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# Girls Just Want to Have Fun? Sexuality, Pregnancy, and Motherhood among Bolivian Teenagers

by

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# Abstract[1]

This study attempts to quantify female teenage sexual activity, pregnancy, and motherhood in Bolivia using the most recent Demographic and Health Survey. Descriptive results suggest that teenage sexual activity, pregnancy, and childbearing are more prevalent among those adolescents who are more likely to be socially vulnerable and excluded. In addition, the high incidence of undesired pregnancies among Bolivian teen girls suggests that government action to prevent teenage pregnancy is needed. Lastly, the estimation results indicate that not only socioeconomic and demographic factors, but also some of the expected outcomes of teenage motherhood, regional fertility factors, and knowledge about and use of family planning methods, are significantly related to the probability of teenage pregnancy/childbearing.

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# 1. Introduction

There is increasing concern among health and education policymakers in Latin America about the region's high rates of teenage pregnancy and motherhood. In spite of important opposition from social conservative and religious groups, most governments in the region have introduced sexual education into the high school curriculum,[2] and Chile and Argentina have recently endorsed the free distribution of the "morning-after pill" to adolescents (Rohter, 2006; Román, 2007). These policies that attempt to modify patterns of teenage sexual activity and reduce the incidence of teen pregnancy/childbearing are based on the belief that teenage pregnancy and motherhood are negative life events that can perpetuate social exclusion.

Although adolescent fertility decreased slightly in the late 1990s, Bolivia is still the country with the highest adolescent fertility rate in South America (Guzmán et al., 2000). Moreover, teenage fertility in Bolivia has declined at a much slower rate than total fertility (Guzmán et al., 2001), increasing the proportion of children born to teenagers. Lastly, adolescent fertility has increased considerably in Bolivia's rural areas during the past decade (Flórez and Núñez, 2001). These high rates of adolescent fertility can have important negative consequences in terms of poverty and social exclusion, since previous studies using U.S., Colombian, and Brazilian data have found that teenage mothers have worse adult outcomes—less education, lower incomes, higher dependency on welfare, and higher rates of single parenthood—than women who delay childbearing (Ashcraft and Lang, 2006; Barrera and Higuera, 2004; Cardoso and Verner, 2006). In addition, research from the United States and Chile suggests that there are important negative intergenerational effects of teenage motherhood, with the children of teenage mothers having worse health and educational outcomes than the children of non-teen mothers (Buvinic et al., 1992; Haveman, Wolfe, and Peterson, 1995).[3]

Given the relatively high incidence of teenage pregnancy and motherhood in Bolivia and the important negative socioeconomic and intergenerational consequences that early motherhood can have, this study seeks to (1) quantify and describe the prevalence of teenage sexual activity, pregnancy, and motherhood in Bolivia using the most recent Demographic and Health Survey (DHS 2003) dataset, and (2) estimate the demographic, socioeconomic, and

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[2] For a reference to the countries that provide sexual education in schools, see Guzmán et al. (2000) and Guzmán et al. (2001).

[3] It is important to note that studies that have attempted to control for the non-random nature of teenage pregnancy have found that teenage pregnancy and motherhood have only marginal negative effects on adult and offspring outcomes (Furstenberg, 2003; Hoffman, 1998). However, for the most part, the negative effects remain.

contextual/behavioral factors associated with female teenage pregnancy and childbearing in Bolivia.[4] It is organized as follows. Section 2 discusses the theoretical framework and summarizes the literature on determinants of early female fertility, while Section 3 describes the data and methodology used in this study. In Section 4, we analyze the incidence of sexual activity, pregnancy, and motherhood and relate them to the teenager's demographic and socioeconomic characteristics. Section 5 analyzes some proximate determinants of fertility (such as knowledge of the reproductive cycle and use of contraceptives) and their consequences (such as undesired pregnancies). In Section 6, we discuss the results of our regression analyses, and we conclude the paper with some conclusions and policy implications in Section 7.

## 2. Theoretical Framework and Literature Review

Although most of the existing literature on the consequences of teenage pregnancy and childbearing suggests that these behaviors constitute negative life events that can perpetuate social exclusion, the behaviors can be completely rational if teenagers who become pregnant and have children face lower opportunity costs as compared to those who do not (Ashcraft and Lang, 2006; Flórez and Núñez, 2001; Haveman et al., 1997; Wolfe et al., 2006). That is, teenagers who become pregnant and are mothers might be demonstrating *rational behavior*.[5] Human capital theory predicts that teenagers who have high opportunity costs if they have a child while still a teen might be less likely to engage in sexual activity and become pregnant. In addition, the theory predicts that pregnant teenagers who have higher cost of childbearing might be more likely to have abortions. Following Haveman et al. (1997), teenager $i$'s utility realized from pregnancy/childbearing choices can be written in the following way:

$$(1) \qquad U_{ij} = f(X_i, PC_i, C_i, G_i) = \alpha X_i + \beta PC_i + \gamma C_i + Z_g \ln G_i + \varepsilon_i$$

where $X_i$ is a vector of individual-specific characteristics such as socioeconomic status, $PC_i$ is a pregnancy/childbearing indicator for teenager $i$, $C_i$ measures the costs of avoiding pregnancy and childbearing such as the cost of acquiring and using contraceptives, $G_i$ is the lifetime discounted stream of consumption, and $\varepsilon_i$ is the random utility term.

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[4] Although Bolivia's DHS 2003 includes a male questionnaire, this study does not address male teenage sexual activity and parenthood simply because the costs of teenage childbearing are higher for women than for men when men have the ability of "opting out" of parenthood while women do not (given the illegality of abortion).
[5] An alternative view is that teenagers who become pregnant do so because the risks they would face as childless adults, such as access to welfare benefits or monetary contributions from their offspring, are greater.

Teenager $i$ maximizes this utility subject to a budget constraint that relates teen pregnancy and motherhood with the future stream of income:

$$(2) \qquad Y_i = \alpha(Q_i)PC_i + \beta X_i + v_i$$

$$Y_i \geq G_i$$

where $Q_i$ are variables that affect the returns to teenage pregnancy and childbearing, $\alpha(Q_i)$ are the returns to individual $i$ conditional on teen pregnancy/motherhood, and $v_i$ is a random component. It can be assumed that teenagers do not know for certain their future income prospects. Instead, they form expectations based on the incomes of adult women who have similar characteristics and costs and who made similar choices:

$$(3) \qquad E[Y_i|Q_i, X_i, PC_i = 1] = \alpha(Q_j)PC_j + \beta X_j \qquad \textit{for } Q_i = Q_j;\ X_i = X_j$$

Teenager $i$ will choose whether to become pregnant or have a child by maximizing the expected utility of pregnancy/childbearing subject to the budget constraint. Then, the probability that a teenager will become pregnant or have a child can be written as:

$$(4) \qquad \Pr_i = \Pr(U_{PC=1} > U_{PC=0}) = \Pr_i\{(\varepsilon_1 - \varepsilon_0) < (\alpha X_1 - \alpha X_0) + (\beta PC_1 - \beta PC_0)$$
$$+ (\gamma C_1 - \gamma C_0) + Z_g[E(\ln Y_1) - E(\ln Y_0)]\}$$

Researchers from other fields of the social sciences suggest that teenagers take into account other factors beyond opportunity costs and their individual and household characteristics when deciding whether to become a teen mother. Among these factors are macrosocial factors including (1) *sociocultural norms*, such as the increase in commonality of early sexual initiation, the need to have children to demonstrate femininity, low societal expectations for women, and the cultural perception that the basic role of women is reproduction and domestic work (Pantelides, 2004; Remez, 1989; Stern, 2004; Torres, 1998); (2) the *characteristics of the neighborhood/community* (Crane, 1991; Hogan and Kitagawa, 1985; Pantelides, 2004; Singh, Darroch, and Frost, 2001); and (3) *public policies*, particularly those related to the provision of health services, sexual education, and family planning (Flórez, 2005; Flórez and Núñez, 2001; Flórez et al., 2004; Pantelides, 2004). Other factors associated with adolescent fertility are *exposure to the risk of pregnancy*, such as age at first sexual intercourse, early marriage/union, knowledge and use of contraceptives, and availability/legality of abortion (Barrega and Higuera, 2004; Flórez, 2005; Flórez and Núñez, 2001; Flórez et al., 2004; Stern, 2004). Lastly, some

authors have argued that there is *social vulnerability* to teenage pregnancies, meaning that adolescent pregnancy is more prevalent among the groups that are structurally or temporarily excluded (Singh, Darroch, and Frost, 2001; Stern, 2004).

There are numerous empirical studies analyzing the factors that contribute to higher rates of teenage sexual activity, pregnancy, and childbearing.[6] In a series of studies on the causes and consequences of adolescent non-marital childbearing using the rational behavior theoretical framework and longitudinal data from the United States, Haveman and colleagues found that teen girls are rational in their fertility choices and respond to the economic incentives they face if they do or do not give birth. They also found that other factors, particularly public expenditures on family planning, can reduce the prevalence of teen births (Haveman et al., 1997; Wolfe et al., 2006). Other studies based on U.S. data focused on the impact of the community where the teenager lives, and found that the effect of neighborhood quality on adolescent pregnancy and childbearing varies. Crane (1991) found that the likelihood of teenage childbearing increases sharply in the worst neighborhoods in large cities, while Hogan and Kitagawa (1985) found that neighborhood quality does not affect teen pregnancy once controls such as whether parents supervise their daughters' dating behavior are added.[7]

Most of the research on teenage fertility that uses data from Latin American countries is descriptive or qualitative in nature (see Binstock and Pantelides, 2005; Gogna, Fernández and Zamberlin, 2005; Guzmán et al., 2000; Guzmán et al., 2001; Stern, 2004). Studies on the determinants of teenage pregnancy and motherhood on Latin American countries are more scant, and have focused on socioeconomic, cultural, and public policy factors, as well as exposure risks. Three recent studies using Colombian data suggest that contextual and socioeconomic factors—such as education, the teenager's marital status, family history of teenage fertility, and lack of parental supervision—are important determinants of teenage pregnancy and motherhood (Barrera and Higuera, 2004; Flórez, 2005; Flórez et al., 2004). A study on Mexican teenagers found that teenage pregnancy in Mexico is primarily a response to the social context of the adolescent, particularly her marital status, age, and educational level (Menkes and Suárez, 2003). Finally, a multicountry study concluded that the effect of socioeconomic status (measured by

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[6] For a summary of empirical studies on the determinants of teenage pregnancy and motherhood, see Wolfe et al. (2006).
[7] For a review of studies on the determinants of teenage pregnancy and childbearing in other developed countries, see Singh, Darroch, and Frost (2001).

education, area of residence, residence in a female-headed household, and ownership of household goods) on teenage childbearing acts through the timing of the first sexual intercourse or through the timing of the first birth (Flórez and Núñez, 2001).

So far there is no study that has analyzed in detail the issue of teenage sexual activity, pregnancy, and childbearing in Bolivia in spite of the considerable policy debate that occurred there recently regarding family planning policies.[8] This study builds on the previous empirical literature and uses a recently released cross-sectional dataset to fill the gap in the knowledge on the extent of, and factors associated with, teenage pregnancy and childbearing in this Andean nation.

## 3. Data and Empirical Strategy

*Data*

This study relies on data from Bolivia's 2003 Demographic and Health Survey (DHS), a nationally-representative household survey. The 2003 Bolivian DHS includes 20,000 households; within each household all women between 15 and 49 years of age were eligible for the individual woman questionnaire. Of 18,487 eligible women, the DHS includes survey information on 17,654 women (a response rate of 95 percent). This study defines teenagers as those women who are between 15 and 19 years old at the time of the interview.[9] There are 3,859 women of this age range in Bolivia's 2003 DHS, representing 22 percent of all women included

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[8] Bolivia's main reproductive health program is the *Programa Nacional de Salud Sexual y Reproductiva* (Sexual and Reproductive Health National Program or PNSSR), which was first adopted in the 1980s. Using the PNSSR as a benchmark, family planning began to be formally offered as a free-of-charge service in 1998 with the introduction of the *Seguro Básico de Salud* (Basic Health Insurance [SBS], Decreto Supremo 25265, December 1998). The SBS was replaced in November 2002 with *Seguro Universal Materno-Infantil* (Universal Maternal-Infant Insurance or SUMI). SUMI originally provided health services to all pregnant women up to six months after delivery, but it did not include a family planning component for women who wanted to prevent pregnancies (Programa Nacional de Salud Sexual y Reproductiva [PNSSR], 2004). Only in December 2005, with Law 3250, did the Bolivian Congress widen the coverage of SUMI to include women who are not pregnant and are between 5 and 60 years old, and allowed for distribution of contraceptives. More recently, the Bolivian Congress sanctioned Law 810 in May 2004, entitled *Ley Marco sobre Derechos Sexuales y Reproductivos* (Sexual and Reproductive Rights Benchmark Act). This law incorporated the policies of the PNSSR and of the *Plan Nacional de Anticoncepción* 2004-2008 (National Contraceptive Plan) into legal rights. Due to strong opposition from conservative and religious circles to the provisions regarding the availability of contraceptive services to adolescents without parental consent, post-abortion services, and an equality of rights independent of sexual orientation, the law was returned by then President Mesa to Congress for public consultation. It has yet to be re-approved by Congress.

[9] Adolescence is a socially and culturally defined term, and as a result there is no consensus on its definition. Some studies define adolescents as being at most 18 years of age (Ashcraft and Lang, 2006; Furstenberg, 2003; Haveman et al., 1997; Wolfe et al., 2006), others limit the age range to 19 (Barrera and Higuera, 2004; Flórez, 2005; Flórez and Núñez, 2001; Hogan and Kitagawa, 1985; Menkes and Suárez, 2003), while still others limit the maximum age to 20 or even 21 (Crane, 1991; Singh, Darroch, and Frost, 2001; Stern, 2004).

in the survey. Figure 1 shows the age distribution of the sample, indicating that it is slightly skewed toward the younger ages.

The female questionnaire collects information on marriage, fertility, family planning, reproductive health, child health, HIV/AIDS, and domestic violence. Of particular importance for this study is the inclusion of information on date of first sexual intercourse, first marriage, and first birth. In addition, the DHS collects information on the women's schooling level and labor-market activities. Lastly, the individual questionnaire can be merged with a household questionnaire that includes information on household wealth and other relevant household characteristics.

There are two limitations to this dataset. The first is that it surveys only adolescents who are 15 years old or older. Thus, teenagers who are younger than 15 years of age and are sexually active, pregnant, or have children are excluded from the sample. And these are, according to the medical literature, the adolescents for whom pregnancy and childbearing present the highest health risks (see Stern, 1997, for a brief review of that literature). As a result, we can only know about the incidence of very early sexual activity and childbearing for those who were already 15 at the time of the survey. The second limitation is that the information is self-reported, and we can expect that teenagers who are interviewed with a parent present in the room may underreport sexual activity and pregnancy. Nonetheless, this underreporting of pregnancies is partially corrected for by using pregnancy information obtained from an anemia blood test done on 6,038 women.

### *Empirical Strategy*

In the conceptual framework and literature review section, we mentioned that a teenager's demographic and socioeconomic characteristics, the expected outcomes of teenage childbearing, and the characteristics of the community where she resides are factors found to be significantly associated with teenage pregnancy and childbearing. Thus, the probability of teen $i$ being pregnant or having borne a child can be written as:

$$(5) \qquad \Pr(Y_i) = \beta X_i + \gamma P_i + \delta R_i + \psi C_i + \varepsilon_i$$

where $Y$ is a dichotomous dependent variable that equals 1 if the teen is pregnant at the time of the interview or has already given birth to a live child, and 0 otherwise.[10] $X$ is a vector of

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[10] This variable does not include teenagers who became pregnant and did not carry the pregnancy to term. Thus, our

demographic, household, and socioeconomic characteristics. It includes controls for the teen's age, years of schooling, membership to an indigenous group,[11] work status, household wealth,[12] gender of the household head, number of members of the household, and rural residence. *P* is a vector of variables describing the expected outcomes of being a teen mother and includes measures of the difference in educational level, household wealth, and marital status between women 20–49 years old who did not bear a child as teenagers and those in the same age group who became mothers while they were teenagers. These differences are computed for women who reside in the same region and place of residence as the teenagers in our sample. *R* contains variables that describe the regional context. Previous research suggests that women who live in a region with high fertility levels have higher probabilities of bearing a child at an early age than women who live in low-fertility regions (Flórez and Núñez, 2001). Bolivia is divided into nine regions, and we control for the proportion of all women in each region who have borne a child while they were teenagers, have an unmet need for family planning, and have never used any contraceptive method. Lastly, *C* is a vector of health and family planning characteristics and includes variables that measure knowledge of the menstrual cycle, use of contraceptive methods (modern and traditional), whether the teen has basic health insurance, and whether the teen smokes and drinks.

Equation (5) can be straightforwardly estimated using a Probit model. However, teenage pregnancy and childbearing are events that can only observed among adolescents who have selected to become sexually active in the first place. Then, the expected value of the observed probability of teenage pregnancy and childbearing is:

$$(6) \qquad E(Y_i \mid X_i, P_i, R_i, C_i; S_i = 1) = \beta X_i + \gamma P_i + \delta R_i + \psi C_i + E(\varepsilon_i \mid S_i = 1)$$

where *S* equals 1 for teenagers who are sexually active. If engaging in sexual intercourse is not random, given a teenager's observed characteristics, then $E(\varepsilon_i \mid S_i = 1) \neq 0$ and the average observed rate of teenage pregnancy and childbearing is subject to selectivity bias—and as a result, Probit coefficients will be biased too (Heckman, 1979).

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dependent variable might underreport teenage pregnancy if some of these pregnancies result in miscarriage, provoked abortion, or still birth.

[11] Unlike many other surveys where the respondent is asked about her native language, Bolivia's DHS asks whether the respondent considers herself to belong to one of the native/indigenous groups such as Quechua, Aymara, Guaraní, or others. This variable, therefore, measures self-identification with one of these groups.

[12] A household wealth index is provided in the DHS 2003 dataset, and is a composite of household characteristics such as access to water/electricity/other public services, type of materials used for the construction of the home, and ownership of goods.

We can write the probability of becoming sexually active as:

$$(7) \qquad S_i = Z_i \zeta + \mu_i$$

where $Z$ is a vector of observable characteristics. Assuming that $cov(\varepsilon_i \mu_i) = c$ we have:

$$(8) \qquad E(\varepsilon_i \mid S_i = 1) = c\lambda_i$$

with $\lambda_i = \phi(A_i)/\Phi(-A_i)$ and $A_i = -(Z_i\zeta)/(\sigma_\mu)^{1/2}$ and where $\phi$ and $\Phi$ are the standard normal pdf and cdf, respectively. Then, we can write the regression equation for the subsample of sexually active teens as:

$$(9) \qquad \Pr(Y_i) = \beta X_i + \gamma P_i + \delta R_i + \psi C_i + c\lambda_i + v_i$$

where $\sigma^2_{v|S=1} = \tau_i^2 = 1 + c^2\lambda_i(A_i - \lambda_i)$.

But since our dependent variable is dichotomous, we estimate the following teenage pregnancy/childbearing equation by maximum-likelihood Probit (Van de Ven and Van Praag, 1981):[13]

$$(10) \qquad \Pr(Y_i) = \beta(X_i/\tau_i) + \gamma(P_i/\tau_i) + \delta(R_i/\tau_i) + \psi(C_i/\tau_i) + c(\lambda_i/\tau_i) + \eta_i$$

with $E(\eta_i \mid S_i{=}1) = 0$ and $E(\eta_i^2 \mid S_i{=}1) = 1$.

## 4. Incidence of Teenage Sexual Activity, Pregnancy, and Childbearing in Bolivia

Recent studies have suggested that teenage fertility has been slightly declining in Bolivia (Flórez and Núñez, 2001; Guzmán et al., 2000; 2001), but early childbearing is still of an important magnitude among Bolivian teens. Figure 2 shows that 27.8 percent of Bolivian teenagers were sexually active at the time of the 2003 DHS survey, 3.6 percent were pregnant, and 12.6 percent had already borne a child. A comparison between these rates and the ones obtained using 1998 DHS data (see Flórez and Núñez, 2001; Gutiérrez Sardán, Ochoa, and Castillo Guerra, 2004; Instituto Nacional de Estadística, 1998) suggests an increase in the incidence of teenage sexual activity, pregnancy, and motherhood in Bolivia, reversing the decline that teenage fertility experienced in the 1990s.

There is considerable overlap in the distribution of age at first sexual intercourse and age at first birth (Figure 3), suggesting that many Bolivian teenagers become pregnant around the

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[13] We use the STATA command "heckprob" to estimate this two-stage Probit model.

time they have their first intercourse. In fact, the difference between the average age at first sexual intercourse (15.6 years old) and the average age at first birth (16.4 years old) is only 10 months. Another interesting observation is that 6.5 percent of sexually active teens had their first intercourse and 2.1 percent became mothers at a very early age (13 years or younger). Still, the majority of Bolivian teenagers do not engage in sexual activity and, when they do, they are older than the age at which pregnancy and childbearing is riskier.

These average rates of incidence of teenage sexual activity, pregnancy, and childbearing mask important differences by the teenagers' demographic and household characteristics, as can be seen in Figure 4. For example, the prevalence of sexual activity and motherhood is considerably higher among older teenagers than among younger ones (Panel A), and appears to increase linearly with age (which does not seem to be the case with pregnancy). This, of course, is consistent with the life cycle (Barrera and Higuera, 2004) and with the cross-sectional and right-censored features of the DHS dataset, which implies that older teenagers have been at risk of experiencing these events for a longer period of time than younger teens.

The patterns of incidence of teenage sexual activity, pregnancy, and childbearing found here are in line with the view that early motherhood (and the risk of becoming a teen mother) is more prevalent among those who are more likely to be socially excluded and face the lowest opportunity costs of teenage childbearing. While only 22 percent of teenagers with secondary education and 27.8 percent of teens with higher education are sexually active, more than half of the Bolivian teens that never attended school are sexually active (Panel B). This difference in sexual activity by education level translates into important differences in pregnancy and childbearing rates, with Bolivian teens with higher levels of education having considerably lower rates of pregnancy and motherhood than their counterparts with no education or only primary schooling.[14] The incidence of teenage sexual activity, pregnancy, and motherhood declines considerably when we move from the poorest households to the richest ones (Panel D), and is also lower among urban households than among rural ones (Panel E). Interestingly, there is one diversion in our data from what has been found for other Latin American countries.[15] Our results do not suggest that indigenous groups are more affected by teen sexual activity, pregnancy, and

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[14] It is important to note that although teenage pregnancy and childbearing can result in teens dropping out of school, many teens have already dropped out of school by the time they became pregnant/mothers. In Bolivia, early pregnancy might be responsible for only 17 percent of school dropouts (Guzmán et al., 2000).
[15] See Guzmán et al. (2000), Pantelides (2004), and Stern (1997).

childbearing (Panel C): the two largest indigenous groups in Bolivia—Quechuas and Aymaras—have the lowest rates of teen pregnancy and childbearing, even compared to non-indigenous teens. Lastly, in terms of socialization factors, panel F shows no evidence of differences in sexual activity between teens who reside in male-headed households and those who live in female-headed households, although the former have slightly higher pregnancy and childbearing rates.

A different way of looking at the vulnerability of teenage pregnancy and childbearing is by analyzing the share of these pregnancies and births that occur outside of a formal union. Most Bolivian teenagers (89.1 percent) were not in a formal union (married or cohabiting) at the time of their DHS interview, a larger share than in many other Latin American countries (Guzmán et al., 2000). However, as Table 1 shows, sexual activity, pregnancy, and childbearing are non-negligible events among non-married/cohabiting teens: 19.1 percent are sexually active (similar to the average rate of premarital sexual activity in the region, see Guzmán et al., 2001), 1.6 percent are pregnant, and 5.5 percent are single mothers. In addition, 29.8 percent of married/cohabiting teenagers formalized their union after finding out they were pregnant.[16]

In sum, this descriptive analysis finds that not only the risk of pregnancy (sexual activity), but also pregnancy and childbearing have increased recently among teenagers in Bolivia. It also confirms most of the findings from other countries on the apparent importance of the macro-social context in which teenage sexual activity, pregnancy, and motherhood take place. Lastly, it indicates that many births to teenagers occur outside of formal unions, placing these teens and their children in more vulnerable social positions (Maynard, 1996). However, most of the contextual factors analyzed here are highly correlated with each other and, therefore, these results might not hold once we take into account these correlations. We discuss the results of our multivariate analysis below, but before doing so, we need to further characterize teenage pregnancy and childbearing in Bolivia by providing a descriptive analysis of family planning behavior and its consequences.

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[16] This percentage is computed after comparing age at first marriage and age at first birth. If the interval is negative (indicating that birth occurs before marriage) or is no greater than eight months (to allow for some births before due date and for the two-week timeframe, based on a regular menstrual cycle, between conception and the first missed period), then the pregnancy is said to have begun outside of a formal union.

## 5. The State of Bolivian Teenagers' Reproductive and Sexual Health

We have seen that an important number of Bolivian adolescents are pregnant or have borne a child (16.3 percent) and that pregnancy and childbearing are more prevalent among poorer and less educated teens. In addition, slightly more than a quarter of Bolivian teens are sexually active and at risk of becoming pregnant. Therefore, it is important for policy purposes to understand how much teenagers know about family planning and whether sexually active teens practice contraception, since these behaviors can suggest courses for specific policy interventions.

We start by analyzing knowledge of the menstrual cycle among teenagers, which is the basic indicator for teens' awareness of reproduction and sexuality. The Bolivian 2003 DHS asks all women the following question: "Between menstrual cycles, do you think there are certain days in which a woman can more easily become pregnant if she has sex?" If the answer is "yes," then the response is corroborated by asking if those days are "just before the beginning of the cycle," "during the period," immediately after the period," "at the middle of the cycle," or "at any day." Overall, only 31.3 percent of Bolivian teens can answer this question correctly. Although knowledge of the menstrual cycle is higher among sexually active teens, still just 35 percent of them know when in the cycle they are more likely to become pregnant. Lastly, knowledge of the menstrual cycle is lower among teen mothers (30.3 percent) and lowest among currently pregnant teens (23.2 percent). And even though these figures appear to be quite low and have declined slightly since 1998 (Guzmán et al., 2001), knowledge of the menstrual cycle is considerably higher among Bolivian teens than among adolescents in many other Latin American countries (Guzmán et al., 2001; Menkes and Suárez, 2003).

Knowledge of the reproductive cycle varies considerably according to the adolescent's demographic and socioeconomic characteristics (Figure 5). It increases considerably with age, educational level, and household wealth among teens who are not sexually active, but this pattern is less pronounced among the sexually active. Differences in knowledge of the menstrual cycle are large between urban and rural teenagers, but are not as great between teens who live in female-headed and male-headed households. Finally, there is no clear pattern in knowledge about the reproductive cycle based on indigenous descent, with teenagers from indigenous groups not necessarily being less knowledgeable about the fertility cycle than non-indigenous teens.

Another factor related to teenagers' reproductive and sexual health has to do with the use of contraceptive methods among those who are sexually active. Contraceptive use depends on whether the sexually active adolescent who is trying to prevent an undesired pregnancy is aware of birth control methods, on whether modern contraceptive methods (such as the pill, condoms, IUDs) are easily available, and on knowledge of the menstrual cycle for those who intend to use traditional family planning methods (Flórez and Núñez, 2001). Usage of family planning methods among Bolivian sexually active teens is not high; 36.1 percent have used a modern contraceptive method and 18 percent have used a traditional/folkloric method.[17] However, these rates of contraceptive use are not surprising when 44.1 percent of sexually active teens indicate that becoming pregnant would not be a problem for them. And these rates also suggest that Bolivian teenagers are increasingly adopting modern birth control methods, since findings from 1998 indicated that traditional methods were more commonly used than modern methods among Bolivian teens (Flórez and Núñez, 2001).

There are important differences in the rate and type of contraceptive use according to the teenager's demographic and socioeconomic characteristics. Panel A of Figure 6 indicates that almost 60 percent of 15-year old and half of 16-year-old sexually active Bolivian teens do not use any type of contraceptive. This might be related to the (erroneous) belief among many adolescents that one cannot get pregnant during the first sexual intercourse (Menkes and Suárez, 2003). As teenagers become older, there is an increase in the rate of use of modern contraceptives, but the rate of use of traditional/folkloric methods fluctuates considerably by age without a clear pattern. There is a clear relationship between educational level, household wealth, and use of contraceptives (Panels B and D), with the use of contraceptives increasing considerably for sexually active teens who have more schooling and who come from wealthier households. The differences in contraceptive use by educational level are more pronounced, with almost 90 percent of sexually active teens with no schooling not using any type of contraception while, at the opposite end of the spectrum, close to 80 percent of sexually active teens with some higher education use modern contraceptive methods. When looking at contraceptive use by indigenous descent, we find that non-indigenous teenagers have higher rates of use of modern methods, while the majority of Quechua and Aymara sexually active teens have not used any

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[17] A direct comparison of contraceptive use between Bolivian sexually active adolescents and their counterparts in other Latin American countries is not possible because the existing regional studies have computed contraceptive use among all teenagers and have not restricted use to those who are sexually active (see Guzmán et al., 2001).

type of family planning method—and when they have, a considerable share of them used a traditional/folkloric one (Panel C). As expected, birth control is lower among rural sexually active adolescents than among their urban peers, and the use of modern methods is considerably higher among the latter group (Panel E). Lastly, more than half of teenagers who are having premarital sex have never used any type of contraceptive (Panel G), a behavior that puts these girls in a vulnerable position if they become pregnant, since they will have to opt between single motherhood, having an illegal abortion, or entering a formal union at an earlier age than planned.[18]

The relatively low rate of contraceptive use, particularly among non-married, young, and low-socioeconomic status teenagers, results in very high rates of undesired pregnancies (pregnancies that are either unwanted or mistimed). Of 649 Bolivian teenagers who were pregnant or had had a child at the time of their DHS interview, 66.3 percent indicated that either their last or current pregnancy was unwanted/mistimed (see Table 2).[19] This high rate of undesired pregnancies, and the fact that it has increased since 1998 (Guzmán et al., 2001), probably constitutes the strongest evidence favoring the view that teenage pregnancy and childbearing is a social problem that requires government action through policies designed to reduce its incidence (United Nations Population Information Network [UN-POPIN], 1994). As an indication that Bolivian adolescents are not necessarily taking the measures needed to prevent undesired pregnancies, the proportion of unwanted or mistimed pregnancies among teens who never used any type of contraceptive methods is higher than among those who have used contraceptives (69.4 percent vs. 63.8 percent). Also, the fact that close to three quarters of current/last pregnancies were undesired among those who have used contraceptive methods suggests that these teens might not be using these methods appropriately. Lastly, unwanted or mistimed pregnancies are also very prevalent among married/cohabiting teens—which could be related to the significant number of teenagers who formalize their union after the pregnancy.

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[18] It is important to note the differences between the findings from the 1998 DHS (Flórez and Núñez, 2001; Guzmán et al., 2001) and those from the 2003 DHS. Data from 1998 suggested that contraceptive use was more prevalent among non-married but sexually active teens than among married teens, while 2003 DHS data indicates that contraceptive use is considerably higher among married/cohabiting teens when measured by current use or by ever use.

[19] "Undesired pregnancies" is computed from the following question: "When you became pregnant, did you want to become pregnant (i) at that moment, (ii) wait some time, or (iii) not to have any more children?" Those who responded "wait" and "not to have more children" are coded as having an undesired last/current pregnancy.

As expected, the proportion of undesired pregnancies decreases with the teenager's age but there is no such clear pattern relating undesired pregnancies with education levels. However, and consistent with findings from the United States (Donohue and Levitt, 2001), there seems to be a link between low levels of education and undesired pregnancies, with 95 percent of teens with no schooling having unwanted or mistimed pregnancies. The share of undesired pregnancies among Bolivian teens increases slightly for urban residents and as household wealth increases, and could suggest that wealthier teenagers and those who live in cities might face higher opportunity costs to becoming pregnant. Lastly, there are important differences in undesired pregnancies by ethnicity, with Quechua and non-indigenous teens having the largest shares of unwanted or mistimed pregnancies (around 70 percent).

Thus, this analysis of knowledge of reproductive health, use of contraceptive methods, and incidence of undesired pregnancies suggests that Bolivian teenagers are still very unknowledgeable about the reproductive cycle in spite of the fact that sex education has been introduced as one of the objectives of the 1994 Education Reform (Centro Legal para Derechos Reproductivos y Políticas Públicas [CRLP], 2001),.This, combined with the lack of family planning policies designed specifically for adolescents (see footnote 8), might contribute to the low levels of contraceptive use among low-income and less-educated sexually active teen girls and to the high proportion of undesired teen pregnancies in the country.

## 6. The Determinants of Teenage Pregnancy and Childbearing

Our descriptive analysis has suggested that the prevalence of teenage pregnancy and childbearing varies considerably according to the teen's demographic, socioeconomic, and household characteristics. However, as we mentioned, these results might not hold once we take into account the fact that most of these factors are highly correlated. Thus, this section presents the results from two multivariate analyses in which the dependent variable is a dichotomous indicator for whether the teenage girl was currently pregnant or had already borne a child. The first model is a Probit performed on all teenage girls independent of whether they were sexually active. The second model takes into account that pregnancy and childbearing can occur only to those teens who have already decided to become sexually active, and is estimated in two stages: in the first stage we estimate the probability of becoming sexually active using a Probit, and in

the second stage we estimate the probability of teenage pregnancy and motherhood conditioned on sexual activity also using a Probit.

The sample's descriptive statistics are shown in Table 3, as are the descriptive statistics for sexually active teens and for adolescents who were pregnant or had already borne a child at the time of the interview. These descriptive statistics are as expected (and discussed previously), with teenagers who were pregnant or mothers being older, having fewer years of schooling, coming from poorer households, and living in rural areas. In addition, they live in areas where the difference in years of schooling between older women who did and did not bear a child before they reached 20 years of age is largest, and in regions of the country where there is a higher incidence of teenage childbearing.

Table 4 displays the results from the two regression analyses.[20] Column A shows the results from a simple Probit for teenage pregnancy/motherhood. As expected, we find that a teenager's probability of being pregnant or having borne a child increases significantly with age and decreases with years of schooling. Although there are some differences in the rate of incidence of teenage pregnancy and childbearing by indigenous descent, once we take into account socioeconomic, regional, and fertility characteristics, we no longer find that indigenous teenagers are more or less likely to be pregnant or a mother. The adolescent's socioeconomic and household background significantly affects her probability of pregnancy/motherhood, with teens from the four lowest quintiles of the wealth distribution having a significantly higher probability of pregnancy/childbearing as compared to those from the richest quintile. In addition, the probability of teenage pregnancy/childbearing in Bolivia is significantly higher for teens from female-headed and large households. Interestingly, the large raw differences in teenage pregnancy/motherhood between rural and urban residents disappear once we control for these teens' differing expected outcomes of teenage childbearing.

Teenage pregnancy and motherhood appear to be related to the expected outcomes of teenage childbearing, as the rational behavior theory predicts. The coefficient on expected wealth suggests that teenagers appear to respond to economic opportunities when making their pregnancy/motherhood decision, since the probability of being pregnant or having borne a child increases when the net wealth gain associated with the decision of not bearing a child as a

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[20] Both analyses have been conducted using DHS-provided probability weights to make the sample nationally representative and to correct for clustering.

teenager is smaller. The positive and statistically significant coefficient on differences in years of schooling between older women who did not bear a child as teenagers and those who did might suggests that adolescents are more likely to be pregnant/have a child when the opportunity cost of teen motherhood in terms of education is smallest. Thus, these coefficients suggest that teenagers seem to act rationally when deciding on pregnancy and motherhood.

Contrary to what has been found previously in the literature (Flórez and Núñez, 2001), the regional context does not have any effect on whether a teenager becomes pregnant/bears a child. Lastly, marriage significantly increases the probability that a teenager is pregnant or has borne a child, and having health insurance does so as well.[21] The practice of family planning either by using traditional or modern contraceptive methods is related to a higher probability of teenage pregnancy and childbearing in Bolivia. Although this result seems puzzling, it is subject to bias since those teens who are sexually active (and therefore at risk of becoming pregnant and having children) are also those most likely to practice any form of contraception.

Columns B and C of Table 4 present the results of a two-stage Heckman selection Probit model that considers that teenage pregnancy/childbearing is observed only for sexually active teens.[22] There are important differences in the magnitude of marginal effects between Columns A and C. For example, age and years of schooling are still significantly related to teenage pregnancy and childbearing; but now a teenager who is a year older has a probability of being pregnant/having borne a child that is 8.9 percent higher while a teenager with an additional year of schooling has a probability of pregnancy/childbearing that is 4.2 percent lower. Most of the socioeconomic and household background variables continue to be significantly correlated with the probability of being pregnant/having a child, and in most cases the magnitude of the effect increases. There are, however, some exceptions: adolescents who were working at the time of the survey were 3 percent less likely to be pregnant/have a child, while those who lived in female-headed households were 3.1 percent less likely to experience early pregnancy/motherhood.

The most interesting differences between the basic regression and the one that corrects for selection into sexual activity are related to the effects of expected outcomes of teenage motherhood, regional fertility indicators, and family planning behavior. First, when correcting

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[21] We should not interpret this coefficient as suggesting that access to a welfare benefit such as free health insurance results in increasing rates of teenage pregnancy and motherhood, since it might be suffering from reverse causality.
[22] For identification purposes, we exclude "marriage/cohabiting" from the second stage. We contend that marriage/cohabitation by itself cannot biologically affect the probability of pregnancy/childbearing, and only does so by acting through an increase in the probability of becoming sexually active.

for selection into sexual activity, we find that the expected gains in household wealth due to the decision to not bear a child as a teenager are insignificantly related to teenage pregnancy/childbearing, and its effect in the basic model appears to have been related to a decrease in the probability of becoming sexually active. The result for expected schooling, in contrast, continues to be statistically significant and positive.

Second, the proportion of women in the teen's region of residence who had a child as a teenager is now significantly and negatively related to the teen's probability of being pregnant/having borne a child. This finding contradicts the prediction that we should expect to see an increase in the probability of pregnancy/motherhood for teenagers who live in areas where teenage motherhood is more common. However, the regional rate of teenage fertility does increase the probability of a teen becoming sexually active. The other two regional indicators of fertility are statistically significantly related to the probability of teenage pregnancy/childbearing. As expected, an increase in the percentage of women in the region with unmet family planning needs increases the probability of teen pregnancy/motherhood. In contrast, an increase in the proportion of women who never used contraceptive methods is negatively associated with the probability of teenage pregnancy/motherhood; however, this variable could not only be measuring lack of contraceptive use but also lower rates of sexual activity (and therefore no need to use contraceptives) so its interpretation is not straightforward.

Third, all of the family planning variables now have the expected sign and are all statistically significant. Knowledge of the menstrual cycle reduces the probability of teenage pregnancy/childbearing by 4.1 percent, while use of modern and of traditional contraceptive methods decreases the probability by 20.8 percent and 22.7 percent, respectively. Lastly, the coefficient on the selection term $\lambda$ is negative and significant, and suggests that the unobserved factors that increase the probability of sexual activity lower the probability of teenage pregnancy/childbearing.

## 7. Conclusions and Policy Implications

This study has analyzed teenage pregnancy and childbearing in Bolivia, a country that is experiencing a reversal in its trend toward lower teenage fertility. Confirming some of the findings from previous research on this topic, our results suggest that the social context in which teenagers live is an important determinant of teenage pregnancy and childbearing. We find that

the probability of teenage pregnancy is lower for those adolescents with additional years of schooling, and for those teenagers from wealthier and smaller households. We have also found that the regional context has an important effect, as previously estimated (Flórez and Núñez, 2001), with the probability of teenage pregnancy/motherhood increasing for adolescents living in areas of the country where there is unmet need for family planning.

Our study, however, provides weaker evidence for the importance of other factors that the existing literature has found to affect teenage pregnancy and childbearing. For example, in contrast to studies that suggest that teenagers who live in households headed by females are more likely to become mothers earlier in life than their counterparts in male-headed households (Flórez and Núñez, 2001; Hogan and Kitagawa, 1985), we find that teens who live in female-headed households have a lower probability of pregnancy/childbearing conditioned on sexual activity. Studies in the United States have found that teenagers are very sensitive to expected outcomes of teenage motherhood when making the decision to be a teen mother (Haveman et al., 1997; Wolfe et al., 2006). However, and probably due to important differences in the features of the datasets used, we have found only one variable measuring expected outcomes of teenage motherhood—expected educational gains due to not bearing a child as a teenager—to significantly affect the probability of teen pregnancy/childbearing. However, expected wealth gains due to postponing childbearing significantly affect whether a teen decides to become sexually active and, thus, our study does suggest that teenagers do to some extent act rationally.

Most importantly, our findings suggest that there is an important role for policy if Bolivia should decide to tackle the issue of teenage pregnancy and childbearing. We have found that many births to teenagers occur outside of formal unions, placing these teens and their children in more vulnerable social positions. We have also found that most of teenage pregnancy/childbearing is unwanted or mistimed, probably curtailing these adolescents' life plans. Moreover, our regression results indicate that knowledge of the menstrual cycle and use of traditional or modern birth control methods can significantly reduce the probability of teenage pregnancy and motherhood. And, as our descriptive analysis has shown, knowledge of reproductive biology and contraceptive use is far from widespread among Bolivian adolescents.

Thus, our study indicates reproductive and sexual health efforts focused on adolescents could play a crucial role in considerably reducing the prevalence of undesired and out-of-wedlock teen pregnancy and childbearing and, potentially, reducing social exclusion. One policy

option is to strengthen sex education at schools. In particular, the sex education curriculum should be broad and include references not only to abstinence but also to responsible sexuality, and teachers should be trained in human biology and as well as able to understand the psychological, social, and cultural aspects of teenage sexuality. Also, reproductive and sex education should start at an early age and should incorporate the concerns of different social actors (Guzmán et al., 2000).

Another policy option is to expand the knowledge and availability of contraceptive methods. Many teenagers are aware of the broad range of contraceptive alternatives, but they do not use them correctly. Contraceptive counseling should not only be available to teenagers to inform them about birth-control alternatives, but it also should be designed specifically for the particular needs and concerns of girls (and also boys) who are starting their sexual life. Lastly, the government could guarantee the free distribution of modern contraceptive methods in hospitals, clinics, and even schools. In the past, the international donor community has participated in campaigns to make contraceptive methods more readily available, and the Bolivian government might want to coordinate efforts to ensure that teenagers' family planning needs do not go unmet.

# References

Ashcraft, A. and K. Lang. 2006. *The consequences of teenage childbearing*. NBER Working Paper 12485.. Cambridge, MA: National Bureau of Economic Research.

Barrera, F. and L. Higuera. 2004. *Embarazo y fecundidad adolescente*. FedesarrolloDocumento de Trabajo No. 4.. Bogota: Fedesarrollo.

Binstock, G. and E. Pantelides. 2005. "La fecundidad adolescente hoy: Diagnóstico sociodemográfico." In: M. Gogna, ed. *Embarazo y maternidad en la adolescencia. Estereotipos, evidencias y propuestas para políticas públicas.* Buenos Aires: Centro de Estudios de Estado y Sociedad.

Buvinić, M., J. P. Valenzuela, T. Molina, and E. González. 1992. "The fortunes of adolescent mothers and their children: The transmission of poverty in Santiago, Chile." *Population and Development Review* 18(2): 269-297.

Cardoso, A. and D. Verner. 2006. *School drop-out and push-out factors in Brazil: The role of early parenthood, child labor, and poverty*. IZA Discussion Paper Series No. 2515. Bonn: Institute for the Study of Labor.

Centro Legal para Derechos Reproductivos y Políticas Públicas (CRLP). 2001. *Derechos reproductivos de la mujer en Bolivia: Un informe sombra*. www.reproductiverights.org, accessed December 5, 2006.

Crane, J. 1991. "The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing." *The American Journal of Sociology* 96(5): 1126-1259.

Donohue, J. and S. Levitt. 2001. "The impact of legalized abortion on crime." *Quarterly Journal of Economics* 116(2): 379-420.

Flórez, C. 2005. "Factores socioeconómicos y contextuales que determinan la actividad reproductiva de las adolescentes en Colombia." *Revista Panamericana de Salud Pública* 18(6): 388–402.

Flórez, C. And J. Núñez. 2001. *Teenage childbearing in Latin American countries*. Inter-American Development Bank Research Network Working Paper R-434. Washington, D.C.: Inter-American Development Bank.

Flórez, C., E. Vargas, J. Henao, C. González, V. Soto, and D. Kassem. 2004. *Fecundidad adolescente en Colombia: Incidencias, tendencias y determinantes. Un enfoque de*

*historia de vida.* Documento CEDE 2004-31. Bogota:  Universidad de los Andes— Economic Development Research Center School of Economics (CEDE).

Furstenberg Jr., F. 2003. "Teenage childbearing as a public issue and private concern." *Annual Review of Sociology* 29: 23-29.

Gogna, M., S. Fernández, and N. Zamberlin. 2005. "Historias reproductivas, escolaridad y contexto del embarazo: Hallazgos de la encuesta a puérperas." In: M. Gogna, ed. *Embarazo y maternidad en la adolescencia. Estereotipos, evidencias y propuestas para políticas públicas.* Buenos Aires: Centro de Estudios de Estado y Sociedad.

Gutiérrez Sardán, M., L.H. Ochoa, and W. Castillo Guerra. 2004. *Bolivia: Encuesta Nacional de Demografía y Salud ENDSA 2003*. La Paz: Instituto Nacional de Estadística de Bolivia. Guzmán, J. M., M. Falconier de Moyano, R. Hakkert, and J. M. Contreras. 2000. *Políticas de población para adolescents: Diagnóstico de situación y políticas de salud sexual y reproductiva*. Working Papers Series CST/LAC No. 9, United Nations Population Fund.

Guzman, J.M.; M. Falconier de Moyano, R. Hakkert, and J.M. Contreras. 2000. *Políticas de Población para Adolescentes: Diagnóstico de Situación y Políticas de Salud Sexual y Reproductiva.* Mexico City: UNFPA, CST/LAC.

Guzmán, J. M., R. Hakkert, J.M. Contreras, and M. Falconier de Moyano. 2001. *Diagnóstico sobre salud sexual y reproductiva de adolescents en América Latina y el Caribe.* New York: United Nations Population Fund.

Haveman, R., B. Wolfe, and E. Peterson. 1995. *The intergenerational effects of early childbearing*. Institute for Research on Poverty, Discussion Paper No. 1071-95, University of Wisconsin-Madison.

Haveman, R., B. Wolfe, K. Wilson, and E. Peterson. 1997. *Do Teens Make Rational Choices? The Case of Teen Nonmarital Childbearing*. Institute for Research on Poverty, Discussion Paper No. 1137-97, University of Wisconsin-Madison.

Heckman, J. 1979. "Sample selection bias as a specification error." *Econometrica* 47(1): 153-161.

Hoffman, S. 1998. "Teenage childbearing is not so bad after all… or is it? A review of the new literature." *Family Planning Perspectives* 30(5): 236-239+243.

Hogan, D. and E. Kitagawa. 1985. "The impact of social status, family structure, and neighborhood on the fertility of black adolescents." *The American Journal of Sociology* 90(4): 825-855.

Instituto Nacional de Estadística (INE). 1998. *Encuesta Nacional de Demografía y Salud 1998*. La Paz: Instituto Nacional de Estadística de Bolivia. .

Maynard, R., ed. 1996. *Kids having kids: A special report on the costs of adolescent childbearing*. New York: Robin Hood Foundation. Menkes Bancet, C. and L. Suárez López. 2003. *Sexualidad y embarazo adolescente en México*. Papeles de Población No. 035. Toluca: Universidad Autónoma del Estado de México. Ministerio de Educación y Culturas. 2005. *Proyecto de transformación de la escuela secundaria. Primera fase: 2006-2009*. http://www2.minedu.gov.bo/veea05/docs/psec.pdf, accessed March 14, 2007.

Menkes, C. and L. Suárez. 2003. "Sexualidad y Embarazo Adolescente en México." Papeles de Población 29: 233–262. Mexico: Centro de Investigación y Estudios de la Población, Universidad Autónoma del Estado de México (CIEAP/UAEM).

Pantelides, E. 2004. *Aspectos sociales del embarazo y la fecundidad adolescente en América Latina*. Notas de Población No. 78:7-33.Santiago: Centro Latinoamericano y Caribeño de Demografía/Comisión Económica para América Latina y el Caribe (CELADE/CEPAL).

Programa Nacional de Salud Sexual y Reproductiva (PNSSR). 2004. *Plan nacional de anticoncepción (2004-2008)*. La Paz: Dirección Nacional de Desarrollo de Servicios de Salud, Ministerio de Salud y Deportes de Bolivia.

Remez, L. 1989. "Adolescent fertility in Latin America and the Caribbean: Examining the problem and solutions." *International Family Planning Perspectives* 15(4): 144-148.

Rohter, L. 2006. "Policy on Morning-After Pill Upsets Chile." *The New York Times*, December 17.

Román, V. 2007. "La píldora del día después ya se distribuye gratis en todo el país." *Clarín*, March 4.

Singh, S., J. Darroch, and J. Frost. 2001. "Socioeconomic disadvantage and adolescent women's sexual and reproductive behavior: The case of five developed countries." *Family Planning Perspectives* 33(6): 251-258+289.

Stern, C. 1997. "El embarazo en la adolescencia como problema público: Una visión crítica." *Salud Pública de México* 39(2): 29–58.

Stern, C. 2004. *Vulnerabilidad social y embarazo adolescente en México*. Papeles de Población No. 039. Toluca: Universidad Autónoma del Estado de México.

Torres, C. 1998. "Las niñas madres." *Agenda Salud 9*. Santiago: Isis Internacional.

United Nations Population Information Network (UN-POPIN). 1994. *Report of the "International Conference on Population and Development."* New York: United Nations Population Division, Department of Economic and Social Affairs.

Van de Ven, W. and B. van Praag. 1981. "The demand for deductibles in private health insurance. A Probit model with sample selection." *Journal of Econometrics,* 17(2): 229-252.

Wolfe, B., R. Haveman, K. Pence, and J.A. Schwabish. 2006. *Do youth nonmarital childbearing choices reflect expected income and relationship consequences?* Working Paper No. 2006-020, La Follette School of Public Affairs, University of Wisconsin-Madison.
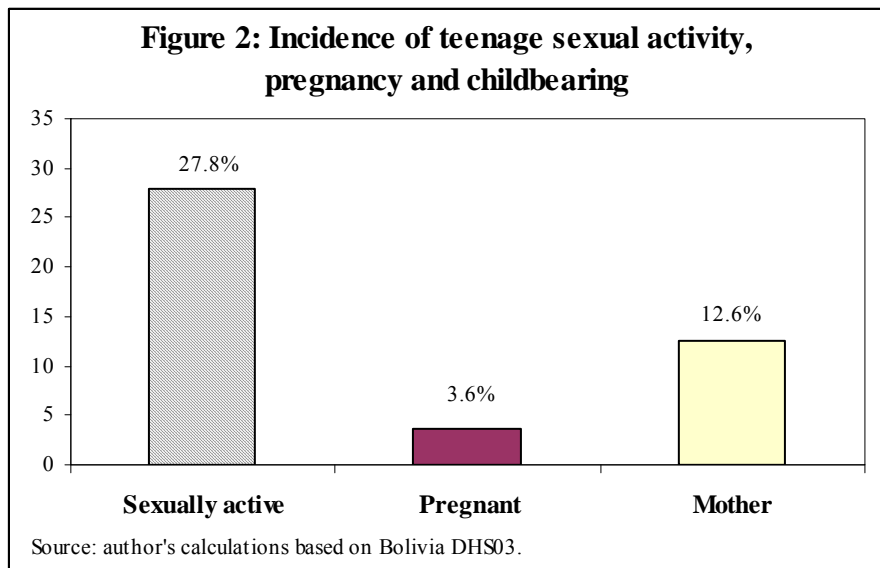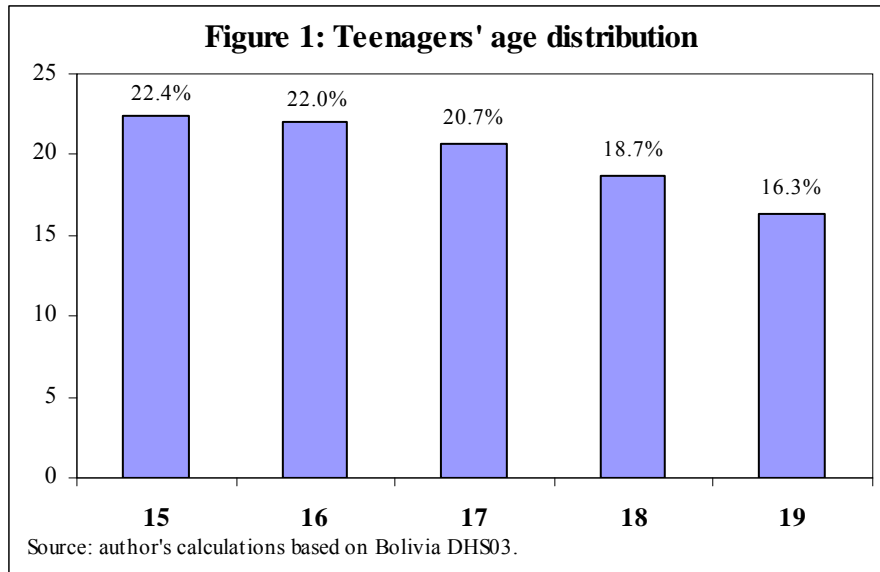
**Figure 1: Teenagers' age distribution**

22.4%    22.0%
         20.7%
                18.7%
                       16.3%

25

20

15

10

5

0

15    16    17    18    19

Source: author's calculations based on Bolivia DHS03.

**Figure 2: Incidence of teenage sexual activity, pregnancy and childbearing**

35

30    27.8%

25

20

15                                    12.6%

10

5              3.6%

0

Sexually active    Pregnant    Mother

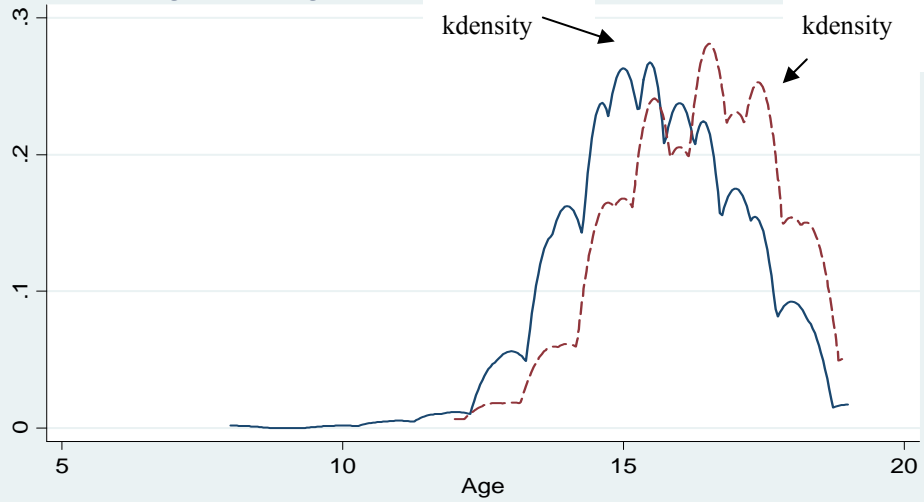Source: author's calculations based on Bolivia DHS03.

Figure 3: Age at first intercourse and first birth

Source: Author's calculations based on Bolivia DHS03.

**Figure 4. When Is Teenage Sexual Activity, Pregnancy and Motherhood Most Prevalent?**

**Figure 4. , continued**
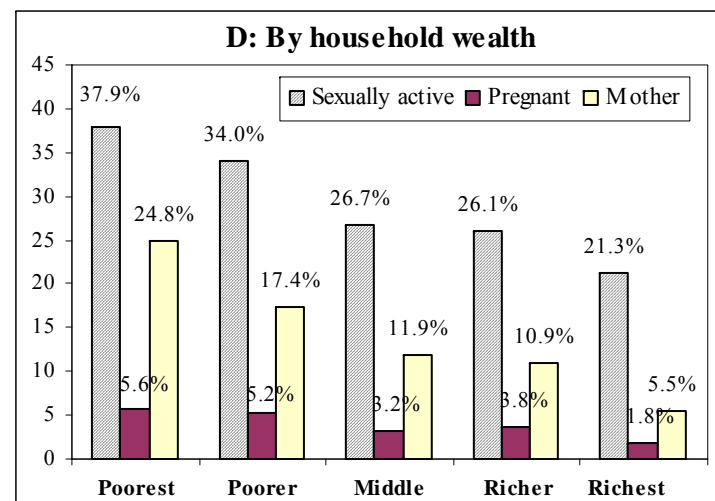


E: By place of residence

Sexually active | Pregnant | Mother

25.8%  3.2%  10.2%  (Urban)
32.6%  4.6%  18.2%  (Rural)

F: By sex of household head

Sexually active | Pregnant | Mother

27.9%  3.9%  13.2%  (Male)
27.9%  2.8%  10.4%  (Female)
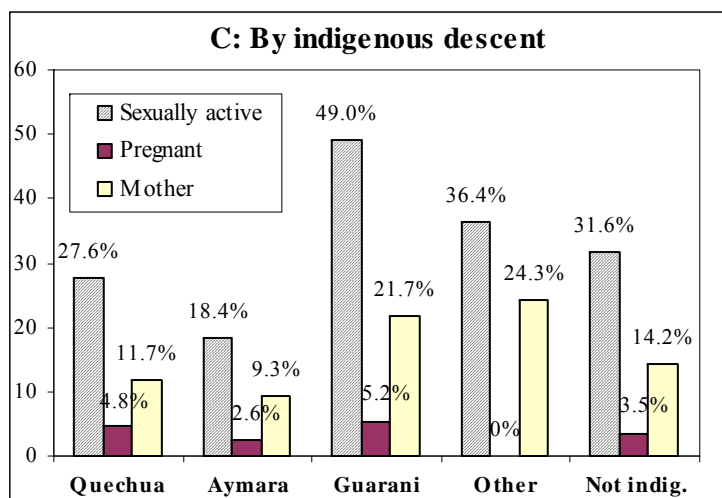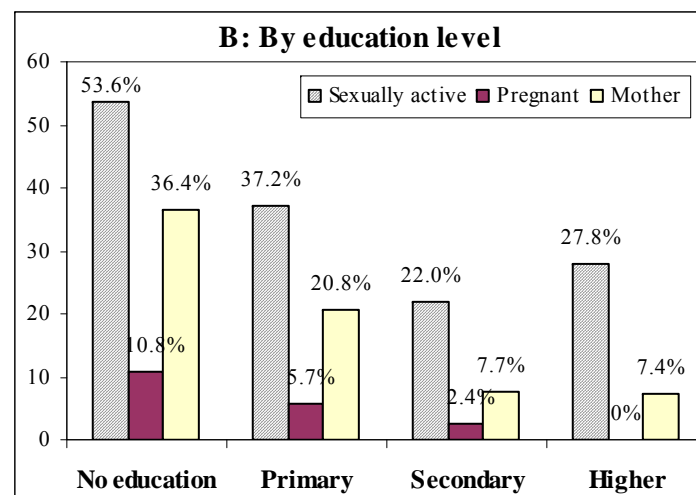
**Figure 5. Teen's Knowledge of Menstrual Cycle by Selected Characteristics**



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**Figure 5, continued**



E: By place of residence

| | Not active | Sexually active |
|---|---|---|
| Urban | 33.7 | 40.1 |
| Rural | 20.3 | 25.8 |

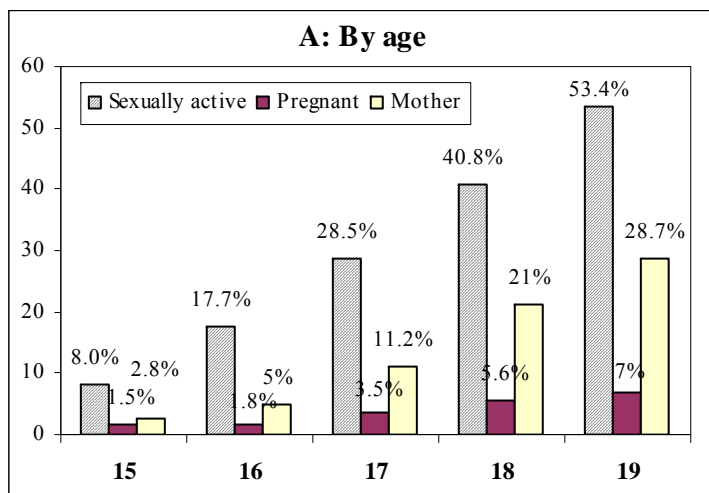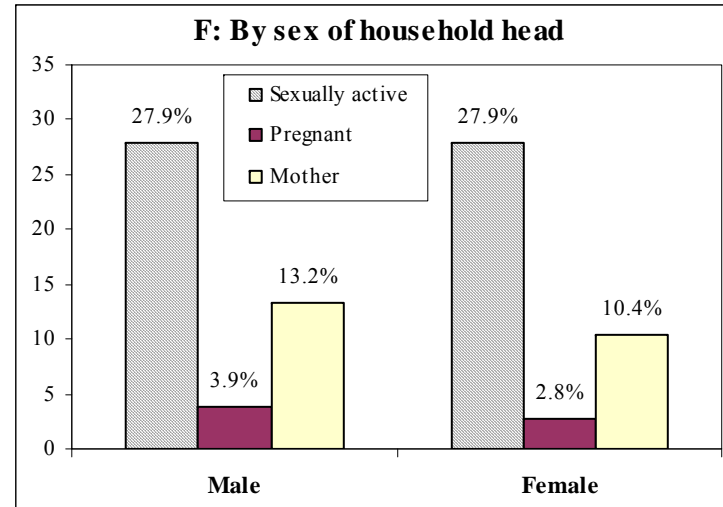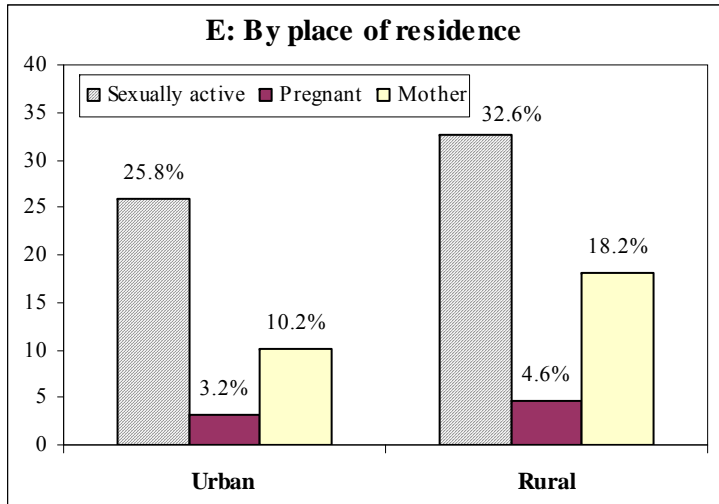F: By sex of household head

| | Not active | Sexually active |
|---|---|---|
| Male | 29.48 | 34.18 |
| Female | 31.14 | 38.02 |
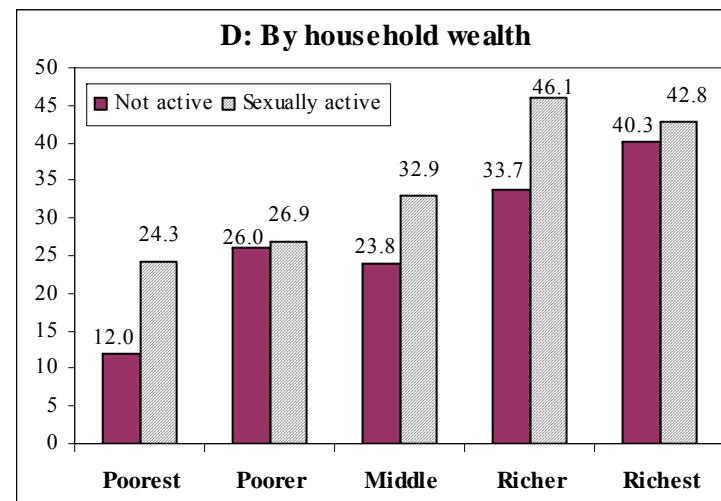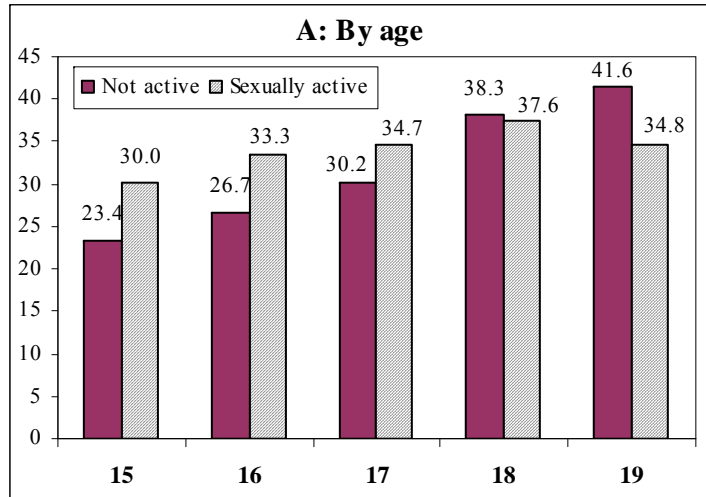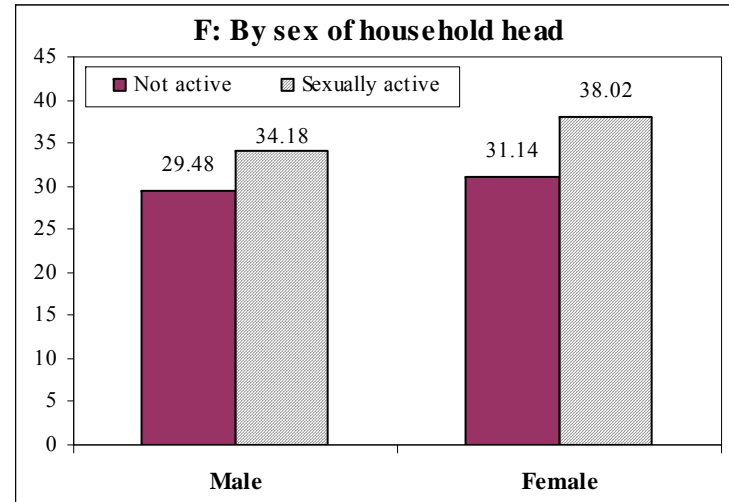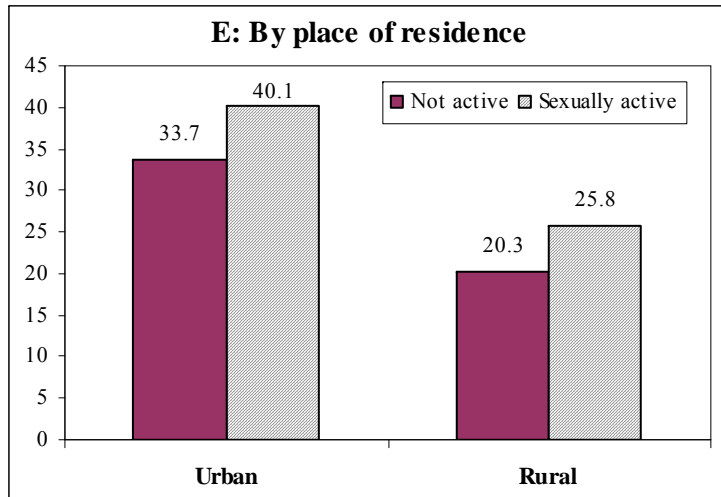
**Figure 6. Contraceptive Use among Sexually Active Teenagers, by Selected Characteristics**



**A: By age**

Modern / Trad/Folk / No method

| Age | Modern | Trad/Folk | No method |
|-----|--------|-----------|-----------|
| 15 | 28.4 | 13.6 | 58.0 |
| 16 | 29.7 | 19.5 | 50.8 |
| 17 | 36.2 | 14.5 | 49.3 |
| 18 | 32.8 | 24.5 | 42.7 |
| 19 | 43.3 | 14.8 | 41.9 |

**B: By education level**

Modern / Trad/Folk / No method

| Education | Modern | Trad/Folk | No method |
|-----------|--------|-----------|-----------|
| No education | 10.3 | 0.0 | 89.7 |
| Primary | 29.2 | 17.5 | 53.2 |
| Secondary | 41.3 | 19.6 | 39.2 |
| Higher | 78.8 | 3.9 | 17.3 |

**C: By indigenous descent**

Modern / Trad/Folk / No method

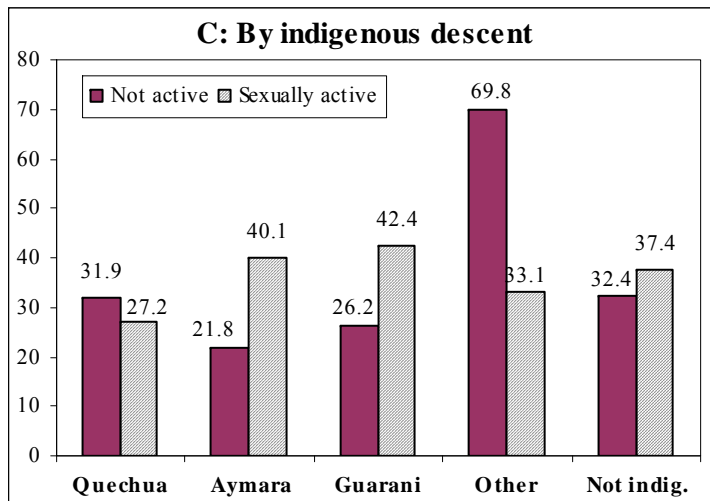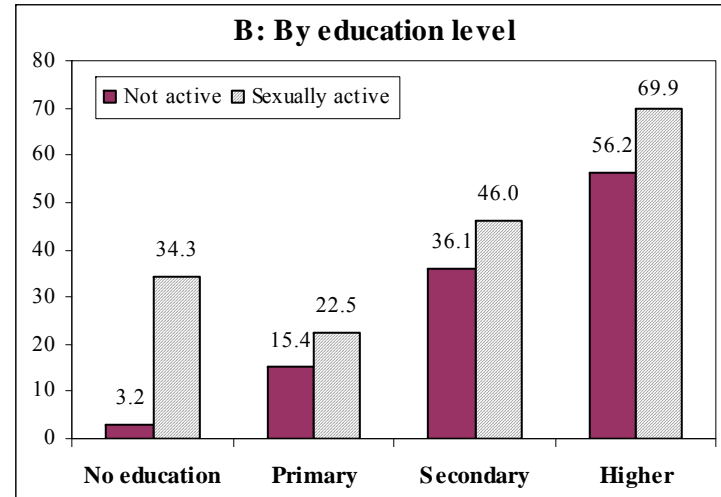| Descent | Modern | Trad/Folk | No method |
|---------|--------|-----------|-----------|
| Quechua | 25.9 | 15.2 | 58.8 |
| Aymara | 18.7 | 25.5 | 55.9 |
| Guarani | 38.8 | 20.9 | 40.4 |
| Other | 19.6 | 24.5 | 55.9 |
| Not indig. | 46.2 | 17.1 | 36.7 |

**D: By household wealth**

Modern / Trad/Folk / No method

| Wealth | Modern | Trad/Folk | No method |
|--------|--------|-----------|-----------|
| Poorest | 22.9 | 15.0 | 62.2 |
| Poorer | 29.4 | 22.6 | 48.0 |
| Middle | 33.3 | 21.7 | 44.9 |
| Richer | 44.1 | 16.9 | 39.0 |
| Richest | 48.6 | 13.2 | 38.3 |

33

**Figure 6., continued**



**E: By place of residence**

Legend: Modern, Trad/Folk, No method

Urban: Modern 41.8, Trad/Folk 17.3, No method 41.0
Rural: Modern 25.8, Trad/Folk 19.2, No method 55.0

**F: By sex of household head**

Legend: Modern, Trad/Folk, No method

Male: Modern 36.5, Trad/Folk 18.2, No method 45.3
Female: Modern 34.6, Trad/Folk 17.2, No method 48.2

**G: By marital status**

Legend: Modern, Trad/Folk, No method

Not married: Modern 30.1, Trad/Folk 14.7, No method 55.2
Married/Cohabiting: Modern 45.4, Trad/Folk 23.1, No method 31.5

**Table 1.  Teenage Sexual Activity, Pregnancy, and Motherhood by Marital Status**

| Marital status | Percentage |
|---|---|
| Married/cohabiting | 11.0% |
|    Sexually active | 100% |
|    Pregnant | 20.0% |
|    Mother | 70.1% |
|    Pregnant before union | 29.8% |
| Not married/cohabiting | 89.0% |
|    Sexually active | 19.1% |
|    Pregnant | 1.6% |
|    Mother | 5.5% |

*Source:* Author's calculations based on Bolivia DHS03.

**Table 2. Unwanted Current/Last Pregnancy by Selected Characteristics**

|  | Percentage |
|---|---|
| *Overall rate of unwantedness* | *66.3%* |
| *Contraceptive use* |  |
| No contraceptive | 69.4% |
| Any type of contraceptive | 63.8% |
| *Marital status* |  |
| Not married | 82.9% |
| Married/cohabiting | 55.3% |
| *Age* |  |
| 15 | 81.5% |
| 16 | 74.7% |
| 17 | 68.7% |
| 18 | 65.9% |
| 19 | 60.8% |
| *Education level* |  |
| No education | 94.9% |
| Primary | 60.8% |
| Secondary | 75.0% |
| Higher | 32.6% |
| *Indigenous descent* |  |
| Quechua | 70.0% |
| Aymara | 58.6% |
| Guarani | 51.8% |
| Other | 33.6% |
| Not indigenous | 68.5% |
| *Household wealth* |  |
| Poorest | 64.8% |
| Poorer | 64.8% |
| Medium | 65.1% |
| Richer | 69.7% |
| Richest | 68.7% |
| *Place of residence* |  |
| Urban | 68.9% |
| Rural | 62.9% |
| *Sex of household head* |  |
| Male | 66.8% |
| Female | 64.3% |

*Source:* Author's calculations based on Bolivia DHS03.

**Table 3: Descriptive statistics of Bolivian teenagers**

| Variable | All | Sexually active | Pregnant/ Mother |
|---|---|---|---|
| Pregnant/mother | 15.7% | 55.3% | 100.0% |
| *Demographics* | | | |
| Age | 16.85 | 17.62 | 17.80 |
| | (1.389) | (1.235) | (1.186) |
| Years of schooling | 8.77 | 8.06 | 7.27 |
| | (2.664) | (3.073) | (3.071) |
| Quechua | 27.9% | 27.5% | 28.1% |
| Aymara | 21.8% | 14.4% | 16.0% |
| Other indigenous | 2.5% | 3.9% | 4.0% |
| *Socioeconomic background* | | | |
| Currently working | 38.3% | 43.7% | 41.1% |
| Poorest household | 12.9% | 17.4% | 24.0% |
| Poorer household | 17.3% | 21.1% | 23.7% |
| Medium-wealth household | 20.5% | 19.6% | 19.5% |
| Richer household | 23.9% | 22.3% | 21.2% |
| Female-headed household | 21.5% | 21.5% | 17.8% |
| Members in household | 5.94 | 5.81 | 5.93 |
| | (2.482) | (2.803) | (2.975) |
| Rural residency | 30.5% | 35.6% | 42.4% |
| *Expected outcomes of teen motherhood** | | | |
| Years of schooling | 2.52 | 2.48 | 2.35 |
| | (1.094) | (1.082) | (1.140) |
| Household wealth | 0.37 | 0.40 | 0.37 |
| | (0.207) | (0.215) | (0.227) |
| Marital status | -0.20 | -0.19 | -0.18 |
| | (0.053) | (0.053) | (0.054) |
| *Regional fertility* | | | |
| % had first child as teen | 50.8% | 53.2% | 53.0% |
| % unmet family planning need | 14.3% | 14.0% | 14.1% |
| % never used contraceptives | 42.1% | 39.8% | 40.2% |
| *Family, fertility and health* | | | |
| Sexually active as a teenager | 27.9% | 100.0% | 98.2% |
| Married/cohabiting | 11.0% | 39.1% | 59.7% |
| Knows ovulatory cycle | 31.3% | 35.0% | 28.6% |
| Ever used modern method | 10.2% + | 36.1% | 35.2% |
| Ever used traditional method | 5.1% + | 18.0% | 18.9% |
| Has basic health insurance | 69.5% | 69.2% | 72.4% |
| Drinks | 35.1% | 55.6% | 53.1% |
| Smokes | 20.8% | 28.7% | 25.1% |
| Observations (unweighted) | 3859 | 1130 | 651 |

Notes: Author's calculations from Bolivia DHS03, weighted using DHS-provided sampling weights (v005). Standard deviations for continous variables in parentheses.

* Computed at the regional level, by rural/urban residence, as the difference for women ages 20-49 who did/did not borne a child before age 20. + Computed for the entire sample.

## Table 4. Regression Results (marginal effects)

| | Probit | Two-stage probit | |
|---|---|---|---|
| | **(A) Pregnant/mother** | **(B) Sexually active** | **(C) Pregnant/mother** |
| *Demographics* | | | |
| Age | 0.0096*** | 0.0266*** | 0.0889*** |
| | (0.003) | (0.006) | (0.023) |
| Years of schooling | -0.0038*** | -0.0092*** | -0.0424*** |
| | (0.001) | (0.003) | (0.012) |
| Quechua | -0.0015 | 0.0103 | -0.0249 |
| | (0.003) | (0.011) | (0.034) |
| Aymara | -0.0029 | -0.0229** | 0.0283 |
| | (0.004) | (0.011) | (0.059) |
| Other indigenous | 0.0030 | 0.0115 | -0.0297 |
| | (0.009) | (0.034) | (0.0697) |
| *Socioeconomic background* | | | |
| Currently working | 0.0015 | 0.0282*** | -0.0295** |
| | (0.003) | (0.012) | (0.027) |
| Poorest household | 0.0400*** | 0.0469** | 0.4422*** |
| | (0.018) | (0.026) | (0.096) |
| Poorer household | 0.0247*** | 0.0530*** | 0.2960*** |
| | (0.011) | (0.021) | (0.082) |
| Medium-wealth household | 0.0087* | 0.0302** | 0.2142*** |
| | (0.006) | (0.016) | (0.066) |
| Richer household | 0.0097** | 0.0111 | 0.1983*** |
| | (0.005) | (0.012) | (0.057) |
| Female-headed household | 0.0059* | 0.0162 | -0.0311* |
| | (0.004) | (0.011) | (0.026) |
| Members in household | 0.0020*** | 0.0008 | 0.0146*** |
| | (0.001) | (0.002) | (0.006) |
| Rural residency | 0.0074 | -0.0096 | -0.0024 |
| | (0.009) | (0.018) | (0.072) |
| *Expected outcomes of teen motherhood* | | | |
| Years of schooling | 0.0069*** | 0.0027 | 0.0613* |
| | (0.003) | (0.008) | (0.028) |
| Household wealth | -0.0347** | -0.1129** | -0.4172 |
| | (0.020) | (0.058) | (0.186) |
| Marital status | -0.0553 | -0.1968 | -0.5783 |
| | (0.042) | (0.127) | (0.439) |
| *Regional fertility* | | | |
| % had first child as teen | 0.0104 | 0.4538*** | -0.3266* |
| | (0.053) | (0.202) | (0.528) |

*Continues on next page*

**Table 4, continued: Regression Results (marginal effects)**

| | Probit | Two-stage probit | |
| --- | --- | --- | --- |
| | (A) Pregnant/mother | (B) Sexually active | (C) Pregnant/mother |
| % unmet family planning need | 0.2103 | -0.3591 | 2.9703** |
| | (0.155) | (0.474) | (1.638) |
| % never used contraceptives | -0.0959 | 0.1014 | -1.5683** |
| | (0.069) | (0.213) | (0.746) |
| *Family, fertility and health* | | | |
| Married/cohabiting | 0.3515*** | 0.6843*** | -- |
| | (0.065) | (0.088) | |
| Knows ovulatory cycle | -0.0011 | 0.0100 | -0.0412** |
| | (0.0031) | (0.010) | (0.027) |
| Ever used modern method | 0.0436*** | 0.7500*** | -0.2075*** |
| | (0.019) | (0.061) | (0.054) |
| Ever used traditional method | 0.0510*** | 0.7920*** | -0.2266*** |
| | (0.024) | (0.086) | (0.068) |
| Has basic health insurance | 0.0089** | -0.0059 | 0.0785*** |
| | (0.004) | (0.008) | (0.037) |
| Drinks | 0.0001 | 0.0649*** | -0.0211*** |
| | (0.003) | (0.020) | (0.027) |
| Smokes | 0.0045 | 0.0044 | -0.0358 |
| | (0.004) | (0.012) | (0.027) |
| $\lambda^{+}$ | -- | -- | -0.7278*** |
| | | | (0.126) |
| Observations (unweighted) | 3841 | 2715 censored; 1126 uncensored | |
| Log-likelihood | -849.74 | -1628.06 | |
| Pseudo R-squared | 0.4896 | | |

*Notes:* Author's calculations from Bolivia DHS03, weighted using DHS-provided sampling weights (v005).
Standard errors in parentheses. [+] For $\lambda$, table reports the Probit coefficient.
* <u>Probit</u> coefficient significant at $p < 0.1$; ** significant at $p < 0.05$; *** significant at $p < 0.01$.