002; Lurie et al., 2003), where women's extramarital partnerships are much more common than in settings like Armenia. Although, the direction of transmission of STDs between the husband and the wife is not possible to capture through our data, we are inclined to believe that women's increased risks of STDs are more likely to be a result of risky behavior of their migrant partners rather than of their own extramarital sexual ties.

This study also offers an interesting addition to the literature by suggesting that the association between male migration and left-behind women's STD risks may be moderated by economic status. The causal link between migration and income is hard to capture through cross-sectional data. On the one hand, higher income may facilitate migration, but on the other hand, migration increases household income. However, regardless of the direction of this association, this study shows that income has different effects on STD risks of women with migrant and non-migrant husbands. In fact, when income is low, and consequently migrants' access to commercial and other transactional sex is

limited, husband's migration may be a protective factor against STDs, perhaps as a result of decreased sexual contact between spouses. However, as migration-derived income rises, husbands' migration is likely to increase the STD risks of their left-behind wives. As previous research has shown, migrants with higher income are more likely to engage in high HIV-risk behavior than migrants with lower income (Liu et al., 2005; He et al., 2005). Higher income affords migrants more opportunities for high-risk behavior in places of migration destination, (in contrast to non-migrants, who are under stronger social control in local communities), and therefore leads to higher infection rates among them and, consequently, among their non-migrant wives.

Increase in risks of women married to economically successful migrants, may also be related to the effect of migrants' income on gender relations. Research on gender inequalities and risks shows that women often fail to negotiate sexual practices due to economic dependency on their partners (Gupta, 2000; Weiss et al., 2000; Wingood and DiClemente, 2000). Thus, higher income and greater material comfort derived from migration may result in decreased power for sexual negotiation among migrants' women. Therefore, on the one hand, higher income of migrants may translate into larger remittances and better socioeconomic conditions for their left-behind households, but on the other hand, it may also result in higher risks of STDs for migrants and for their non-migrant wives. This tradeoff between material comfort and sexual health risks adds another nuance to the complex picture of the effects of men's migration on their

left-behind wives painted in previous studies (e.g., Salgado de Snyder, 1993; Aysa and Massey, 2004; Menjívar and Agadjanian, 2007).

Looking at this finding in the context of significant interactions between migration and household wellbeing, found in the study of abortion rates in the previous chapter, suggests that the lower odds of abortions among better-off migrants' wives might be associated with lower probability of terminating the pregnancy, even if the pregnancy was not planned, rather than with increased contraceptive use among them.

The model predicting STD diagnoses did not point to any significant interaction between the two predictors. It is possible that the difference between the results of the two models is due to the time frame—current year vs. last three years—used for the operationalization of both the main predictor, husband's migration status, and the outcomes. The difference may also have resulted from the different nature of the two outcomes. Thus it is possible that migrants' wives are more likely to report an STD diagnosis because they have greater awareness of risks and therefore are more likely to get tested for STDs. In any case, the inconsistency between the results of the two models calls for caution in their interpretation.

Despite this inconsistency, however, the results of this study do suggest that seasonal male labor migration increases STD risks of women left behind. While further research is needed to fully examine the connections between male migration and STD/HIV risks of non-migrating partners and other household members in Armenia and similar post-Soviet settings, the findings of our study

illustrate the importance of these connections for policy. Given the persistently high levels of international labor migration in the region, high STD rates, and rapidly rising HIV levels, prevention programs should target both migrants and their non-migrant partners. Yet, to be effective these programs should also heed the complex transformations that migration introduces into the household economy and gender relations in origin areas.

Chapter 5

CONCLUSION

The study of international migration has been the focus of researchers for a few decades. Various theories have been developed to explain how migration flows start and continue in different socio-economic and political contexts. The consequences of migration, and especially the economic consequences of migration, have also been thoroughly studied. However most of this research has focused on the implications of migration from the destination point of view. Fewer studies have looked at the impact of migration on the origin countries. The issues of seasonal or temporary type of migration, especially, have been less attractive to researchers, than permanent migration. At the same time, very little is known about migration processes and its consequences in such a large part of the world that once constituted the Soviet Union. . In these countries migration processes have been strongly regulated by the state during the Soviet era, and were later shaped by the economic factors, including the differences in the labor supply and demand across different countries, and socio-political and economic situation of the newly independent countries. The devastating socio-economic crisis after the collapse of the Soviet rule was followed by major changes in the population dynamics, including migration flows. Nevertheless, the issues of migration in the post-Soviet area have remained understudied.

To fill this major gap in the literature and to be able to understand the implications of migration processes in post-Soviet countries, this dissertation looked at the consequences of seasonal labor migration on the fertility,

contraception and the risks of sexually transmitted diseases among left-behind women in rural Armenia, one of the former U.S.S.R. countries. The dissertation consisted of three interrelated but at the same time independent papers, that combined provide an understanding of the impact of seasonal migration on the origin settings.

First of the papers on migration and fertility looked at the effect of male labor migration on the yearly pregnancies, lifetime fertility and fertility preferences in the rural sending areas of Armenia. The results of this study showed that seasonal migration does not disrupt fertility of left-behind women either in short, or in long run, unlike in high-fertility areas. The findings of this study rather suggest that reverse causation between migration and fertility might be possible: seasonal migration might be employed by the households with slightly higher fertility. However, the reverse causation in this association could not be established in this study due to cross-sectional nature of the data and limited history of husband's migration. It was also found that migrant men have higher fertility preferences than non-migrant men, probably because of the promise of better socio-economic future that labor migration holds.

Below-replacement level of fertility in the country and the findings from first paper suggest that the role of contraception in the associations between migration and reproductive behavior and outcomes should not be overlooked. Second paper in Chapter 3 looks at the effects of seasonal migration on contraceptive use among women left behind. The findings provide strong evidence that women with migrant partners are about 3 times less likely to use

condoms, and 2.5 times less likely to use other modern contraceptives, such as IUD, contraceptive pills and injections, than women married to non-migrants. The findings from the study on migration and abortions, as an indirect measure of previous contraceptive use, have also revealed the complex interrelationships between migration, abortions and household wellbeing. It was found that the association between migration and abortion rates is moderated through household wealth. While household wealth decreases the rate of abortions in migrant households, the effect is reversed for non-migrant households. Despite the significant results, the cross-sectional nature of the data does not allow making definite conclusions on the causal associations between migration, abortions and economic wellbeing. More data on the history of economic status of the household along with the history of seasonal migration and reproductive behavior and outcomes is needed to be able to understand these complex associations.

The evidence on the negative effect of migration on modern contraceptive use, and condom use in particular, raise the issue of sexually transmitted diseases in the context of seasonal migration, which is further explored in Chapter 4 of the dissertation. The findings from this study show a strong evidence for the increased risks of STDs among migrants' wives, compared to non-migrants' wives. The results of this study also revealed complex associations between migration, STD risks and household economic wellbeing. Increased income is found to be associated with lower STD risks among non-migrants, but it is increasing the STD risks among migrants' wives.

The findings from all three studies show that seasonal migration processes, shaped by the changed socio-economic situation in the country, have affected the livelihoods of those left behind. Although it does not have disruptive effects on already below-replacement-level fertility in Armenia, it increases the risks of sexually transmitted diseases among left-behind women by lowering modern contraceptive use. Studying and understanding the process of seasonal migration and its consequences further in Armenia is of upmost importance, as seasonal migration is expected to be growing in the future. On the one hand, labor shortage in rural areas and the economic hardships related to it will drive the breadwinners of the households out of the country, on the other hand, the social networks of migrants and the institutional agents involved in international labor migration will encourage future migration flows by decreasing the risks and costs related to migration process and increasing the benefits of it. The migration process, rooting deeper in the everyday life of the families, generates new behavior and coping mechanisms among those left behind, avoiding the disruptive consequences on the one hand (e.g. fertility), and dealing with newly created problems, on the other (e.g. sexually transmitted diseases). These findings are important not only for Armenia, but also for other former Soviet republics, where similar processes of labor migration have been developed in the last two decades (Heleniak, 2008) and where the most preferred country of destination for labor migrants is Russia or Ukraine (Zhakevich, 2008), two countries with rapidly growing prevalence of HIV. The findings on the associations between migration and fertility can also contribute to our understanding of the effects of migration on

fertility in similar low-fertility settings, which have been understudied in the literature.

The results of the studies conducted in this dissertation also offer a new perspective in understanding the effects of migration in the origin countries. They suggest that the research on labor migration should consider the differences between the economic statuses of the migrants. The effect of seasonal migration on women left behind shows dissimilar results for successful and less successful migrants. The economic success of migration helps the households cope with the economic difficulties in the region, and creates more opportunities for their families, while affecting gender roles and decreasing women's power to negotiate the health risks created by migration. This finding adds a new perspective to the research on migration processes and its consequences in the origin settings.

The findings of this dissertation also have some implications for the social policy. First, the results agree with the national data on overall low levels of modern contraceptive use, although the high rates of abortions indicate that there is unmet need for it. Therefore, there is a need to develop actions, increasing modern contraceptive use among rural population. Since women with migrant partners report even lower rates of modern contraceptive use, considering themselves at lower risk of pregnancies, and because they show higher STD risks, the social policy on increasing contraceptive use, and especially male condom use, must especially target women with migrant partners. Although the availability of modern contraceptives should also be increased, more important is increasing the awareness of the high failure rate of using traditional methods of

birth control and possible negative implications of abortions for the reproductive and sexual health of women. Actions are also needed to increase migrant men's awareness of contracting STDs outside of marriage and of the risks imposed to their wives. These actions will help minimize the negative effects of seasonal migration on reproductive behavior and outcomes among women left-behind, as well as prevent the possible spread of STDs and HIV in the country.

A few limitations of the studies must be acknowledged. Although the data for this dissertation came from three different regions with characteristics distinct from each other, it is not representative of the whole country, which does not allow making conclusions on the national level. The future research on the effects of seasonal migration on those left-behind in similar settings will benefit from using nationally representative data.

While the data for this dissertation included full reproductive histories of women, the migration history of their husbands was collected only for limited time period. Therefore, the time-span of the analyses in this dissertation was limited only to the time period for which husband's migration history was available. Other important determinants, such as economic characteristics, were only collected at the time of the survey. However, it was established that economic wellbeing plays an important role in the associations between migration and the main outcomes. Longitudinal data will help study these complex interrelationships between migration and economic status in more detail and understand how wellbeing moderates the associations between migration and contraception, or STD risks.

Despite of some limitations, the findings presented in this dissertation provide a valuable contribution to the scarce literature on the consequences of seasonal labor migration for the countries of origin. They also suggest new perspectives for studying the consequences of migration that have been overlooked in previous studies. This dissertation also adds to our understanding of the demographic processes in the part of the world that, despite being an epicenter of drastic socio-economic and political changes for the last two decades, has not been properly studied.

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APPENDIX A

THE POLITICAL MAP OF ARMENIA

Source: http://www.ezilon.com/maps/europe/armenia-maps.html