

Fertility behavior in Armenia and Moldova: The decline during the post-Soviet transition and current preferences

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Abstract

In the context of a unanimous fertility decline across the post-communist countries of the former Eastern Bloc, this paper analyzes the fertility decline in Armenia and Moldova using 2005 DHS data. Easterlin's (1976) hypothesis about the negative impact on fertility of lowering living standards is contrasted with Becker's (1960) theory of opportunity costs. In the first case, we would expect to see women with lower potential resources suppress fertility, according to their expected trends, because of the hardship brought on by the economic transition, especially for those with fewer skills. Conversely, opportunity costs would impact women with the highest earning potential. Specifically, the extent of parity declines is analyzed during the transition from communism, with special attention given to identifying women for whom parity declines were greater. The conditions under which women currently want children are also analyzed to determine if a relationship exists between economic conditions and the desire for another child or the desired timing of childbirth. Declines in parity progression ratios since 1986 reveal a greater loss for women with vocational education rather than higher education or only secondary. Logistic analyses of current fertility preferences suggest that women who are working are more likely to want a second birth in both countries, while the wealthiest women in Armenia have higher odds of wanting a third birth. Armenian women have higher odds of wanting to postpone the next birth if their partners are unemployed, while Moldovan women who are working prefer to postpone their next childbirth.

According to national statistics, fertility declined across the entire region of the former Eastern Bloc during the transition from communism. Countries with fertility already below replacement level experienced declines to below “lowest-low” fertility levels of 1.3 children per woman, as did some countries that had fertility above replacement level before the transition. This research takes advantage of rich survey data on two under-studied countries in the region—Armenia and Moldova—to contribute to the debate on the fertility decline in the post-soviet countries. Using Demographic and Health Survey (DHS) 2005 data for Armenia and Moldova, I examine elements of the fertility decline in the last 2 decades, as well as current preferences toward childbearing.

The path to a restructured economy was tumultuous for both Armenia and Moldova. At the time of Soviet dissolution, Moldova was the wealthier country of the two in terms of GDP per capita: 2,650 US\$ PPP in 1991 vs. 2,400 in Armenia. However, by 1994, Armenia’s GDP per capita surpassed Moldova’s, which has still not recovered. As of 2004, Armenia’s GDP per capita was 4,101 US\$ PPP while Moldova’s was 1,729. Therefore, substantial divergence emerged during the transition from communism, albeit similar economic starting points.

DHS data provide detailed information about population, health, and nutrition in countries where these issues are especially important. The 2005 Armenian and Moldovan DHS are nationally representative surveys of 6,566 women aged 15-49 in Armenia and 7,440 women in Moldova. The DHS surveys have a very high response rate: 95.1 in Moldova and 96.9 in Armenia (nevertheless, sample weights are used in all analyses). These data provide rich information to analyze fertility histories and current fertility preferences.

Two distinct aims structure this paper. First, characteristics of the fertility decline during the transition are assessed as well as for whom the decline was greater. The second purpose is to identify important determinants of current fertility preferences. I first set the stage with background information and an overview of what we already know about the fertility decline in Armenia and Moldova from secondary sources. I also review theories about the determinants of

fertility and research related to the post-communist region to provide a framework for analyzing empirical evidence. I next analyze changes within subgroups of women, which may tell us for whom the decline in childbearing was the greatest and for which parity births. The following analysis focuses on the role of socioeconomic characteristics in determining fertility preferences for having a/another child and the preferred timing for the next child. Although the forces behind fertility decline are loosely addressed when discussing results of the descriptive analyses over time, only with more current and comprehensive data are we able to test relationships between fertility behavior and multiple covariates. The findings of these explorations are considered comprehensively in the conclusions section.

Background. Both Armenia and Moldova claimed independence in 1991, following the fall of the Soviet Union and neither had a peaceful start to independence. Moldova experienced internal conflict over the eastern region of Transnistria, in which over 1,000 people were killed or injured. Armenia experienced conflict as well, although not within its own borders; the Nagorno-Karabakh armed conflict between Armenia and Azerbaijan began in 1988 and ended with a ceasefire in 1994 after thousands were killed and over a million Armenians and Azeris displaced.

Armenia has 3.2 million inhabitants in a geographical area of almost 30,000 square kilometers (National Statistical Service et al. 2006). The country is divided into 11 regions and 64% of the total population lives in urban areas. Similarly, Moldova has a population of 3.4 million—excluding the region of Transnistria—covering almost 34,000 square kilometers (NCPM & ORC Macro 2006). The majority of the population in Moldova (58%), however, resides in rural areas. Almost 95% of Armenians are of the Armenian Apostolic religious tradition and another 4% are of other Christian denominations (CIA Factbook 2008). Around 95% of Moldovans are Orthodox Christians. The two countries are similar in many ways.

According to national statistics offices, Armenian TFR declined from 2.6 in 1991 to 1.4 in 2004 and Moldovan TFR declined from 2.3 to 1.3 (Transmonee Database). However, the TFR

for Armenia and Moldova, according to DHS 2005 data calculated over the last three years, is the same: 1.7. This estimation is much higher than what official reports indicate, indicating that either the DHS samples are not representative or official statistics were calculated with incorrect information. The first possibility is unlikely due to the nature of the DHS sample selection design but the latter explanation is possible, especially in turbulent times when migration is difficult to monitor and, thus, the denominator in calculating age-specific fertility rates is incorrect. Without survey data on reproductive behavior for the early part of the 1990s and since national statistics greatly differ from survey data calculations, it is not clear exactly how much the TFR has changed since the onset of transition from communism.

What we do know about TFR changes over time in Armenia and Moldova is limited and comes from only a few sources. Armenian 2000 DHS data (National Statistical Service et al. 2006) indicate that there has been no overall change in fertility levels in the last five years. According to the 1997 Reproductive and Health Survey in Moldova, which excludes the lower rates of Transnistria, fertility was around 1.9 to 2.0 in 1997 (NCPM & ORC Macro 2006), which indicates decline in at least the last 8 years. Given the diverse, limited, and sometimes contradictory information on fertility declines in these countries, one of the primary goals of this paper is to definitively show evidence of a decline.

Understanding changes underlying fertility decline requires disentangling multiple mechanisms. Fertility decline can occur for different reasons, such as fewer children desired, postponement of the first child—which can lead to both a distortion of period fertility measures and fewer children ever born—and greater access to fertility control. DHS data do not indicate a dramatic shift in contraceptive uptake by cohorts over the last decade. Westoff et al.'s (2002) study on the relationship between abortion and contraception in Armenia using Armenian DHS data for 2000 also do not indicate that a massive shift in fertility control has occurred in Armenia.

Research on the desired number of children in the post-communist region has yielded interesting findings. Lithuanian surveys found a significant drop in desired number of children shortly after the transition: from 2.8 in 1988 and 1990 surveys to 2.1 by 1995 (Stankuniene 1997). According to a 1994 micro-census in Russia, women expected to have, on average, 1.7 children during their lifetime, but actually desired to have 1.9 children (Borisov 1997 in Antonov 2001). In reality, the TFR for Russia was 1.4 in 1994 and continued to decline to 1.17 in 1999.

Explanations have emerged to help us understand why women may want to have fewer children than previous cohorts or why they may postpone childbirth. The debate in fertility research from developed countries currently involves two theoretical perspectives: van de Kaa's (1987) Second Demographic Transition (SDT) and Becker's (1960, 1981) micro-economic theory of the family. SDT theory posits that fertility will decline to levels below replacement level, as in the case of Armenia and Moldova, due to women shifting toward post-materialist values that are attached to greater individual autonomy (Lesthaeghe & Neidert 2006). The transition from communism brought increased female enrollment in higher education and increased political and economic decision-making power in most post-communist countries. Therefore, we must consider the possibility of a SDT and attempt to disentangle the impact of SDT from economic forces.

The plausibility of a SDT in Armenia and Moldova is jeopardized by a theoretical element of SDT theory—post-materialism—and an important symptom of SDT—postponement. Changes in women's fertility behavior are argued to be related to value shifts that occur when material needs are no longer a focus in life, hence “post-materialism”. But along with an increase in autonomy, the transition brought radical social change, severe economic crisis, and uncertainty about the future. Material needs likely became a greater focus during this time, rather than less; the economic shock of transition increased difficulty in maintaining economic stability for many households through rising unemployment, inflation and decreased value of

wages. Postponement of first birth, also an important part of SDT, does not fit either at first glance. According to national statistics, the average age of Armenian mothers at first birth held remarkably stable: 22.5 in 1991 and 22.7 in 2004 (Transmonee Database). A somewhat greater age growth is evident in Moldova: from 22 in 1998 (the earliest year available) to 23.6 in 2004. However, the majority of this increase took place in the last year: from 22.4 in 2003 to 23.6 in 2004. These considerations cast doubt on the likelihood that a fertility decline can be explained as a SDT for Armenia and Moldova. However, the shift that has very recently taken place within Moldova may foreshadow other SDT components.

Hotz, Klerman, and Willis (1997) summarize the micro-economic theory of fertility decline as being “the result of variations in family incomes and the “prices”, or opportunity costs of children” (p. 276). Outside the current mainstream economic debate is an alternative explanation offered by Easterlin (1976). His theory of the conflict between aspirations and resources predicts that if women or families experience a conflict between the level of resources at their disposal and the level to which they are accustomed, they will cease to expand their family. Although living standards were notoriously low under the Soviet regime, the early years of transition saw tremendous decline in the value of wages and increases in job loss. Therefore, it is plausible that resources dropped to a lower level than individuals were accustomed. Over time, Moldova saw recent recovery in terms of real wages that Armenia has not experienced, reaching 99.5% of the value of wages at 1989 by 2004, where Armenia had only recovered 45.6% of real wages by this time (TransMonee Database). Conversely, although employment levels have continued to decline in both countries over the 1990s and early 2000s, Armenia barely leads in 2003 at 69.6% of its 1989 employment status and Moldova at 64.8%.

Easterlin’s aspirations/conflict theory is similar to Becker’s theory on the direct costs of children in regards to the direction of the relationship proposed; childbearing ceases if the cost outweighs the perceived benefits of the child. As the economic situation deteriorated, children likely became more expensive, possibly leading those with fewer resources to forego having

another child. The Easterlin theory and direct cost theory are distinct from Becker's opportunity cost theory in that opposite relationships between resources and children are predicted. A negative relationship would exist if opportunity costs played the main causal role, with women of higher earnings capacity being less willing to have children due to the costs associated with opting out of the labor market. In this sense, evidence in support of one theory is evidence against the other. These two distinctive relationships form the basis for interpreting changes in fertility behavior and preferences of women with different levels of education and resources.

In summary of the basic information we have about the two countries, I offer some stylized facts and implications. Despite economic growth in Armenia, there has been little wage recovery over the years following the most tumultuous time of the transition. This may increase the likelihood that women will choose to not participate in the labor force, as their reservation wages are likely not being met in the market. Indeed, the 2005 DHS finds only 27% of women aged 15-49 working. Unfortunately, the non-working population cannot be separated according to those that are unemployed and those that are not participating in the labor force on the basis of DHS data. The World Bank (2008) reports 48% of all Armenian women participating in the labor force in 1990, 41.5% in 1995 and 45.5% in 2004. Evidence exist then that women have retreated from the labor market during the transition to capitalism as well as experienced high rates of unemployment, which are estimated at 64% of all registered unemployment (World Bank 2001). As long as the market wage is not a real competitor for women's time, women likely remain outside the labor force or employment, leading to a possible return to the breadwinner model. If this is the case in Armenia, the most important determinants of childbearing are likely related to direct costs; moreover, the level of resources received through partners' employment may be more important than the respondents'.

The Moldovan case shows the opposite scenario in one regard: wage recovery has occurred even if employment levels have not returned to levels preceding the transition to capitalism. This indicates that jobs are also scarce in Moldova, but quite valuable; therefore, a woman who

is in the labor force is more likely to earn a wage that surpasses the value of her non-labor time, hence, opting out on her reward from the labor market is more likely to incur opportunity costs than her Armenian counterparts. These scenarios draw on “stylized facts” because we lack information on women’s income and whether or not they are unemployed or not participating in the labor market. Therefore, the facts provide a rough structure of what we may expect to see in the two countries: namely, the impact of direct costs in Armenia and opportunity costs in Moldova. To see these mechanisms at work, I conduct each analysis according to variations in earning power or resources among the women.

With these expectations in mind, I turn to the question of whether the decline in socioeconomic conditions impacted fertility behavior by checking whether women with lower resources had fewer children than their previous cohorts or if women with more resources were the ones that had fewer children than their previous cohorts. The question is a matter of degree, since it is assumed that instability and uncertainty, along with greater educational attainment for women, likely impacted women in all social strata. Some research has attempted to answer this question for the Russian case by focusing on the birth risks and concluded that negative economic circumstances for individual women is not a determinant of declining fertility, since women with fewer resources have a higher risk of having another child (e.g., Kharkova et al. 2000; Kohlman et al. 2001; Kohler et al. 2002). However, these findings only confirm that women with less means are still more likely to have more children than women with greater means, a relationship that has been robust across countries and time, except in very recent years. Rather, I estimate in which subgroup of women fertility declined to a greater extent.

I assess degrees of fertility decline by analyzing completed fertility at age 35. Women may still become pregnant after the age of 35, but family size has generally been achieved by this time. If patterns were to hold stable over time, the excluded births are negligible losses; i.e., 15 births per 1000 women in the 35-39 age group in Armenia and 4 births in the 45-49 category

(National Statistical Service et al. 2006), and 13 and 4 births in Moldova, respectively (NCPM & ORC Macro 2006).

The oldest cohort of women, who were 49 at the time of interview, turned 35 in 1991, the year the Soviet Union dissolved. Hence, this analysis offers results that tell us mostly about the changes in fertility patterns before the transition began, since only the women reaching 35 in the years after 2000 made the majority of their fertility decisions during the 1990s. The following figure includes information on highest educational level achieved, consisting of women with secondary or lower education level, secondary special education or higher education. In Moldova (as described in NCPM & ORC Macro 2006), completing compulsory education entails completion of at least nine grades. Secondary special education is an option after finishing secondary school that takes 2-3 more years and provides specialized training in a field requiring specific skills such as nursing, agriculture, construction, etc., and qualifies the graduate to work in these fields. Higher education attainment means the student completed 12 years of schooling, or primary education and a secondary special education, and continued on to a university. In Armenia (as described in National Statistical Service et al. 2006), compulsory education is completed in the 8th year of education. Students at this point may finish general secondary education or choose secondary special, which includes professional-technical training and training for mid-level qualifications such as teachers, midwives and mechanics. Secondary special education takes either two or four years, depending on whether the student joins secondary special education after the 8th grade or the 10th grade. Higher education includes those who have completed a full secondary education and attend a university. Figure 1 tells us for which women the greatest decline in completed fertility occurred for women before the transition from communism and the first cohorts of women who experienced childbearing during the transition.

Figure 1 about here.

The table clearly shows that an educational gradient in fertility existed before the transition began and persists. Particularly in Moldova, the differences in the number of children women had was great: In the first cohort of women, those with secondary or less education had on average 2.4 children, women with specialized secondary education had 2.2, and women with higher education had 1.8 children. In Armenia, the initial gradient was minimal, in which the difference between the least and most educated women was .2 children. However, Armenia exhibits great volatility over the years, especially in regards to women with higher education. Also noticeable is that decline in the average number of children women had was minimal until 2000; namely, the cohorts that began their childbearing as the transition from communism commenced.

Taking a three year average at the beginning and end of the series (not displayed in Figure 1), the relative rate of change among these groups of women shows two patterns. In Armenia, the overall relative rate of decline was 23% for the highest educated women, while the change for women with secondary or specialized secondary education was only 1.5% and 2%, respectively. The relative rates of decline were much greater overall in Moldova, but in this case women with specialized secondary education experienced the most significant decline: 17% compared to 8.5% for secondary educated women and 16% for higher educated women. In terms of absolute changes, rather than relative, the greatest losses in average number of children per woman reaching 35 each year was .47 for the highest education subgroup in Armenia, followed by .36 for the secondary special education subgroup in Moldova.

To include younger cohorts than those who have turned 35 by the time of the DHS interview and further analyze changes over this time period, I next assess changes specific to each parity progression, using parity progression ratios (PPRs), which are displayed in Figure 3. Since most of the action appears to revolve around changes in the second (1-2) and third (2-3) parity progressions, these are the foci of this analysis. Fourth births would also have been interesting to analyze, considering that almost 8% of currently married women in Moldova and

over 10% in Armenia have given birth to four or more children. However, the sample of women who have a fourth birth is too small to yield significant associations with personal characteristics.

PPRs are the “proportion of women of a given parity who go on to have another child” (Hinde, 1998, p.109). The PPRs calculated here are period PPRs rather than cohort PPRs and combine “true PPRs” with “synthetic PPRs”. True calculations include data up to a ten year period, following a birth in a certain year. In order to calculate PPRs that are more recent than ten years ago, the synthetic method allows efficient use of the up-to-date data that is available, even if the complete ten year time-series is lacking (see also Ní Brolcháin, 1987).

PPRs are presented for the years 1986-2005. Of particular interest are when the greatest decline in second and third births occurred and for whom. In contrast to the last empirical analysis of changes in fertility patterns according to educational levels, an issue of sequencing exists here. It is almost certain that women at the age of 35 have finished their education, whereas parity progression ratios are calculated for all women at a specific parity, regardless of age. Therefore, educational level may be assigned to women who have not yet finished their education. In this sense, the results are to be interpreted cautiously, as some women may not have completed their education by the time they are included in the parity progression ratios. However, as these analyses are descriptive, no direction of causality is assumed.

Figure 2 about here.

In terms of timing, Figure 2 shows sharp declines in the percentage of women who go on to have a second or third birth occurred in various years in the two countries. If economic crisis were to be an important factor, we would expect to see two declines: the first should occur around 1991-4, while the second should occur around 1998. This pattern does not clearly emerge, but a sharp decline does appear in many cases before 2001. However, the interpretation of timing may not be straightforward, as it may be the PPRs for women who had the initial

births two years or so before the crisis years that would deviate from the trend since they are the ones who would have had the next birth in crisis years.

More consistently, declines and increases in PPRs occurred almost simultaneously for the two parities within education groups. For example, the trajectory of PPRs after 1993 for women with secondary special education is quite similar for those having a second and a third child within Armenia and Moldova. The 2-3 PPR trajectory for higher educated women mirrors the 1-2 PPR trajectory in Armenia after 1994, as does the 2-3 PPR trajectory of higher educated women in Moldova after 1991 mirror that of the 1-2 PPRs. This indicates experiential cohesion among women of the same educational groups according to time, which points to important contextual changes that were specific for these different groups of women, regardless of their parity.

To identify which group experienced the greatest overall decline, I again use three year averages for the first and last years to smooth fluctuations. The following table summarizes information related to overall declines.

Table 1 about here.

If we believe the transition impacted all women similarly, we might have expected changes to be similar across all subgroups—or a gradient among the changes as well, in which higher educated women might decline more due to an increase in opportunity costs. However, the summary statistics in Table 1 show that neither of these expectations hold.

Armenia experienced less of a shift in childbearing patterns across the transition for the 1-2 parity progression than Moldova. An inverted U-shaped relationship appears by education within Armenia in which both secondary/less educated and higher educated women had a smaller loss in PPRs than women with secondary special education. The decline in the 1-2 PPR was 0.96 to 0.9 for secondary or less educated Armenian women and 0.95 to 0.87 for higher educated women, compared to a decline of 0.93 to 0.69 for secondary special educated women. These results contradict what we would expect based on the previous findings in which the

secondary special educated women in Armenia had the most minimal decline in average number of children. This may be due to the relative importance of this parity decline in relation to total loss in number of children born to women, or it could reflect an entirely different process, which was brought about by the inclusion of women who were having these births during the years of the transition. This analysis is more effectively capturing the “transition effect”, since few women in the last analysis would be having their first child in these years. This different pattern indicates a dramatic shift in patterns from pre to post-transition eras in Armenia.

In Moldova, the results were as we would expect from the last analysis: secondary special and the highest educated women experienced a similar decline in 1-2 parity progressions: 0.39 and 0.31, respectively. Moldovan women with secondary special education experienced a decline from 0.81 to 0.42, while the decline was from 0.73 to 0.42 in the highest education group and 0.82 to 0.59 in the lowest education group.

The decline in the 2-3 PPRs was greater across the board in Armenia than in Moldova, for which both countries demonstrate more volatility than the 1-2 PPRs. In Armenia, the 2-3 PPR was remarkably similar for all women: 0.6 for women with secondary and secondary special educational levels and 0.58 for the highest educated women. By 2003-2005, the PPRs for the highest and lowest educational categories were 0.28 and .25, respectively, and the secondary special education PPR was 0.23. The decline was greatest for women with secondary special education at 0.37 and almost an equal loss of parity progression occurred for other women: 0.32 for the lowest education groups and 0.33 for the highest. In Moldova, the disparity among educational groups is greater to start with but is also greatest by the end of the decline in 2005. The PPRs from 1986-1988 are 0.48, 0.39 and 0.19 for secondary, secondary special and higher educated women, respectively, and 0.24, 0.02 and 0.03 by 2003-2005. The declines in PPRs for the lowest and highest educational groups were 0.24 and 0.16 respectively, and the greatest loss was found in the middle education category with a decline of 0.37.

The previous discussion focused on absolute changes in the proportion of women having a further birth. In terms of relative changes, the finding that women with secondary special education experienced the greatest decline in parity progressions does not change. But the relative declines are greater than the absolute declines for women with the highest education level. In Armenia, the relative declines for parity 1-2 were -6.25%, -25.81% and -8.42% for secondary, secondary special and higher educated women, respectively, and -53.33%, -61.67% and -57% for the 2-3 parity, respectively. In Moldova, the relative declines for parity 1-2 were -28.05%, -48.15% and -42.47% for secondary, secondary special and higher educated women, respectively, and -50%, -94.87% and -84.21% for the 2-3 parity, respectively.

These results reconfirm the findings of the previous analyses in Moldova but indicate other patterns for the more recent fertility developments in Armenia; namely, the greatest loss in fertility occurred for the secondary special educated group according to second and third births. The lowest and highest educated women had remarkably similar rates of decline in Armenia for both second and third birth progression, while the lowest educated women had a lesser decline in second births but a greater decline in third births than the highest educated women in Moldova.

In summary of these descriptive analyses, on the basis of Figures 1 and 2, we now know that the decline in the number of children born to the 1956-1970 cohorts has evolved in a way that has not eradicated the educational gradient. The PPRs indicate that the decline in Armenian TFR was likely driven by fewer third births than before the transition, while the decline in Moldovan TFR seems to be driven more by fewer second births. Moreover, women with secondary special education consistently had the most significant decline among all women of both countries for both the second and third progressions. Interpreting this observation in terms of the opportunity cost theory and the direct cost and conflict/aspirations theories is more complicated. If the scenarios based on stylized facts are justifiable, then both mechanisms may be working in tandem. At the risk of being speculative, women with lowest education may not

have been able to find lucrative employment during the transition and left the labor force. Because of this, they were able to continue previous childbearing patterns at a more similar rate since their value in the labor market was such that opting out did not incur great loss, nor greatly impact the balance of direct costs. However, women with secondary special education, who had received job-specific training, may have received a return to their job-specific education that was high enough to surpass their reservation wage; hence, they remained in the labor market. But this wage may not have been high enough to allow them the level of resources on which they previously lived, possibly leading these women to have fewer children than women of the same educational level in the past.

The previous analyses have given us detailed information about past fertility trends in Armenia and Moldova. However, the determinants of fertility behavior can only be assessed when covariates match the timing of the behavior. Studying current preferences will yield information that makes use of the rich information available at the time of the interview. Therefore, I now analyze the social determinants of current fertility preferences in Armenia and Moldova.

Method

Two different dependent variables will be analyzed. The first analysis will identify determinants of the desire to have another child (0=does not want another child or has been sterilized, 1=does want another child) using discrete samples based on whether the respondent has one or two children at the time. A disparity between fertility preferences and actual fertility is well known. Blake (1967 in Macunovich 1998) argues that analyzing the timing of desired childbirth helps to qualify analyses of fertility desires. Therefore, the second dependent variable is the preferred timing of the next birth. The sample for this model includes women who indicate they would like another child. Rather than split the sample according to parity, all women who desire another birth are pooled together in this model. To control for the impact of parity and time lapsed since the last birth, two control variables are included; time since last

birth is also included in the first model predicting desire for a/nother child. This dependent variable takes the value of 0 if women prefer to have the next child in the next two years or the value of 1 if they prefer to wait more than two years.

In this sample, descriptive results show a surprisingly high number of women who prefer to wait more than two years to have the next child: for second births, these percentages are 58% in Moldova compared to 42% who want to have a child soon and 68% vs. 32% in Armenia. It may be that postponement, once a childbearing career has begun, reflects different determinants of childbearing than those of the preference to have another child. Timing of the next childbirth may reflect not only the strength of the intention, but also how conditional it is. For example, it may be that women with high opportunity costs are more reluctant to have a child, but once they have the first child and decide to have another, they may be less likely to postpone because they are less likely to have uncertainty about being able to provide for another child; moreover, the next birth is less likely to require a significant sacrifice in current living standards than their poorer counterparts. Hotz et al. (1997) see spacing working in two ways: 1) rising income increases the incentive to space births since parents will prefer to have the next birth when income is high and 2) parents will wait until the price of having another child is low, according to the cost of the mother's time. The strategy to use timing as a dependent variable along with preference for another child also mirrors the strategy of Philipov, Spéder and Billari (2006) in their analysis of fertility preferences in Bulgaria and Hungary. The present study follows their lead by confirming the importance of analyzing factors that contribute to not only quantum but tempo.

The independent variables included in the models are grouped according to three categories. The first category includes characteristics specific to the women and includes age, education level and employment status. Age is divided into seven five-year categories to absorb variation in its impact. The categorization of educational levels has been described in a previous section. In Armenia, 46% of the respondents have only a secondary education or less compared to 60%

of Moldovan respondents. However, almost the same share of women reaches higher education in both countries: 20% in Moldova and 21% in Armenia. The major educational difference between the two countries, therefore, is the extent to which women choose specialized secondary training in Armenia: 34% vs. only 21% in Moldova. Armenian women appear then to have more occupation-specific skill development.

Occupational status is measured in terms of working or not. Ideally, the indicator would have three categories: not participating in the labor force, unemployed or working. However, the questions in the survey do not allow for such precise coding. Thus, the coding is 0= not working and 1= working. As 60% of the women are working in Moldova vs. only 28% in Armenia, we can expect to see very different patterns in family formation strategies. To gain some insight into who the working women are, the following figures offer supplementary information about the working and not working samples of women that are included in the regression analyses. Figure 3 shows working and not working women according to the distribution of wealth by households. In Armenia, little difference exists according to wealth among the women who work; the women of the richest ranking lead in the share of women working by 8 percentage points, compared to women of the poorest ranking. A greater difference exists for Moldovan women, in which the richest women lead the poorest women in the share of women working by 18% points.

Figure 3 about here.

Figure 4 displays the distribution of educational attainment according to work status. If education endows women with higher skills to be utilized in the labor force, we would expect to see women working more as their educational level increases. This is the case in Armenia, in which the expected gradient exists and fewer women with secondary education worked than women with secondary special or higher education; however, the difference in the share of women working with secondary special and higher education was minimal. Moldova displays a different trend, in which the greatest share of women working was out of those with secondary

special education rather than higher education. As mentioned, the women who are not working may not be unemployed; rather they might not want employment. Women with the highest skill levels might also have married a man with higher skills, reside in a household with greater wealth, and hence, be more comfortable in opting out of the labor force to spend time in home production.

Figure 4 about here.

Age at first cohabitation was thought to possibly be an important indicator due to its obvious impact on the family formation process and what it might tell us about the respondent.

However, Pearson's correlation scores show that this variable is highly correlated with age in Moldova (.53) and, thus, is excluded from the models. Finally, months since last birth is included, as well as age at first birth, as control variables. Because the relationship between desire for another child and months since last birth is not likely to be linear, I also square this indicator.

These indicators of personal characteristics give us tools to control for obvious aspects that would influence childbearing, as well as to test the impact of opportunity costs, through education and employment status. The second group of explanatory variables includes household characteristics: household size, urban or rural location, and wealth ranking. Household size averages 5.03 persons in Armenia and 3.96 persons in Moldova. The wealth indicator is an estimation based on asset accounting and a multi-step index calculation (Rutstein & Johnson 2004). The wealth index value has been classified into three-level quantiles: poorest, middle and richest. These indicators essentially attempt to identify a lack of resources to test Easterlin's and the direct cost hypothesis, as we can assume that the greater the household size, the lower the wealth ranking, as well as residing in a rural area, the more likely the household to have fewer resources.

The final variable included is related to the woman's partner: partner's occupational status. This indicator is coded similarly to respondents' work status, but is less problematic than the

indicator for women because men are not as likely to remain outside the labor force, which means that “not working” implies unemployment with less ambiguity. 10% of Armenian partners are unemployed, as are 11% of Moldovan partners. This variable offers an additional dimension to assessing the impact of household resources, which may be more relevant to immediate economic conditions. Partner’s preference for having more children is also an important covariate; however, the survey captures this preference only as it is related to the respondent’s preference (i.e., partner prefers more or less children than the respondent), rendering the indicator endogenous with the dependent variable of preference for a/another child. Partner’s educational attainment is not included either, due to collinearity with respondents’ educational attainment—0.56 in Armenia and 0.54 in Moldova.

The final sample used in this analysis includes only those respondents who have at least one child and are in unions at the time of the survey. 38% of the Armenian sample and 34% of the Moldovan sample are not living in a union. Women who were not in unions were highly likely to answer these questions with “undecided” or “waiting until married,” and were therefore excluded. To analyze the determinants of women who would like a second or third child means that we are excluding women who do not have a first or a second child, thus creating selection bias. The characteristics of women who do not select themselves into motherhood may correlate with the characteristics of women who prefer to have a second or third child. Women have also selected themselves into the analysis of desired timing for the next birth, since they all prefer to have another birth.

Despite the likelihood of selection bias, the rho (correlation of the residuals of the two equations used in the Heckman probit selection model) was consistently insignificant, even with different specifications of the selection equation. This means independence of the two equations cannot be rejected and that selection bias is not influencing the results. This is not unexpected for the sample of women with one child—analyzed for preferences of a second child—as having at least one child remains mostly universal. However, we would expect a selection

process in regards to the sample in which women have two children and the desire for a third birth is analyzed. This was not the case though and, in fact, does not bode well for the findings, since if there are specific determinants of the desire to have a second or third child, then these determinants should appear as selection bias. Finally, because Heckman's selection corrections were not necessary, the probit model was exchanged for logistic, yielding results that can be understood in terms of relative likelihoods.

Results

The results presented in Table 3 show few statistically significant relationships for the variables that are theoretically important.¹ In the results of the model for the desire to have a second birth, whether the respondent is working or not is significant in both countries and is in the same direction: working respondents have higher odds of wanting a second child than non-working women. The lack of other significant variables is surprising in and of itself, but more so because it is true for both countries. Despite the decreasing likelihood that all women will have a second birth and the prevalence of women who currently prefer not to have a second birth (24% of women with one child in Armenia and 40% in Moldova), this preference varies little according to the characteristics that are represented in the model. However, this does somewhat explain the lack of selection bias for those women who have a second birth and are asked about their preference for a third child.

Table 2 about here.

85% of women with two children in Armenia prefer not to have a third child, while 89% of Moldovan counterparts feel the same. Preference for a third child appears to be influenced by at least one theoretically interesting characteristic in Armenia. Armenian women in the richest wealth ranking had 63% higher odds of wanting a third child than women in the poorest wealth ranking. Although the wealth indicator indicated a relationship of the same direction as in Armenia, in which wealth is positively related to preference for a third child, no variables

¹ Age was statistically significant, but the results are not discussed here, since they were as expected and provide a control for the other variables of interest.

related to the hypotheses proved to have a statistically significant relationship with preference for a third child in Moldova.

Table 3 presents the results of a logistic regression in which the same characteristics are regressed on the likelihood to want the next child later than two years.² In this case, the reference category is “wanting to have the child within two years,” so the outcomes are referred to as sooner or later, with the odds ratios predicting “later”. The number of children the woman already has is included as an important control variable, since women of all parities are pooled in this analysis. The number of months that have passed since the last birth took place is again included, along with a squared term, and age at first birth as control variables. The impact of these variables, except age at first birth, is remarkably similar across the two countries. Whether or not the respondent’s partner was working at the time of the survey was significant in Armenia; the odds are lower for respondents with working partners to prefer to have another child later than those whose partners are not working, all else held constant. In contrast, whether Moldovan respondents are working matters rather than their partners: the odds are higher for women who are working to prefer to have the next child later rather than sooner in comparison to non-working women. The only other significant variable related to the research questions of this study is whether the respondent resides in an urban or rural area. In Armenia, women in rural areas had half the odds of urban women for preferring to wait more than two years for the next child. In other words, different spacing preferences are observed in Armenia among rural and urban women, all else constant.

Table 3 about here.

Discussion

² As in the case of the regressions on fertility preference, these regressions also proved not to be biased by selection. The selection effect in these models is likely captured by the control variables of number of children, age at first birth, and when the last child was born.

Armenia and Moldova are analyzed in this study in the effort to contribute to research on the fertility decline that occurred across the region that transitioned from communism in the 1990s. A contraceptive revolution does not seem to have taken place, as far as the extent of changes in fertility control methods. A second demographic transition is also not a likely culprit in these two countries, as postponement of first birth has been nonexistent for the most part. Therefore, this analysis has explored two themes to determine whether opportunity costs or direct costs of childbearing or a conflict between aspirations and resources may have played a role: 1) the characteristics of the fertility decline during the transition from communism according to subgroups of women, and 2) the determinants of current fertility preferences in Armenia and Moldova.

During the transition, childbearing rates according to education level changed dramatically for both Armenia and Moldova. Women who completed their childbearing mostly before the transition from communism display an educational gradient in how many children they had, in which women with higher education had fewer children than women with secondary education. After the transition from communism began, fertility declined for women of all education levels. Interestingly, a consistently high decline in parity births occurred for women with secondary special education, or job-specific education. This finding is interpreted as possibly reflecting the earning power of women with job specific education in comparison to women with only secondary education: whereas labor force participation may not have been worthwhile for women with only secondary education—enabling these women to continue childbearing in a less disrupted pattern—women with job specific education were able to reap sufficient rewards from the labor market to stay engaged, but not sufficient to secure a lifestyle conducive to having children at the same rate as before. This interpretation is corroborated by the less dramatic decline for women who have higher education in Armenia and Moldova for both the second and third parity progression.

Findings on current fertility preferences must be qualified before being summarized. The inability to distinguish unemployment from not participating in the labor force renders this analysis particularly susceptible to issues of endogeneity, as women who prefer to have more children may also prefer not to join the labor force. However, results do not indicate the possibility of bias in that direction. Women who are working prefer to have a second birth more than women who are not working in both Armenia and Moldova. Work status does not appear to be important for either countries in regard to third birth preferences. Women's employment matters to the timing of fertility intentions in Moldova, by delaying the desired timing; but when the partner is working in Armenia, respondents prefer to have the child sooner rather than later. When wealth matters to fertility preferences, being wealthier than the poorest group of women increases the desire for another child.

Education itself was not an important determinant of current fertility preferences, likely because other covariates absorbed the impact of education. Since a positive relationship between education and fertility is a common sign of selection bias, this is further evidence that the results should be free of selection bias.

Urban and rural differentials were not observed in current preferences for another child, but were observed for timing preferences in Armenia. Rural women preferred to have the next child sooner than urban women. While women in rural areas may have fewer resources, the interpretation of this indicator is not straightforward.

In summary, this analysis contributes some evidence that the decline in fertility over the transition and current low preferences for children are not easily explained by opportunity costs. The findings related to employment status indicate that women prefer to have more children when they are contributing to household income, which is evidence that direct costs are important to the desire for a second child rather than opportunity costs. Also, lower potential earnings—measured through education—seem to have furthered the fertility decline that occurred during the transition while lower household wealth currently decreases the odds that

women will want children. The suspicion that women play a less central role in bringing in household income in Armenia materialized in the analysis, as partners' employment status mattered more to the timing of the next childbirth, whereas women's employment mattered more in Moldova.

These findings are important in determining the direction of policies related to increasing fertility rates in the post-communist context. Rather than strictly focusing on relieving the conflict between managing paid and unpaid work for women who have high earning capacity and therefore often lower fertility, policies might more successfully impact fertility rates by ensuring women have access to employment and the capacity to increase household welfare.

Acknowledgements

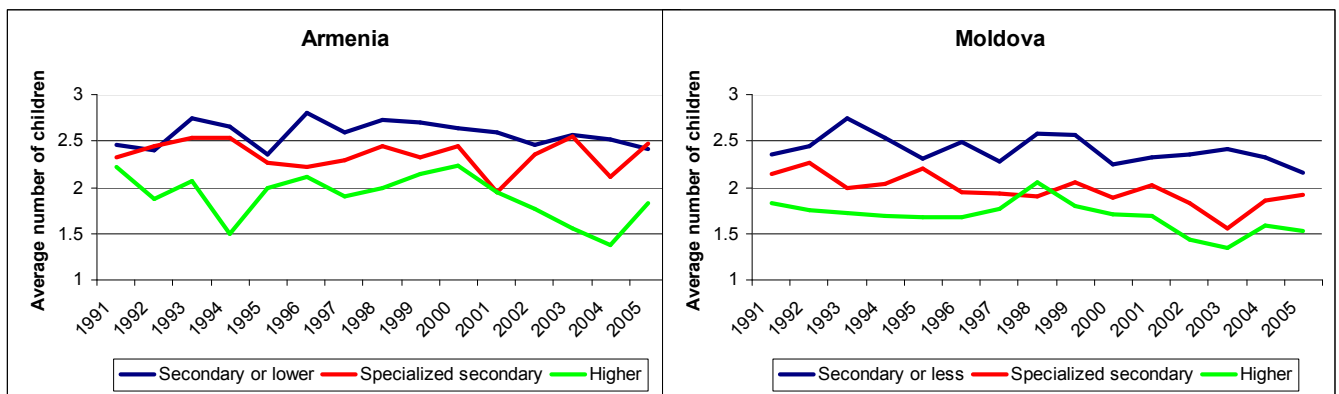
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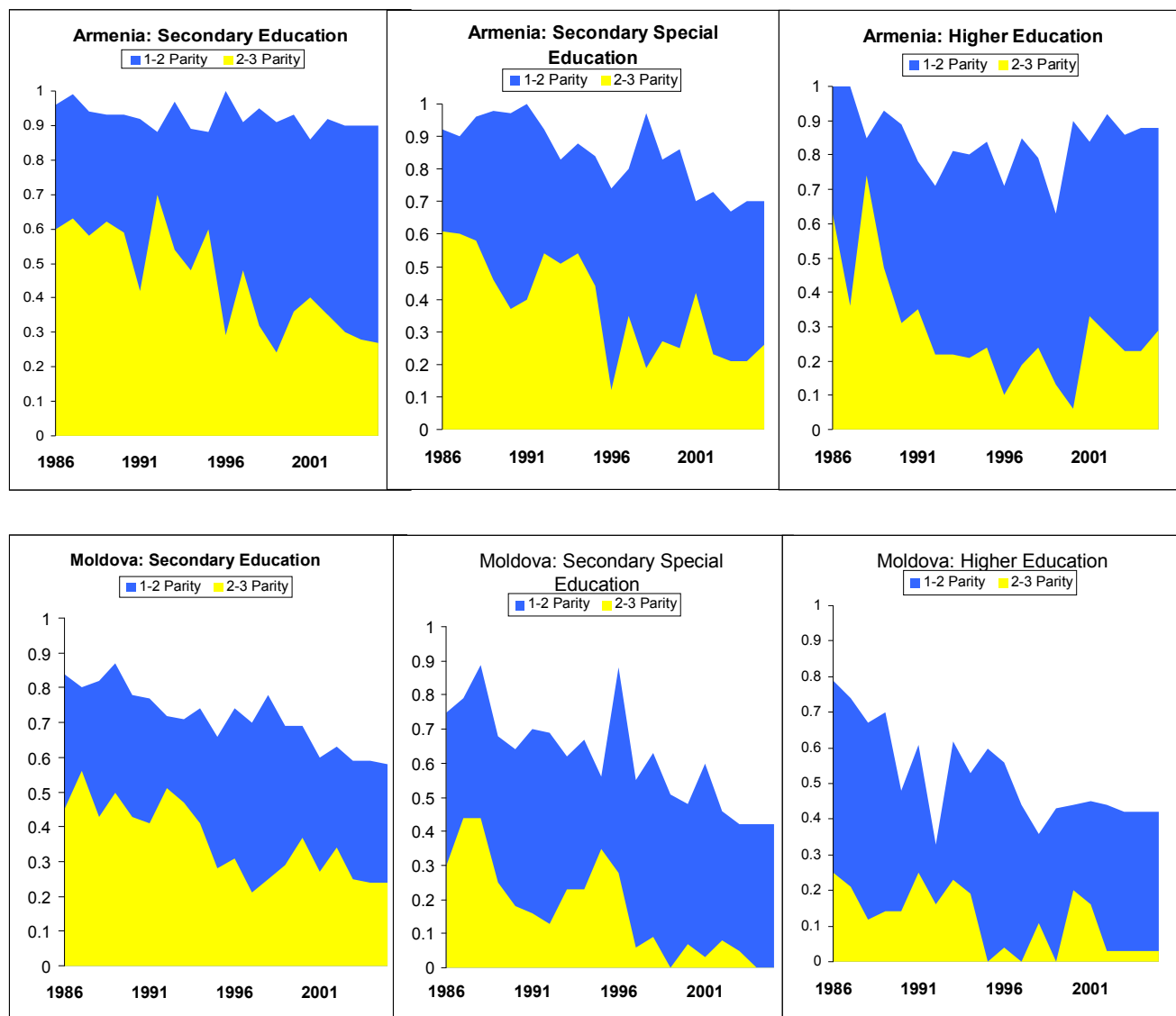
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Figure 1. Average number of children ever born to women aged 35, cohorts 1956-1970, by education level



Source: Author's calculations from 2005 Armenia and Moldova DHS data.

Figure 2. Parity-progression ratios for second and third births by year of the previous birth for all women in Armenia and Moldova, by education level



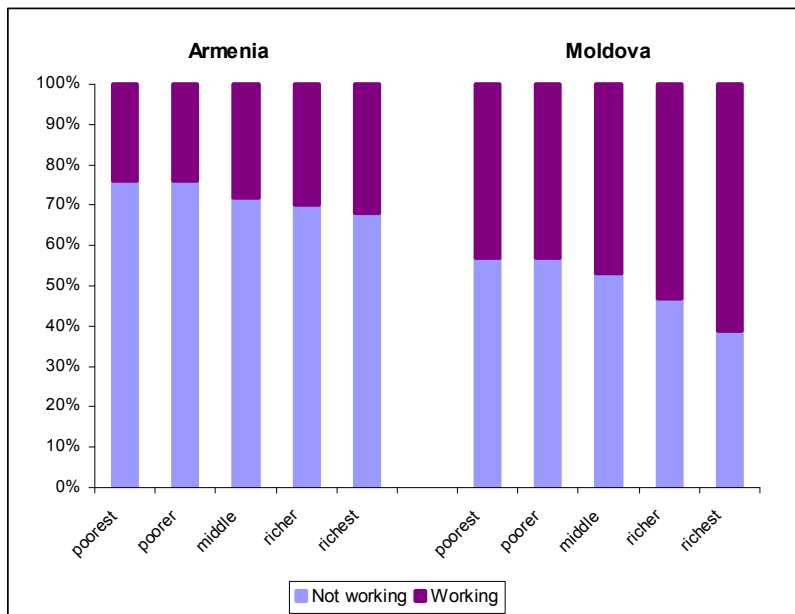
Note: Author's calculations of 2005 DHS data for Armenia and Moldova.

Table 1. Summary of changes within education groups according to Parity Progression Ratios

Ratios

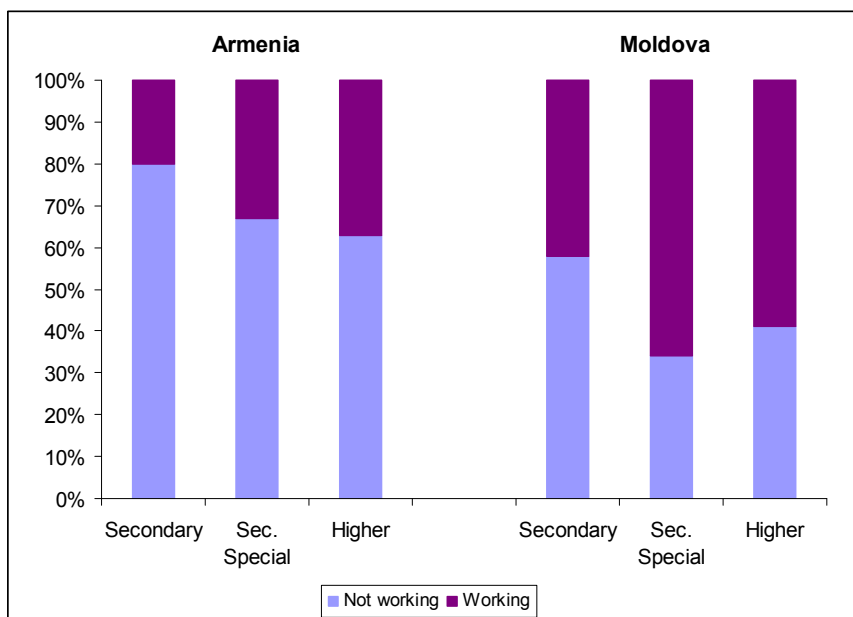
	Armenia			Moldova		
	Sec	Sspec	High	Sec	Sspec	High
1-2 Parity	0.06	0.24	0.08	0.23	0.39	0.31
2-3 Parity	0.32	0.37	0.33	0.24	0.37	0.16

Figure 3. Share of women who are working and not working according to wealth rankings



Note: Sample includes women who are in a union.

Figure 4. Share of women who are working and not working according to educational level



Note: Sample includes women who are in a union.

Table 2. Logistic regression results for the preference of another child for women currently in unions and with 1 child (in 2nd child preference model) and women with 2 children (in 3rd child preference model)

Preference for Another Child: Wanting Another Child									
# of observations	2nd child preference				3rd child preference				
	Armenia		Moldova		Armenia		Moldova		
	Odds ratios	P>z	Odds ratios	P>z	Odds ratios	P>z	Odds ratios	P>z	
	452		1253		1373		1840		
Woman's characteristics									
Secondary or less education	1		1		1		1		
Secondary Special education	1.72	0.348	0.85	0.419	1.21	0.42	0.82	0.348	
Higher education	2.13	0.285	1.12	0.554	1.11	0.73	1.07	0.772	
Respondent is not working	1		1		1		1		
working	3.03	0.037	1.45	0.023	1.07	0.769	0.99	0.964	
Months since last birth	0.99	0.524	0.98	0.002	0.99	0.953	1.01	0.002	
Months since last birth, squ.	0.99	0.598	0.99	0.815	0.99	0.163	0.99	0.004	
Age at first birth	0.87	0.272	0.86	0.003	0.98	0.771	1.06	0.135	
Household characteristics									
Household size	1.11	0.401	0.95	0.494	0.96	0.6	0.9	0.212	
Urban	1		1		1		1		
Rural	1.31	0.565	0.99	0.972	1.11	0.667	0.87	0.57	
Poorest wealth ranking	1		1		1		1		
Middle wealth ranking	1.13	0.802	0.8	0.352	0.97	0.893	1.17	0.472	
Richest wealth ranking	1.95	0.212	1.25	0.479	1.73	0.667	1.24	0.49	
Partner's characteristics									
Partner is not working	1		1		1		1		
working	0.51	0.237	1.25	0.309	0.84	0.611	0.74	0.283	

Notes: All models control for age and have a prob >chi2=0.0000. Odds ratios that are at least significant at the 90% level are highlighted in bold.

Table 3. Logistic regression results for desiring the next child later rather than sooner, including all women who have had one birth and are currently in a union

Odds Ratios of Timing Preference for the Next Child:				
# of observations	Armenia		Moldova	
	583		881	
	Odds	P>z	Odds	P>z
Woman's characteristics				
Secondary or less education	1		1	
Secondary Special education	1.03	0.914	1.25	0.368
Higher education	1.31	0.459	1.43	0.142
Respondent is not working	1		1	
working	0.82	0.627	1.37	0.088
Months since last birth	0.97	0.004	0.96	0.000
Months since last birth, squ	1	0.005	1	0.001
Age at first birth	1.13	0.174	0.96	0.461
Number of children	3.32	0.000	2.28	0.004
Household characteristics				
Household size	1.04	0.618	1	0.998
Urban	1		1	
Rural	0.51	0.043	1.14	0.638
Poorest wealth ranking	1		1	
Middle wealth ranking	0.83	0.619	0.99	0.997
Richest wealth ranking	0.82	0.6	1.49	0.258
Partner's characteristics				
Partner is not working	1		1	
working	0.45	0.031	1.07	0.836

Notes: All models control for age and have a prob >chi2=0.000. Odds ratios that are at least significant at the 90% level are highlighted in bold.