Adolescent Births and Schooling Outcomes in Mexico: More than Correlation?

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I. Introduction

Adolescent childbearing is of increasing concern to policymakers in Latin America both because teen motherhood is correlated with adverse social outcomes, and because the tendency has been increasing or stagnant among specific countries and demographic groups in the region (Flórez and Soto 2007, Flórez and Nuñez 2003). Using Demographic and Health Surveys for seven countries in Latin America and the Caribbean Florez and Soto find an increasing tendency in birth rate of 15-19 year olds in Colombia over the period 1992-2004, and a stagnant tendency in the Dominican Republic (1986-2002), and Peru (1992-2004) despite considerable declines in the Total Fertility Rate (TFR) for women 15-54 in all three countries.

In Mexico as well as much of Central America over 40% of women are mothers by the time they are 19 years of age compared with an incidence between 20-40% in most South American countries.[1] (Sing 2009, Flórez and Soto 2007) Women in Mexico who had their first birth as a teen have completed on average two fewer years schooling than women who did not have a teen birth.[2] However skeptics argue that the teen births did not *cause* the adverse outcomes but rather that teen births were merely another co-determined outcome of poor socioeconomic backgrounds. In other words, women who become mothers in their teens on average would have had the same schooling and earnings outcomes in the absence of having a teen birth since they were already on paths leading to poor outcomes. According to this line of thought the teen birth is a symptom and did not itself not determine these outcomes.[3] From the policy perspective it is crucial to understand whether preventing teen pregnancy will contribute to improved educational and labor market opportunities for women or whether it is necessary to intervene earlier through the factors determining teen pregnancy.

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[1] Based on women 15-54 in the pooled 2002 and 2005 MxFLS. The rates are lower among the younger cohort of women 25-34 than for women 35-44.
[2] Based on the 2005 sample of the Mexican Family Life Survey.
[3] Adolescent childbearing is also correlated with higher rates of maternal mortality and infant mortality (Lloyd 2005).

An extensive literature has examined the pattern of lower levels of educational attainment and earnings for women in the United States who had births as teens compared to those who did not become parents as teens (Furstenberg 1976; Mott and Marsiglio, 1985; Ribar 1994) . In the U.S. literature, Geronimus and Korenmen (1992 and 1993) and Hoffman et. al. (1993), find that the large cross-sectional estimates of the negative relationship between teen parenthood and education are not sustained across samples of sisters. Geronimus and Korenmen (1992 and 1993) find that sisters tend to have similar outcomes regardless of whether one did or didn't have a teen birth. This suggests that family background is the determining factor behind poor school outcomes rather than teen births. In a similar study for Sweden, Holmlund (2004) finds the effect of a teenage birth among Swedish sisters is further diminished when school performance is considered, providing additional evidence that the relationship may capture unobserved factors correlated with teen births. The effects of teen parenthood on educational attainment in Latin America may be expected to be larger given that a school district's accommodation to a pregnant or teen mother may be considerably less than occurs in the U.S. or Sweden. Or the effect could be negligent or small given that household composition in Latin America includes more potential caregivers for the child, particularly through the greater share of extended families.

This study examines the effect of teen births on schooling outcomes in Mexico, using the Mexican Family Life Survey (MxFLS) collected in 2002 and 2005. Adolescent fertility in Mexico has followed similar trends as in other countries in Latin America. Although fertility rates for women ages 20 and over have fallen quite rapidly since 1970, fertility among 15-19 year olds has fallen less dramatically. The phenomenon of teen births remains common in Mexico with 40% of women being mothers by age 19. [4] In comparison in Chile, Kruger and Matias 2009 report that only 6% of women had births before age 19 and in Sweden Holmund (2005) finds that only 3% of a recent cohort of women born had births as teens. The adolescent fertility rate for girls ages 15-19 in Mexico is approximately 66 births per 1000 girls, higher than the rate for adolescent girls in Haiti, Peru and the United States. (WDI database circa 2005).

[4] The rates are lower among the younger cohort of women 25-34 than for women 35-44.

II. Data

The data analyzed comes from the 2002 and 2005 waves of the Mexican Family Life Survey as described in Rubalcava and Teruel (2006). The survey is designed to follow families longitudinally over time with each wave of the sample occurring every three years. The survey collects a very rich set of information on household members and includes fertility histories for women ages 14-54 as well as information on school attainment, Raven test scores, age of menarche, and household composition. The sister sample is comprised of biological sisters, as identified through detailed household composition variables.

Table 1 presents some summary statistics from the 2002 and 2005 Mexican Family Life Surveys.[5] The largest uncontrolled difference in educational attainment is observed within the 2002 sample with women who had their first birth before age 18 achieving 2.5 fewer years of completed schooling than women who had their first birth after age 18. In the 2005 sample the difference had narrowed to approximately 2 years. If we compare across sisters without making any other controls we observe a difference of 1.7 years.

[5] Presently weights are not available for the 2005 sample so the estimations do not use weights.

Table 1. Summary Statistics

	Observations	Mean	Std. Dev.	Min.	Max.	Non-teen - teen *	
						difference	p-value
SISTER SAMPLE 2002 - 2005							
Non-teen							
Years of schooling	2,286	9.469	3.480	0	20	1.692	0.000
Age in 2005 (years)	2,286	22.543	7.167	14	52		
Teen							
Years of schooling	331	7.776	2.878	0	17		
Age in 2005 (years)	331	24.514	6.738	15	51		
CROSS SECTION 2002							
Non-teen							
Years of schooling	5,755	8.592	3.823	0	20	2.515	0.000
Age in 2005 (years)	5,755	27.240	10.317	14	49		
Teen							
Years of schooling	2,957	6.077	3.462	0	18		
Age in 2005 (years)	2,957	33.001	8.821	14	49		
CROSS SECTION 2005							
Non-teen							
Years of schooling	6,580	8.724	3.990	0	20	1.946	0.000
Age in 2005 (years)	6,580	29.081	11.632	14	52		
Teen							
Years of schooling	2,732	6.778	3.523	0	20		
Age in 2005 (years)	2,732	32.340	9.469	14	49		

* Two-sample t test: null hypothesis is difference in means equals zero, alternative hypothesis is difference in means is different from zero.

III. Conceptual Framework and Identification Strategy

To address the endogeneity of teen births various studies using US data have employed the use of instrumental variables including age of menarche (Ribar (1994), Hotz, McElroy and Sanders (1998, 2005) and Ashcraft and Lang (2006). While age of menarche is available in the MxFLS and is plausibly uncorrelated with schooling and earnings except through its influence on teen fertility (through fecundity), the instrument is not sufficiently correlated with teen childbearing to be serve as an instrument (Bound , Jaeger, Baker 1995). The use of reported miscarriage as an exogenous influence on fertility is problematic for the case of Mexico where intended abortions may be reported as unintended miscarriages due to religious or cultural influences. Thus rather than attempt to address the endogeneity through a instrumental variable framework this paper follows the long line of literature that uses biological siblings as a natural control for unobserved family background (Geronimus and Korenman 1992 , Almond, Chay and Lee 2005) . We extend the analysis to sisters using the pooled sample of 2002 and 2005 MxFLS for women ages 14-54.

$$S_{ih} = \beta_0 + \beta_1 T_{ih} + \mathbf{C}_{ih}'\boldsymbol{\beta}_2 + \mu_h + \varepsilon_{ih}$$

We control for whether the sister is the oldest among those cohabitating given that other studies have found that older sisters typically achieve fewer years of schooling than younger siblings. While the vast majority of the demographic literature has focused on sibling care as the source of transmission of the lower schooling, we will explore whether it is related to adolescent fertility, exploiting the panel data.

First, consider the assumption of strict exogeneity within the family, which implies that teenage births .should be random to sisters, conditional on X. Clearly, sisters differ in many respects, and these differences may be correlated with both the propensity to become a teenage mother and the labor market outcome variable. For example. consider a premotherhood characteristic such as school performance. It is reasonable

to assume that the correlation between school performance and teenage motherhood is negative. Failing to control for school performance (or any other variable with a similar correlation structure) could cause a downward bias of the effect of teenage motherhood on labor market outcomes, that is the estimated coefficient will be more negative than the true coefficient.

IV. Results

As seen in Table 2 the significant negative effect of having of teen birth is maintained across the four specifications. While the effect of 1.46-1.75 years of schooling is the largest in the cross-section (eqs. 1 and 2) there is a smaller but still significant effect on completed education in the fixed effects regressions of sisters (eqs. 3 & 4). In contrast to the Holmunds' finding the inclusion of Raven's scores does not reduce the effect of the teen birth on schooling attainment across regressions 3 and 4. The results in Table 2 suggest that the association between adolescent births and lower schooling attainment is not driven by unobservable factors merely correlated with teen births. We conclude that in Mexico effective programs to prevent teenage fertility can have important effects on schooling attainment.

Table 2. Estimates of the effect of teenage motherhood on years of schooling in Mexico

	Outcome variable: years of schooling [1]			
	2002-2005 sister sample			
	OLS (unweighted)		Within-sister estimates (unweighted)	
	(1)	(2)	(3)	(4)
1 if teen mom	**-1.75*** **	**-1.46*** **	**-0.71*** **	**-0.68*** **
95% CI	-2.14 - -1.37	-1.80 - -1.12	-1.10 - -0.32	-1.06 - -0.30
p-value	0.000	0.000	0.000	0.001
SE	0.20	0.18	0.20	0.20
Raven score		0.48***		0.21***
95% CI		0.42 - 0.53		0.15 - 0.28
p-value		0		0
SE		0.03		0.03
1 if oldest sister	0.39***	0.33***	0.51***	0.46***
95% CI	0.14 - 0.63	0.09 - 0.56	0.21 - 0.82	0.17 - 0.76
p-value	0.002	0.007	0.001	0.002
SE	0.13	0.12	0.16	0.15
Age (years)	-0.00	0.02	-0.03	-0.01
95% CI	-0.03 - 0.03	-0.01 - 0.05	-0.09 - 0.02	-0.07 - 0.04
p-value	0.931	0.177	0.242	0.608
SE	0.02	0.01	0.03	0.03
1 if 2002 but not 2005	-0.06	0.02	-0.01	-0.04
95% CI	-0.45 - 0.34	-0.34 - 0.38	-0.48 - 0.45	-0.51 - 0.43
p-value	0.778	0.917	0.953	0.871
SE	0.20	0.18	0.24	0.24
1 if Raven taken in 2002		-0.23		-0.29
95% CI		-0.86 - 0.39		-0.93 - 0.36
p-value		0.464		0.381
SE		0.32		0.33
Constant	9.36***	5.56***	9.87***	8.01***
95% CI	8.79 - 9.92	4.88 - 6.24	8.74 - 11.00	6.79 - 9.22
p-value	0.000	0.000	0.000	0.000
SE	0.29	0.35	0.58	0.62
Observations	2,579	2,579	2,579	2,579
Log likelihood	-6,809.86	-6,599.59	-5,277.34	-5,226.64
Adj R2	0.028	0.174	0.014	0.051
F Test	21.957	71.767	6.777	12.421
Prob >F	0.000	0.000	0.000	0.000
N sister groups	1,101	1,101	1,101	1,101

[1] CI, p-values and standard errors were calculated allowing for clustering at the sister level.

Data comes from the Mexican Family Life survey First and Second Wave. More information in Rubalcava, Luis and Teruel, Graciela (2006). "User's Guide for the Mexican Family Life Survey Second Wave", www.mxfls.uia.mx.

V. Conclusions

A longstanding debate has existed regarding the interpretation of the negative correlation observed between adolescent childbearing and lower schooling attainment. In the United States research exploiting differences across sisters, and thus controlling for family background, has shown that much of the difference disappears with the additional controls. However contrary to evidence found for the United States and some other countries the association between adolescent births and lower schooling attainment in Mexico does not seem to be driven by unobservable factors. Even after controlling for family background influences there appears to be a long-run effect of teenage fertility on educational attainment. We conclude that in Mexico programs to prevent teenage fertility can have important effects on increasing schooling attainment.

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