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Research Article

Teen Fertility and Gender Inequality in Education: A Contextual Hypothesis

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Abstract

Previous studies in developed countries have found a micro-level association between teenage fertility and girls' educational attainment but researchers still debate the policy implications of these associations. First, are these associations causal? Second, are they substantively important enough that policy efforts to reduce unintended pregnancy among teens would pay off in terms of narrowing national gender gaps in education? Third, if such policies do pay off, under what contexts are the payoffs likely to be most important?

This paper focuses on the latter two questions. We begin by proposing a contextual hypothesis to explain cross-national variation in the gender-equity payoffs from reducing unintended teen fertility. We then test this hypothesis, using DHS data from 38 countries.

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1. Introduction

Early, unplanned childbearing has long been viewed as a plausible impediment to the completion of girls' schooling. Micro-level studies in developed countries have often found an inverse relationship between teen pregnancy and the educational attainment of girls but researchers still debate whether this relationship is causal or simply a spurious reflection of the socioeconomic disadvantage of poorer teens (Hayes and Hofferth 1987; Geronimus and Korenman 1992; Hoffman et al. 1993; Ribar 1994; Klepinger et al. 1995; Hoffman 1998; Ribar 1999). Even assuming a causal statistical relationship, the policy importance of this link depends on (1) its importance at the national, rather than individual, level and (2) its variation across countries. In other words, how much would policy efforts to reduce unintended teen fertility pay off in terms of raising girls' schooling and reducing the gender gap in educational attainment, at the national level? In what kinds of settings can these gender-equity payoffs be expected to be large enough to warrant policy attention?

This paper attempts to address these two questions. We begin by proposing a contextual hypothesis that subordinates payoffs to countries' demographic, educational, cultural and economic context. Specifically, payoffs are predicted to be greater in countries that are intermediate in terms of their advance in the levels of teen fertility, teens' school participation, gender equity in adult literacy, and economic conditions. We then test this hypothesis using DHS data from 38 countries. The analyses are designed to (1) estimate the magnitude of gender-equity payoffs from reducing pregnancy-related dropouts within each of the 38 countries, and (2) examine whether these payoffs are systematically correlated with contextual features of these countries, along the lines suggested by our contextual hypothesis.

2. A contextual hypothesis

The debate on the schooling effects of teen fertility was initially framed in antithetical terms, i.e., whether or not teen fertility affects girls' educational outcomes (Hoffman 1998). There is evidence, however, that these effects have changed over time in the US for instance (Hofferth et al. 2001) and this raises the possibility of cross-national variation as well. Yet because most studies have focused on industrial countries (Mensch et al. 1998; Montgomery and Lloyd 1999), researchers have not been able to identify the contextual forces that mediate the schooling consequences of teen fertility. The contextual hypothesis proposed here attempts to identify some of these forces. Its main idea, developed below, is as follows: In order to understand variation in the schooling importance of teenage fertility, one must consider national or regional differences in both the etiology of school dropout and the normative life course of teens.

With respect to etiology, pupils drop out of school for several proximate reasons, both sex-specific and non-sex-specific. Most of these reasons (e.g., poor health, tuition, death, or school performance) are not intrinsically sex-specific, i.e., they would not affect boys and girls differently in the absence of gender discrimination. This discrimination can be rooted in culture where societies are not open to the idea of educating girls on a par with boys, regardless of economic circumstances. Discrimination can also stem from difficult economic conditions. In this case, families wish to educate their daughters but when constrained by resources, they view investments in sons as a better strategic choice (Odaga and Heneveld 1995; Eloundou-Enyegue and Calves 2004). Contrary to other dropout reasons, pregnancy-related dropouts tend to be more sex-specific. Girls, more than male partners, bear the burden of pregnancies in developing countries. Often the partner is an older male and, even when a younger male student is involved, he is spared the full responsibility of fatherhood precisely because of his insolvency. Teen mothers occasionally receive assistance from partners or family but they ultimately bear the brunt of childcare and must often drop out of school as a consequence.

A second factor to consider is the normative life course of teens. Even where teen pregnancies are common, their contribution to the educational gap between boys and girls depends on several factors, one being the normative life course of women. Pregnancies matter most in countries where the period of school participation extends well beyond puberty and where girls' schooling has gained some cultural acceptance as an alternative to early childbearing. Teen fertility is thus innocuous (from the standpoint of girls' schooling) in societies where the average duration of schooling is short or where reproductive norms prescribe early marriage and childbearing for girls. It will also have less impact at the other extreme, when teens' schooling participation has become the norm and when teen pregnancies are highly uncommon or socio-economically selective. Teen fertility will matter most in intermediate countries/situations where teen fertility and education overlap and compete within the life course of teens.

Given these considerations, we postulate that the gender-equity impact of teen fertility will be greatest within countries at intermediate stages of any one of four aspects of socioeconomic development. The first aspect is *demographic* in nature, specifically the extent to which childbearing during teen years evolves from being normative to being uncommon and selective. Teen pregnancies become problematic (from the stand point of schooling) in demographically-intermediate countries because they still occur frequently but also because they increasingly occur outside wedlock and at a time when girls would still consider attending school (Mensch et al. 1998; Calves et al. 2004). A second aspect relates to the *educational* state of progress, specifically the extent to which the school participation of older teens is common. In countries that are educationally-intermediate, the number of older teens who are at risk of dropping out through pregnancy increases as well. A third aspect is *cultural*. In countries where there is an increasing acceptance by families and by the State of the idea of female education, sex-specific factors (such as pregnancy-related dropout) increasingly become the only force sustaining a gender gap in education. A fourth and final aspect is *economic*. Even where cultural discrimination against girls subsides, adverse economic conditions can stall the progress in narrowing the educational gap between boys and girls. Families under duress will still favor boys, if they expect to reap better returns from boys', rather than girls', schooling (Odaga and Heneveld 1995). This economic discrimination should wane as countries become more affluent in ways that increase the returns to female schooling and families' ability to afford to educate all their children.

Overall, we expect the schooling impact of teen fertility to be greater during the intermediate stages of societal development, whether the focus is on its demographic, educational, cultural, or economic dimensions. By considering each one of these four dimensions alternatively, we propose four hypotheses:

H1 (demographic): Impacts will be greater in the intermediate settings where childbearing among teens has begun to evolve from being normative to being unlikely and selective.

H2 (educational): Impacts will be greater in the intermediate settings where the school enrollment of older teens has begun to evolve from being uncommon and selective to being the norm.

H3 (cultural): Impacts will be greater in the intermediate settings where families have begun to evolve from male favoritism to egalitarianism.

H4 (economic): Impacts will be greater in the intermediate settings where the economic constraints against girls schooling have begun to subside.

3. Data, sample, and methods

3.1 Dependent variable

The first step in this research is to estimate the dependent variable, i.e., the gender-equity payoff associated with reductions in unintended teen pregnancy. In other words, how much would any of the sampled countries narrow its gender gap in educational attainment if it reduced the incidence of pregnancy-related dropouts? These estimates were generated for 38 countries where the Demographic and Health Surveys (DHS) have collected information on dropout reasons and on the enrollment status of children (DHS 2003). The estimation procedure, described in Appendix I, is as follows. First, we combined the DHS information on dropout reasons and enrollment status with UN statistics for each country on the pace of school progression and the structure of the school system (i.e., the age of school entry and the duration of primary school and secondary school) to estimate grade-specific and reason-specific probabilities of school dropouts. Second, using these probabilities, we created schooling life tables for each of the 38 countries. Finally, these schooling tables serve to estimate how much each of the countries would narrow its gender inequality in secondary school completion, assuming hypothetical reductions in the incidence of pregnancy-related dropouts. In other words, we estimated the gender equity payoffs from policies to reduce pregnancy-related dropouts.

Payoffs can be measured in absolute, relative, normative, or substantive terms. Absolute payoffs represent the nominal increase in the female-to-male ratio in secondary school completion (i.e., a reduction in the gender gap in educational attainment) that would result from averting all pregnancy-related dropouts. Relative payoffs measure the *percent* increase in this female-to-male ratio if all pregnancy-related dropouts were averted. Normative payoffs refer to whether or not the reduction of pregnancy-related dropouts in a country suffices to achieve gender parity in educational attainment. Finally, substantive payoffs refer to whether or not the impact is large enough to warrant policy intervention. We used two somewhat arbitrary but reasonable criteria: (1) the policy must induce an absolute improvement greater than 0.10 points and (2) the country should have a substantial gender gap to begin with, i.e., a baseline female-to-male ratio below 0.95. To illustrate these measures, consider a country with an initial female-to-male ratio in secondary completion of 0.85, i.e., only 85 female students complete secondary school for every 100 male students who do so. This implies a gender gap of 0.15. If a policy happens to raise the initial female-to-male ratio by 0.15, its absolute payoff will be 0.15 or 15 percentage points. Its relative payoff, on the other hand, will be 17.6 percent (0.15/0.85). In this case, the normative payoff will be important since the reduction of pregnancy-related dropouts moves the country to gender parity. The payoff would also be significant on substantive grounds, since the initial ratio was below 0.95 and it increased by more than 0.10 points. For reasons that are discussed below, the analyses in this paper are based on substantive significance. Countries where teen fertility policy is expected to have a substantively significant impact are coded 1, while the others are coded 0.

Before discussing the predictors, the accuracy of estimates for the dependent variable deserve note. The DHS responses to questions about dropout reasons may be affected by how questions are framed, notably whether respondents are expected to provide a single, rather than multiple reasons for the dropout. Responses can also depend on the informant. If parents serve as informants, they may tend to blame children themselves for their school failure, hence emphasize reasons such as poor grades or pregnancy, whereas pupils may shift the blame to parents, and hence stress the lack of resources. Because pregnancies are a dramatic and memorable event, they could be over-emphasized at the expense of other contributing factors. On the other hand, respondents may have reservations against acknowledging premarital pregnancy, and instead redefine such dropout reasons as marriage-related. Based on our field experience, we have little reason to believe that DHS data over-reports pregnancy-related dropouts (Note 1). Of greater concern is the interpretation of reported dropout reasons. We assume that whenever pregnancy is reported as a dropout reason, it is the sole and true reason for the dropout. If pregnancies are merely a symptom of underlying socioeconomic disadvantage (or even if they only represent one of several cofactors in the dropout), we would overestimate the contribution of teen pregnancy to gender inequality. For this reason, our dependent measure is best viewed as an upper-bound estimate of the payoff of reducing pregnancy-related dropouts.

A second observation pertains to the procedure used to convert the DHS data into measures of payoff. This conversion procedure assumes the following: (1) enrollments decline linearly within the age categories selected for tabulation by DHS, (2) the distribution of dropout reasons is similar within the grade level categories selected for tabulation by DHS, and (3) the pace of school progression relative to age is similar for boys and girls. Reasonable departures from these assumptions change the nominal value of the gender-equity payoffs but not to a degree that alters the general conclusions. (Note 2) Provided that the initial DHS data are accurate, the conversion procedure used here should generate accurate, albeit imprecise estimates of the payoff of reducing pregnancy-related dropouts.

3.2 Independent variables

Relevant predictors within the contextual hypothesis include the levels of teen fertility, teen schooling, gender inequality among the adult population, and economic conditions. The context of teen fertility is indicated by the percentage of teens who reach age 20 without becoming either mothers or pregnant. This number varies in theory from 0 to 100 percent and higher numbers indicate a more advanced demographic context. A country's context in teen's educational development is indicated by the percentage of older teens (16-20) still enrolled in school. This number also varies in theory from 0 to 100 percent and larger numbers indicate more advanced educational contexts. The country's context of cultural discrimination is indicated by the female-to-male ratio in adult literacy. Higher ratios indicate more advanced cultural contexts where families are more receptive to the idea of educating their daughters. Economic conditions are indicated by the natural logarithm of the country's gross national income per capita (GNI). Higher GNIs are presumed to be associated with lower economic constraints to the secondary schooling of children. High GNIs are also expected to be associated with better returns to female schooling and this also should reduce the extent of female discrimination on economic grounds.

3.3 Sample

The DHS have collected relevant schooling information within 38 nations, including 23 in Africa, 3 in South Asia, 7 in Latin America, and 5 in the Middle East and West/Central Asia (DHS 2003). The diversity in sampled countries affords an empirical test of the contextual hypothesis. As Figure 1 indicates, these countries differ widely in their levels of teen fertility, from Niger (where only 57 percent of teens turn 20 without becoming pregnant) to Jordan or Vietnam (where a full 94 percent of teens do so). Similar diversity is found in teen education. The proportion of older teens still enrolled in school averages 35 percent and ranges from 7 in Niger to 71 percent in South Africa. The female to male ratio in adult literacy ranges from a low of 0.32 in Niger to a high of 1.04 in Nicaragua, with an average of 0.73. Finally, the sample countries' GNI per capita range from $152 (logged value=5) in Mozambique to countries such as Brazil and South Africa with values over $3,000. Figure 1 also underscores the synchronous nature of these contexts. Reductions in teen fertility are associated with greater proportions of teens enrolled in school (Note 3) (b=0.74; R-square=0.26). An even stronger correlation exists between culturally-based gender discrimination and GNP per capita (b=0.03; R-square=0.42).

3.4 Analyses

Logistic regression was used to estimate the effects of each contextual variable on the likelihood of a nation reaping a significant gender-equity payoff from reducing pregnancy-related dropouts. Because the contextual hypothesis postulates a curvilinear relationship, the models had to consider a linear and a quadratic term for each independent variable. On the other hand, the small size of our sample precluded simultaneous consideration of multiple independent variables and therefore, analyses proceeded as follows: The first series of models estimated the linear effect of each independent variable separately (model I), then a second series examined whether each of these effects were curvilinear (model II), then a fuller model (III) incorporated all the

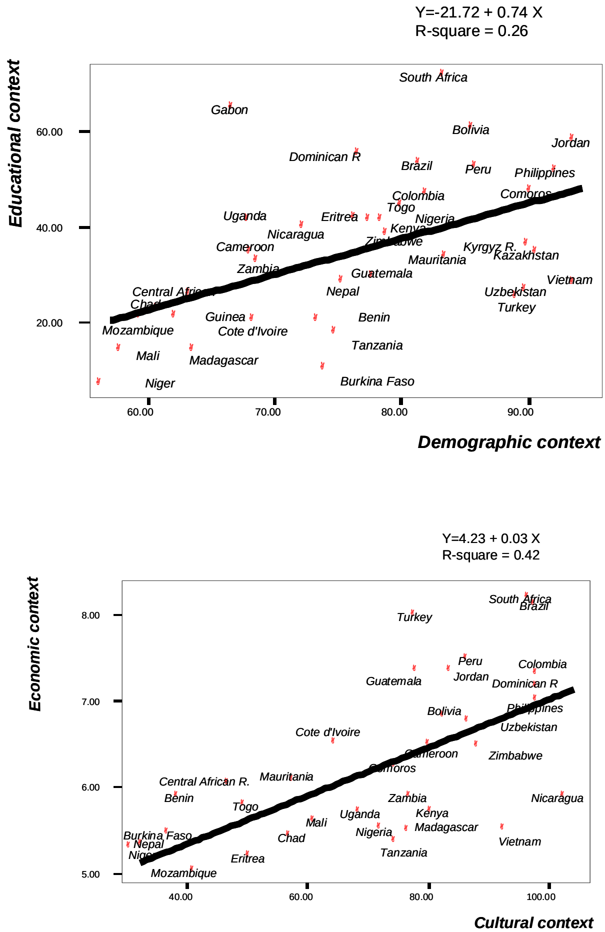


Figure 1: *Distribution of study countries based on development context*

<u>Notes</u>: Indicators for the stage in various aspects of development context are as follows:

Demographic context: percent of females who reach age 20 without becoming mothers or pregnant.
Educational context: percent of older teens (16-20) still enrolled in school
Cultural context: female to male ratio in literacy among the adult population
Economic context: natural log of GNI per capita
For each transition, a higher number indicates more advanced stages.

<u>Sources</u>: DHS (2004) and World Bank (2001)

linear terms and all the curvilinear terms found to be significant in step II. Finally, a parsimonious model is estimated that includes only significant effects.

4. Findings

4.1 Country-specific results

Figure 2 shows the input data from DHS about the percentages of female dropouts associated with pregnancies (columns). It also shows our study estimates of measures for the dependent variable, i.e., the gender-equity payoffs from reducing pregnancy-related dropouts (thin bars above each column). Data are shown for the 38 study countries, grouped by region.

Focusing first on the percentages from DHS, they range from 0 or nearly 0 (Niger, Turkey, Uzbekistan, Vietnam, Kyrgyz Republic) to 27.6 in Gabon. Large differences exist across regions, with higher percentages in sub-Saharan Africa and Latin America. Percentages also differ within regions. Gabon and South Africa for instance have over ten times the rates found in Niger (0.9 percent) or Mauritania (2.1 percent). Even countries with a similar percentage can differ in how these pregnancy-related dropouts are distributed through the school cycle. Detailed data (not shown but see Appendix II) indicate that percentages are typically low in primary school then they rise in secondary school before declining beyond high school.

Figure 2 also shows our estimates of the gender-equity payoffs of reducing pregnancy-related dropouts (thin bars). The base of these thin bars measures the initial female-to-male ratio in secondary school completion. Burkina Faso for instance shows a value of about 0.40, meaning that only 40 girls complete secondary school out of 100 boys who do so. The midpoint and the top of these small bars indicate what this ratio would become if pregnancy-related dropouts were reduced by 50 percent or 100 percent, respectively. These numbers for Burkina Faso are 0.45 and 0.51, respectively. The table in Appendix III shows the detailed results of these simulations for all 38 countries.

In terms of the various impact measures discussed previously, absolute impacts are indicated by the length of the bars; normative impacts are indicated by whether or not the bar crosses the line representing gender equity; substantive impacts are indicated by stars. In other words, stars above the thin bars indicate countries where these impacts are substantively significant, i.e., countries where the initial female-to-male ratio in secondary school completion is less than 0.95 and where an eradication of pregnancy-related dropouts would increase this ratio by over 10 percentage points.

Figure 2 suggests three insights. First, raw DHS data on the percentage of pregnancy-related dropouts are imperfect indicators of potential impact. Pregnancies account for a larger share of female dropouts in Gabon (27.6 percent) than in Uganda (7.4 percent), yet they make a greater nominal contribution to gender inequality in Uganda (36 percentage-point improvement versus 25 percentage-points in Gabon). If the raw DHS percentage was all that mattered, then as one moved from left to right within a region (i.e., as the raw DHS percentage increased), the length of impact bars would rise accordingly. Instead the pattern is more erratic because other factors matter, including the timing of these pregnancy-related dropouts, the extent of gender discrimination, and the total rate of dropout. The point is that the DHS percentages, by themselves, are not a good predictor of the impact of teenage pregnancies to the gender inequality in educational attainment.

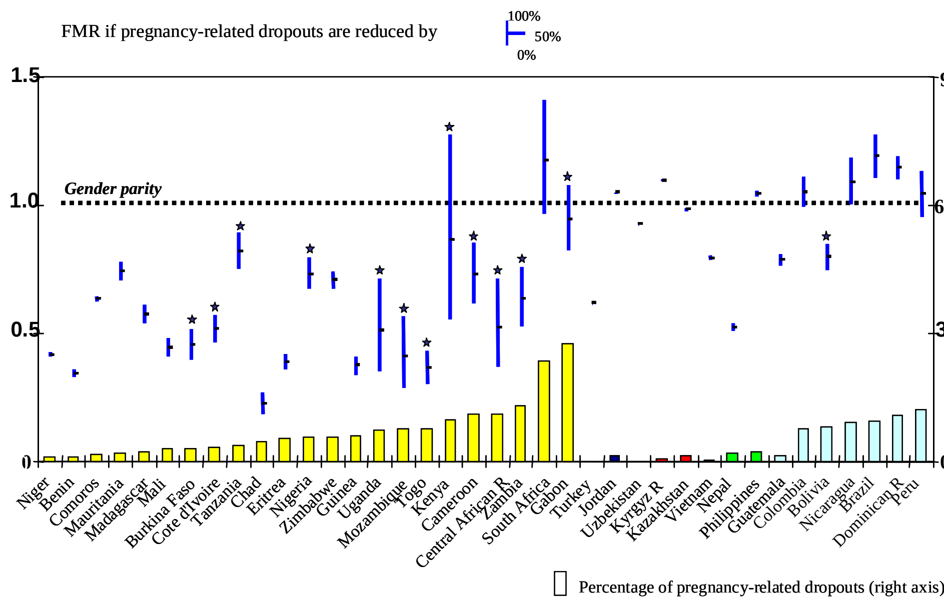


Figure 2: *Simulation results for the impact of reducing pregnancy-related dropouts on the female-to-male ratio in secondary school completion (FMR), by region and country*

As a second insight, few countries would close their gender gap solely by reducing unintended teen fertility. Five countries (Kenya, Gabon, South Africa, Colombia, and Peru) would do so, but the last three of these countries were already very near parity. Nevertheless, many countries would achieve sizeable gains, as illustrated by the length of the bars observed in the Central African Republic, Cameroon, Mozambique, Uganda, or Zambia for instance.

A third insight is the substantial variation both across and within regions. The nominal impacts of teen pregnancy policy range from over 30 percentage points in the Central African Republic for instance to nearly 0 in Niger or Jordan for instance. While Figure 2 underscores this variation, it does not explain it, a task to which we now turn.

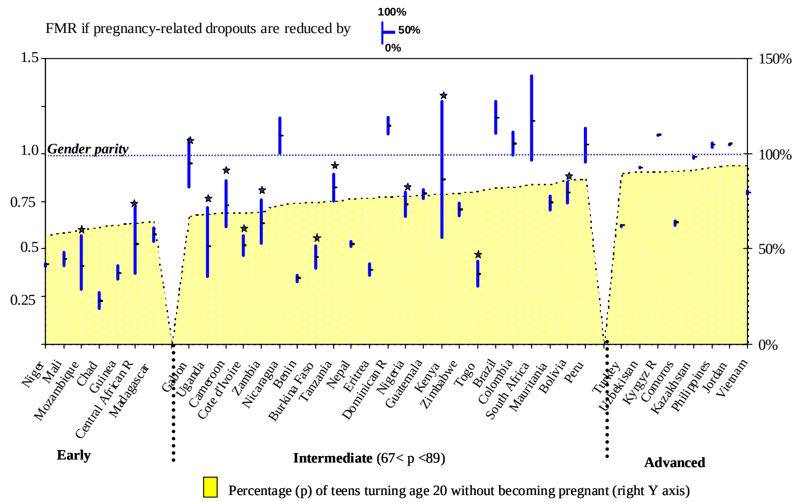
4.2 The effects of context

Figure 3 gives univariate descriptions of how impacts change with context. It is similar to Figure 2, the only difference is that countries are ranked according to where they fall in the four contexts hypothesized to influence gender-parity in education. Analyses are presented separately for each context, whether in demographic (Frame A), education (Frame B), cultural (Frame C) or economic context (GNP per capita) (Frame D). Within each frame, countries are divided into early, intermediate, or advanced, according to whether or not they fall within one standard deviation from the mean of the contextual variable. Stars identify countries where impacts are substantively significant. One can thus observe how substantive payoffs differ as one moves along the X axis, i.e., as countries differ across early, intermediate and advanced contexts.

Results for the demographic context (Frame A) are consistent with expectations. No countries that are advanced in terms of their demographic context (0 out of 8) and few that are early (2 out of 7) would achieve substantive reductions in their gender gaps by relying on teen fertility programs. On the other hand, substantive reductions are observed in 11 out of the 23 intermediate countries, i.e., nearly half the countries in this group.

Results are slightly less consistent for the cultural context (Frame C) and even less so for economic (Frame D) and education contexts (Frame B). In Frame C, no advanced country (0 out of 6) is expected to reap a substantive gender-equity payoff, and most of the countries where a payoff could be observed fall within the intermediate category (8 countries). However, an unexpectedly large percentage of early context countries (4 out of 8, i.e., 50 percent) are found to have a gender-equity payoff that is substantively important on the basis of the criteria adopted in this study. In other words, the curvilinear relationship posited between the male/female literacy ratio and payoff is less

A: DEMOGRAPHIC CONTEXT



B. EDUCATIONAL CONTEXT

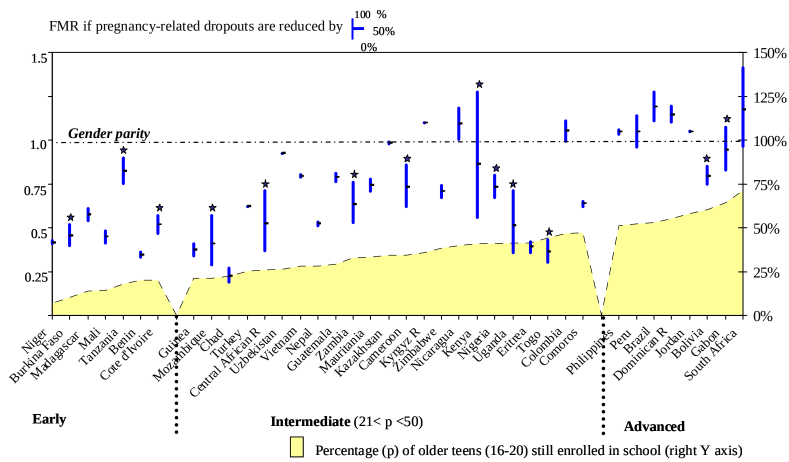
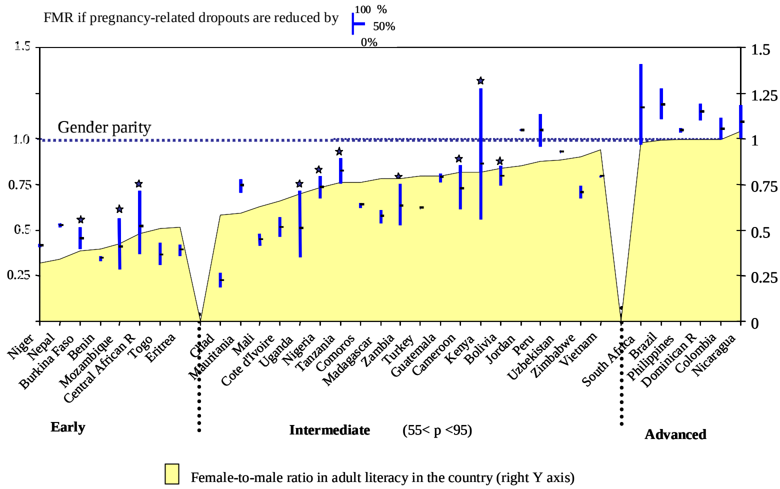


Figure 3: *Gender-equity payoffs from reducing pregnancy-related dropouts, by selected aspects of development context*

C. CULTURAL CONTEXT



D. ECONOMIC CONTEXT

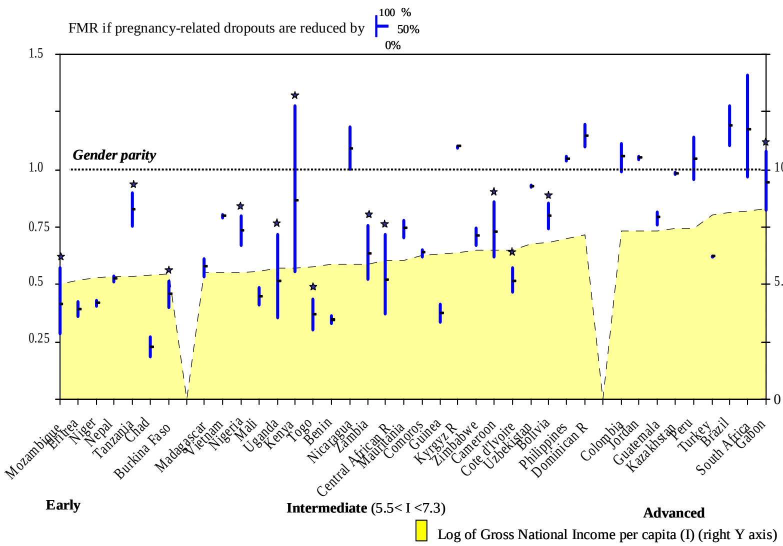


Figure 3: *Continued*

Note: FMR is the female to male ratio in secondary school completion apparent. This relationship is also weaker if one focuses on per capita GNI where only 9 out of 22 intermediate countries would observe a substantive payoff, while 3 out of 7 early countries and 1 of 9 late countries would observe a payoff. Similarly, Frame B which focuses on the educational context indicates that 3 of 7 early countries and 2 of 8 late nations can be expected to reap substantive gender-equity payoffs. Only one third (8 out of 23) of intermediate countries would reap a substantive payoff.

In sum, this preliminary analysis shows partial support for the contextual hypothesis, depending on the specific context examined. The evidence can be tested more formally through statistical analysis. Multivariate modeling improves the analysis in three ways. First, one can examine the combined and net influence of contextual variables. Second, one can avoid a loss of information by measuring contexts as interval, rather than ordinal, variables. Côte d'Ivoire, Zambia, and Nicaragua, for instance, are adjacent countries in their teen fertility contexts but the difference in teen fertility levels between the first two (0.30) is only a small fraction of the difference between the last two (3.70). Third, one can avoid using arbitrary cutoff points. The analysis in Figure 3 used one standard deviation from the mean as the cutoff point to distinguish early and advanced countries from the intermediate countries. While this statistical cutoff ensures a balanced representation of countries across the three categories, it can distort results if our sample is not representative of the full range of developing countries, say if it contains few truly early context countries.

The models in Table 1 summarize how each of the four contextual variables affects the likelihood of a country reaping a substantively important gender equity payoff from reducing pregnancy-related dropouts. Model I focuses on the linear effects. Results show negative effects but only the demographic context has a significant effect. The more advanced a country in its demographic context, the less likely it is that a country would reap a gender-equity payoff from reducing its incidence of pregnancy-related dropouts (OR=0.93; $p< 0.05$).

Model II specifies a series of quadratic models to examine whether relationships are curvilinear as postulated under the contextual hypothesis. The evidence is consistent with theoretical expectations for the demographic and cultural contexts. As teen fertility declines, the payoff of teen fertility policy rises initially (OR=5; $p<0.05$) then it subsequently declines (OR=0.99; $p<0.05$). A similar pattern holds for the cultural context. As cultures become more egalitarian, the payoffs to teen fertility reductions begin to increase (OR=1.41; $p<0.05$) then they ultimately decline (OR=0.997; $p<0.05$). On the other hand, no curvilinear effects are found for either school participation or per capita GNI.

A fuller model (III) incorporates all the linear influences and the significant curvilinear effects. Results confirm the curvilinear influences found in model II, but additionally, the lack of significance for the other two contexts. Because these two

Table 1: *Logistic regression results for the effects of country context on the gender-equity payoff of reducing the incidence of pregnancy-related dropouts.*

Variables	Summary statistics		LOGISTIC REGRESSION RESULTS							
			Model I Univariate linear		Model II Univariate curvilinear		Model III Multivariate full		Model IV Multivariate parsimonious	
	[Min – Max]	Mean (Std)	B	OR	B	OR	B	OR	B	OR
DEPENDENT VARIABLE										
Gender-equity payoff	1= payoff is substantively significant [(a)]									
	[0-1]	0.34 (0.48)								
COUNTRY CONTEXT										
Demographic context	% teens reaching age 20 being neither mothers nor pregnant									
Linear term	[56.9–94.3]	77.2 (10.8)	-.069	.93*	1.610	5.00*	1.802	6.06#	1.662	5.27#
Quadratic term					-.011	.99*	-.013	.99#	-.012	.99#
Educational context	% of teens 16-20 still enrolled in school									
Linear term	[6.9-71.4]	35.5 (15.7)	-.003	.99	-.008	.99	.075	1.08	---	---
Quadratic term					.000	1.00	---	---	---	---
Cultural context	Ratio of adult female-to-male literacy									
Linear term	[32.1-103.9]	73.2 (21.1)	-.026	.97	.345	1.41*	.368	1.44*	.351	1.42*
Quadratic term					-.003	.99*	-.003	.99*	-.003	.99*
Economic context	Log of Gross National Income per capita									
Linear term	[5.0 – 8.3]	6.4 (0.9)	-.635	.53	-2.09	.12	-.584	.558	---	---
Quadratic term					.111	1.118	---	----	----	---
Constant							-71.55	.000*	-69.33	.000*
Model Chi square (df)							16.60	(6df)	14.4	(4df)
Nagelkerke R-square							0.53		0.47	

[(a)] Payoff is substantively significant if the eradication of pregnancy-related dropouts increases the female-to-male ratio in secondary school completion by at least 0.10 points in a country where this ratio was initially less than 0.95.; #, *, and ** indicate significance at the 0.10, 0.05, and 0.01 respectively.

contexts do not have a significant influence, a final model is presented that includes only the significant factors (Model IV). Results remain similar to those in Models II and III. Countries that differ in teen fertility also differ in the likelihood that a substantive gender-equity payoff would be obtained initially. The odds ratio rises (OR = 5.3; p<0.10) then subsequently declines (OR=0.99; p<0.10) as levels of teen fertility continue to increase. Likewise, the gender-equity payoffs initially increase (OR=1.42; p<0.05) then decline (OR=0.99; p<0.05) with the gains in literacy equity among the adult population.

These estimates can help identify the optimal situations where countries would most likely reap a gender-equity payoff from their efforts to reduce pregnancy-related dropouts. The optimal situation, from a demographic standpoint, is at the point where about half (50.4) of teens reach the age of 20 without becoming pregnant. Likewise, the optimal situation, from a cultural standpoint, corresponds to settings where the ratio of female-to-male literacy in the adult population reaches about 0.50. Interestingly, both optima are well below the corresponding sample means of 77 percent and 0.73, respectively. This suggests an under-representation in our sample, of countries that are at the very early stages in demographic and cultural advance. In addition to being skewed in term of this research problem, our sample is small. Further analyses based on a larger number of countries and using more detailed data from each country are warranted.

5. Conclusion

This research proposed a contextual hypothesis to explain variation in the gender-equity payoffs of reducing pregnancy-related dropouts. According to this hypothesis, payoffs should be greatest in settings that are intermediate in terms of their demographic, educational, cultural, and economic advance. Empirical tests verify these predictions only for the demographic context–as indicated by the percentage of teens who reach age 20 without becoming pregnant-and the cultural context–as indicated by the female to male ratio in adult literacy.

The first result implies that the prevalence of fertility in the general population of teens (whether enrolled or not) is a valuable indicator of the contribution of pregnancies to the educational gap between boys and girls. The second result (about the significance of cultural context) is also important. It suggests a generational momentum, whereby progress in raising women’s education in one generation spills over to the next generation. These two aspects of development matter for different reasons. The first aspect, teen fertility levels, matters because it affects the absolute number of girls who are exposed to a sex-specific reason for dropping out. In other words, it affects the "absolute" contribution of pregnancies to the total gender gap in education. In contrast, the second aspect can be termed "relative," because it affects the relative contribution of pregnancies to the total gender gap in education. In settings where the cultural context is less conducive to gender discrimination, pregnancy becomes the main or only contributor to the gender gap in schooling. In that environment, any effort to address pregnancy-related dropout will have a greater effect in narrowing the educational gap between boys and girls.

The study findings provide background information for global policymakers seeking to narrow the gender gaps in education across countries or regions. While this information alone will not sway policy, it should at least inform expectations about the gender-equity payoffs from reducing unintended teen fertility. In several countries reviewed in this study (e.g., Benin, Niger, Jordan, Madagascar, Turkey, or Vietnam), it is hard to justify investment in teen fertility programs on gender equity grounds, simply because pregnancy-related dropouts are not a key factor. Yet other countries (e.g., Cameroon, the Central African Republic, Kenya, Mozambique, Uganda, or Zambia) can be expected to benefit from such investments. For such countries, efforts to reduce unintended teen fertility are more likely to be warranted on gender equity grounds. In addition to illustrating the wide cross-national variation in the gender-equity payoffs of reductions in teenage fertility, the results of this study help identify, more broadly, the profile of countries where payoffs would be the greatest. This identification should be easier in that it can be based on easily observable characteristics of countries such as the current rate of teen fertility and the female-to-male ratio in literacy among the adult population.

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Notes

1. A comparison of Cameroon DHS data with another national survey we conducted in 1999 in Cameroon showed a slightly lower percentage of pregnancy-related dropouts in the DHS data, although the distributions of pregnancy-related dropouts across grade levels were quite similar. The fact that individuals themselves (rather than their parents) reported this information is another factor working against over-reporting.
2. A sensitivity analysis assuming a common pattern of age/grade progression for all 38 countries (a fairly significant departure from reality) showed conclusions that are quite similar to the ones reported in this study.
3. The educational progress in former Soviet Republics, Vietnam and Turkey lag behind their fertility progress, while the reverse is true for Latin American countries except Guatemala. In other words, the rates of school participation among these Soviet teens are behind where one would expect them to be on the basis of their fertility situation. On the other hand, teens in the Latin American countries in this sample have higher fertility than expected from their rates of school participation. Among sub-Saharan countries, Gabon and South Africa follow the "Latin American" model, i.e., where rates of school participation are higher than expected, based on these countries' levels of teen fertility. Both countries rank at the top of the region in terms of resources and therefore, their outlying status is not surprising.

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APPENDIX I

Methodological notes.

This appendix summarizes the general procedure used to estimate the gender-equity payoffs from reducing pregnancy-related dropouts, within each of the 38 countries. To summarize, we use a schooling life table analysis to simulate how the gender gap in education within individual countries would change if one could reduce the incidence of pregnancy-related dropouts. This general gap can be expressed as

$$G_t = \frac{S_{t(f)}}{S_{t(m)}} = \frac{\prod_{k=1}^{t-1}(1-\lambda_{k(f0)}-\lambda_{k(f1)})}{\prod_{k=1}^{t-1}(1-\lambda_{k(m0)})} = \prod_{k=1}^{t-1}\left(\left[\frac{1-\lambda_{k(f0)}}{1-\lambda_{k(m0)}}\right]-\left[\frac{\lambda_{k(f1)}}{1-\lambda_{k(m0)}}\right]\right)$$

Where $S_{t(f)}$ and $S_{t(m)}$ indicate the school survivorship of females and males respectively, λ indicates the grade-specific probabilities of school dropout with 1 and 0 indexing dropouts associated with pregnancies and non-pregnancy reasons, respectively. By changing the values of $\lambda_{k(f1)}$, (the incidence of pregnancy-related dropouts among girls), one can track corresponding changes in G_t.

This general simulation procedure is implemented in two steps. The first and main step is to obtain data on the grade- and reason-specific probabilities of school dropout (λ values) for boys and girls, respectively. To this end, we combined data from DHS, the UN and the World Bank. Having obtained these probabilities, the second and straightforward step is to create schooling life tables and to simulate how the gender inequality in educational attainment (here secondary school completion) would change if one could reduce the incidence of school dropouts. Each of these steps is described below. An expanded discussion of the methodological procedures can be found in Eloundou-Enyegue (2004).

I. Converting DHS data into life table probabilities

The main input data required to create a schooling life table is a matrix of probabilities of school dropout by sex, grade, and dropout reason. This information ideally comes from having detailed information on the schooling histories of large and representative samples of pupils, including grade-to grade transitions and primary reasons why individual students dropped out of school. Such surveys have been fielded in several countries, but the practice is not widespread or standardized enough to afford comparative analysis across countries.

We use data recently collected and compiled by DHS as part of their education module in 38 countries. The compiled information includes data on school enrollment for four age groups (6-10, 11-15, 16-20, and 21-24) as well as data on primary reason of school dropout by level of educational attainment (primary incomplete, primary complete, secondary incomplete, secondary complete, and university). In themselves, the DHS data are not sufficient to estimate the dropout probabilities needed to construct schooling life tables. In order to convert the DHS data into these probabilities, we use additional country information on the structure of the school system (official age of school entry, duration of primary, and duration of secondary), and on the pace of school progression in the country. These data are shown in Appendix II.

The conversion of the raw DHS into reason-and-grade-specific probabilities of dropout proceeds in four steps. The first step is to transform the age-grouped enrollment data from DHS into enrollments for single years of age. A second step is to convert the age-enrollment data into grade-enrollment data, using the data on the country's age-grade progression schedules. The third step is to convert grade-specific enrollments into grade-specific probabilities of dropout. Finally, we divide the total probabilities of school dropout into "pregnancy-related" and "non-pregnancy-related" probabilities, using DHS information on dropout reasons. Each of these steps is described in detail below.

Step 1. Converting grouped age enrollment data into enrollments for single years

The DHS compilations provide enrollment data for several age groups, including 6 to 10, 11 to 15, 16 to 20, and 21 to 24 but one ideally needs enrollment data for single years of age. One solution is to analyze the original DHS files and do the necessary tabulations, although several of the adjustments indicated below are still needed. Another solution is simply to use the data compiled by DHS and rely on some form of interpolation. In this case, we used linear interpolation at the older ages and logarithmic interpolation for the first age group since dropout rates are very low in early school years and they increase rapidly thereafter. Whether the first or second solution is used, one problem for the purpose of this research is that, because of delayed school entry, it is common to find higher enrollment rates for say age 10 than one would find for age 6 or 8. For the simple analysis of attrition envisioned here, we wish to start off a cohort at the same time and examine their gradual attrition. Our transformation thus begins by assuming that all students who would eventually enter school do so at the official age of school entry in their country (this is a strong assumption but it is adjusted for in a later step when one considers the country's age/grade pace of school progression). The origin anchor for the first interpolation is therefore the official age of school entry and the second anchor is the mid-point of the 11-15 age group. For the remaining interpolation, the anchors are simply the mid-points of successive age groups.

Step 2. Converting age-specific enrollments into grade-specific enrollments

Under an ideal scenario, all pupils who would enter school do so at the official age of school entry, then progress smoothly without grade repetition. If this were the case, then one could easily infer a student's grade based on his/her age and vice/versa. Specifically, the student's grade would be the difference between her age and the age of entry. Such is not the case however and many students enter school later or they repeat grades. The extent of these losses for a given country is captured in a coefficient of age/grade progression published by the World Bank. This coefficient measures the ideal number of years required to complete a schooling level, relative to the actual number of years actually taken. Using that coefficient, one can estimate the average age of students for consecutive grades in the country's system. Once the average age for a grade is established, the corresponding enrollment ratio can be deduced. Suppose for instance a mean age of 11.25 years in grade 5. Knowing the age-specific enrollment ratios for ages 11 and 12, one can estimate the enrollment ratio for age 11.25 (i.e., grade 5) as a weighted average of enrollments for age 11 (weight 0.75) and for age 12 (weight 0.25).

Step 3. Converting grade-specific enrollments into grade-specific probabilities of dropout

Grade-specific probabilities of school dropout are easily obtained from the above data on grade-specific enrollments. One simply takes the difference in enrollment ratios between two consecutive grades and divides the result by the initial number of pupils at risk of dropping out.

Step 4. Dividing the total probabilities of dropout into pregnancy-related probabilities and non-pregnancy related probabilities

Knowing the total probabilities of school dropout within a grade, it is simple to divide this probability into pregnancy-related probabilities and non-pregnancy-related probabilities, since one has information on the percentage of all female dropouts attributed to pregnancies. Note however that in doing so, we assume that no male pupils drop out of school because of pregnancy. Further, the DHS compilations give these percentages by broad schooling level (see Appendix II). We thus assume that this percentage remains constant within this grade level. Both this assumption and the interpolation of age-enrollment data imply that the grade-to-grade variation is smoothed out. We can thus say little about what happens for individual grade levels, but we expect the data on ultimate educational attainment to be accurate, or at least not be seriously affected by these assumptions.

II. The Simulations

Having obtained data on grade-and-cause-specific probabilities of school dropout, the schooling life tables are easily built (see e.g., Eloundou-Enyegue 2004). From the matrix of sex-grade-and-cause-specific probabilities of school dropout, one computes the number of pupils dropping out at each grade and, by subtraction, the number of pupils remaining in school after each grade level. Separate survivorship curves are built for males and for females, respectively. The survivorship of females is compared to males to indicate how the female-to-male ratio changes over the school cycle. While we are ultimately interested in the value of this ratio at the end of the school cycle, for practical purposes, we stop the analysis at the end of secondary school because the small number of pupils who enter university would generate unstable and unreliable estimates. One can then simulate the gender-equity payoff of reducing unintended teen pregnancy by reducing the probability of pregnancy-related dropouts and monitoring the changes in the gender inequality in secondary school completion. The results can be reported in tabular form (Appendix III) or in graphical form as was displayed in Figure 2.

Appendix II.

Table A2: *Input data used for the study simulations*

	Enrollment ratios (DHS 2004)					
	Males			Females		
REGION/ COUNTRY	**11--15**	**16--20**	**21--24**	**11--15**	**16--20**	**21--24**
LATIN AMERICA & CARRIBEAN						
Bolivia 1998	90.8	65.9	35.7	87.1	55.6	25.2
Brazil 1996	90.5	51.6	17	90.8	54.4	20.5
Colombia 2000	83.2	42.4	20.8	85.6	42.2	20
Dominican Republic 1999	93.7	60.6	23.7	95.2	66.7	36.6
Guatemala 1998/99	73.2	31.3	16	65	27.5	11.9
Nicaragua 1997/98	71.1	38.8	18.6	75.6	40.5	17.3
Peru 2000	93.1	51	23	89.7	49	21.7
SOUTH & SE ASIA						
Nepal 2001	80.7	41.1	10.8	61.4	22.9	4.6
Philippines 1998	83.6	49.9	14.8	89.7	52.9	11.1
Vietnam 1997	85.9	31.5	4.9	77.5	24.5	3.9
WEST ASIA						
Jordan 1997	94.4	56.6	16.5	94.5	59.3	10.7
Turkey 1998	73.6	31.6	14.7	55.1	19.6	8.9
CENTRAL ASIA						
Kazakhstan 1999	98.6	63.3	13.9	99.1	61.9	14
Kyrgyz Republic 1997	95	34.3	7	95.9	37.4	9.1
Uzbekistan 1996	95.9	27.6	10.7	96.1	25.6	6.1
SUB-SAHARAN AFRICA						
Benin 1996	55	29.4	11	29	11.3	3.4
Burkina Faso 1998/99	26.5	13.8	7.1	19.2	7	2.6
Cameroon 1998	78.1	42.7	18.9	70.8	27.2	11.4
CAR 1994/95	68.6	38.6	15	45.8	15	5.3
Chad 1996/97	50.7	39.7	22.6	26.6	9.2	3.6
Comoros 1996	73.4	53.6	30.6	57.4	41.8	17.8
Cote d'Ivoire 1998/99	60.3	27.6	14.8	40.8	14.5	6.7
Eritrea 1995	66.4	57.5	24.6	59.3	29.1	6.6
Gabon 2000	95	68.6	39.6	92.6	61.4	31
Guinea 1999	37.4	31	16.1	24.6	11	5.3
Kenya 1998	89.9	46.8	8.5	86.9	35.4	3.7
Madagascar 1997	52.7	16.3	5.8	49.5	11.4	2.2
Mali 2001	43.5	26	15.4	30.9	12.5	5.9
Mauritania 2000/01	70	38.6	21	58.6	28.7	14.5
Mozambique 1997	68.9	33.4	9.9	53.7	10.3	2.4
Niger 1998	28.3	10.4	6.2	20	4.3	2.5
Nigeria 1999	68.8	49.1	26.4	64.9	33.9	17.4
South Africa 1998	94.1	74	27.8	94.8	68.5	26.9
Tanzania 1999	68.9	19.1	2.9	67.2	16.4	0.3
Togo 1998	81.5	58.7	27.5	62.8	29.3	7.1
Uganda 2000/01	89.6	53.5	15.5	87.5	30.4	4.2
Zambia 1996	73.9	42.4	9.2	71.2	23.3	2.6
Zimbabwe 1999	89.8	45.4	6.9	87.2	31	3.1

Sources: DHS 2004. Demographic and Health Surveys. Stat Compiler www.measuredhs.com. UN 2004. UN Statistics. www.nationmaster.com; WB 2001. WB 2001. World Bank. World Development Indicators. CD Rom.

* Notes: Education coefficient of efficiency measures the percent of ideal years to graduate as a percentage of actual years to graduate.

Table A2: *(Continued) Input data used for the study simulations*

	% female dropouts due to pregnancy (DHS 2004)					Structure of school system UN (2004)			
	Primary		Secondary		Uni-versity	Entry age	Duration of schooling		Education coeffic. of efficiency*
REGION/ COUNTRY	Incom.	Comp.	Incom.	Comp.			Prim-ary	Secon-dary	
LATIN AMERICA & CARRIBEAN									
Bolivia 1998	2	8	13.7	11.4	10.1	6	6	6	55.80
Brazil 1996	5.3	4.8	14.8	4.5	5.1	7	4	7	78.00
Colombia 2000	1.8	4.5	15.4	6.9	6.8	5	5	6	84.60
Dominican	5	16.3	25.9	6.7	14.5	5	6	5	84.60
Guatemala 1998/99	0.1	2.1	4.2	0	5.8	5	6	5	51.12
Nicaragua 1997/98	3.1	7.5	18.6	11.2	9.1	7	6	5	80.30
Peru 2000	5.3	7.9	21.7	11.9	9.2	6	6	5	80.30
SOUTH & SE									
Nepal 2001	0.7	0	2.9	6	14.4	6	5	5	45.80
Philippines 1998	0.8	0.8	3.3	1.6	4.1	6	6	4	76.10
Vietnam 1997	0	0	0	2.6	0	6	6	7	79.58
WEST ASIA									
Jordan 1997	0	0	1.5	1.2	2	6	6	6	99.00
Turkey 1998	0	0	0	0.1	0	6	6	6	95.00
CENTRAL ASIA									
Kazakhstan 1999	0	-	1.2	1.3	4.1	7	4	7	94.79
Kyrgyz Republic 1997	0	-	0	0.7	0.7	7	4	7	94.55
Uzbekistan 1996	0	-	0	0.1	0	7	4	7	99.90
SUB-SAHARAN AFRICA									
Benin 1996	0.3	2.8	4	4	0	6	6	7	61.2
Burkina Faso 1998/99	0	0	13.9	0	0	6	6	7	73.5
Cameroon 1998	5.7	3.2	22	0	0	6	6	7	63.7
CAR 1994/95	5	13.8	37	-	-	6	6	7	63.7
Chad 1996/97	3.3	6.3	20	0	0	6	6	7	63.7
Comoros 1996	0.9	1.4	5	0	0	6	6	7	42.8
Cote d'Ivoire 1998/99	0.3	2.4	12.1	19.8	0	6	6	7	66.7
Eritrea 1995	3.6	3.1	10.6	1.2	0	7	5	6	73.5
Gabon 2000	29.8	26.5	26.1	0	0	6	6	7	63.7
Guinea 1999	4.3	6.6	9.7	41.2	0	7	6	7	61.2
Kenya 1998	11.3	8.7	30.8	1.1	0	6	7	5	66.7
Madagascar 1997	1.7	0	4.1	0	8.3	6	5	7	63.7
Mali 2001	0.7	2.3	12.4	-	-	7	6	6	66.6
Mauritania 2000/01	1	1.5	7.8	8	0	6	6	7	68.5
Mozambique 1997	6.5	24.3	25.8	0	0	6	5	5	66.7
Niger 1998	0	0.7	2.5	0	-	7	6	7	68.6
Nigeria 1999	8.6	2.9	13	1.3	2.3	6	6	6	63.7
South Africa 1998	27.8	31.5	36.1	7.6	4.5	7	7	5	75.1
Tanzania 1999	11.1	1.8	6.4	0	-	7	7	6	95.8
Togo 1998	6	10.2	15.2	-	0	6	6	7	66.7
Uganda 2000/01	4.4	6.9	28	18.8	0	6	7	6	66.7
Zambia 1996	5.9	13.3	25.9	-	4.9	7	7	5	95.8
Zimbabwe 1999	3.6	2.5	8.2	0	0	6	7	6	99.1

Appendix III.

Simulation results for the gender-equity payoffs of reducing the incidence of pregnancy-related dropouts, by region and country.

	Estimated female-to-male ratio in secondary school completion (FMR) if pregnancy-related dropouts are reduced by											Gender-equity payoff		
Region/ Country	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Nominal	Relative	Substantive
West Asia														
Jordan 1997	1.045	1.046	1.046	1.047	1.048	1.049	1.050	1.050	1.051	1.052	1.053	0.008	0.75%	NO
Turkey 1998	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.619	0.000	0.02%	NO
Central Asia														
Kazakhstan 1995	0.979	0.979	0.980	0.981	0.982	0.982	0.983	0.984	0.985	0.985	0.986	0.007	0.75%	NO
Kyrgyz Republic 1997	1.096	1.097	1.097	1.097	1.097	1.097	1.098	1.098	1.098	1.098	1.098	0.002	0.18%	NO
Uzbekistan 1996	0.927	0.927	0.927	0.927	0.927	0.927	0.928	0.928	0.928	0.928	0.928	0.001	0.05%	NO
South & Southeast Asia														
Nepal 1996	0.513	0.516	0.518	0.520	0.523	0.525	0.528	0.530	0.532	0.535	0.537	0.024	4.67%	NO
Philippines 1998	1.035	1.037	1.039	1.042	1.044	1.046	1.048	1.050	1.052	1.055	1.057	0.022	2.09%	NO
Vietnam 1997	0.787	0.789	0.790	0.792	0.793	0.795	0.796	0.798	0.800	0.801	0.803	0.016	2.03%	NO
Latin America & Caribbean														
Bolivia 1998	0.745	0.755	0.765	0.775	0.786	0.796	0.807	0.817	0.828	0.839	0.850	0.105	14.15%	YES
Brazil 1996	1.107	1.124	1.140	1.156	1.172	1.188	1.206	1.223	1.240	1.257	1.274	0.167	15.09%	NO
Columbia 1995	0.995	1.007	1.018	1.029	1.041	1.052	1.064	1.076	1.088	1.100	1.112	0.116	11.70%	NO
Dominican Rep. 1996	1.101	1.110	1.119	1.128	1.137	1.146	1.156	1.165	1.174	1.184	1.193	0.092	8.38%	NO
Guatemala 1998/99	0.763	0.768	0.773	0.777	0.782	0.787	0.792	0.796	0.801	0.806	0.811	0.048	6.26%	NO
Nicaragua 1997/98	1.003	1.020	1.038	1.055	1.073	1.090	1.109	1.128	1.147	1.166	1.184	0.181	18.09%	NO
Peru 1996	0.958	0.975	0.992	1.009	1.027	1.044	1.062	1.081	1.100	1.118	1.137	0.179	18.70%	NO

Appendix III. (ctd).

	Estimated female-to-male ratio in secondary school completion (FMR) if pregnancy-related dropouts are reduced by											Gender-equity payoff		
Region/ Country	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Nominal	Relative	Substantive
Benin 1996	0.331	0.334	0.336	0.339	0.342	0.345	0.348	0.351	0.354	0.357	0.360	0.029	8.76%	NO
Burkina Faso 1998/99	0.399	0.410	0.420	0.431	0.443	0.454	0.466	0.478	0.490	0.503	0.516	0.117	29.32%	YES
Cameroon 1998	0.618	0.639	0.661	0.683	0.706	0.729	0.753	0.777	0.803	0.828	0.855	0.237	38.35%	YES
CAR 1994/05	0.370	0.397	0.425	0.455	0.487	0.520	0.555	0.592	0.631	0.672	0.715	0.345	93.24%	YES
Chad 1996/97	0.187	0.194	0.202	0.209	0.217	0.225	0.234	0.242	0.251	0.261	0.270	0.083	44.39%	NO
Comoros 1996	0.623	0.625	0.628	0.630	0.633	0.635	0.638	0.640	0.643	0.645	0.648	0.025	4.01%	NO
Cote d'Ivoire 1998/99	0.465	0.475	0.485	0.495	0.505	0.516	0.526	0.537	0.548	0.559	0.570	0.105	22.58%	YES
Eritrea 1995	0.358	0.364	0.370	0.377	0.383	0.389	0.396	0.402	0.409	0.415	0.422	0.064	17.88%	NO
Gabon 2000	0.825	0.848	0.871	0.895	0.919	0.944	0.970	0.995	1.022	1.049	1.077	0.252	30.55%	YES
Guinea 1999	0.340	0.346	0.353	0.360	0.367	0.374	0.381	0.388	0.395	0.403	0.411	0.071	20.88%	NO
Kenya 1998	0.559	0.612	0.669	0.730	0.794	0.863	0.936	1.013	1.096	1.183	1.275	0.716	128.1%	YES
Madagascar 1997	0.538	0.545	0.552	0.559	0.567	0.574	0.581	0.589	0.596	0.604	0.611	0.073	13.57%	NO
Mali 1995/96	0.412	0.418	0.425	0.432	0.439	0.446	0.453	0.460	0.468	0.475	0.483	0.071	17.23%	NO
Mauritania 2000/01	0.706	0.713	0.720	0.727	0.735	0.742	0.749	0.756	0.764	0.771	0.779	0.072	10.20%	NO
Mozambique 1997	0.288	0.310	0.333	0.358	0.383	0.410	0.439	0.468	0.500	0.533	0.567	0.279	96.88%	YES
Niger 1998	0.407	0.409	0.411	0.413	0.415	0.416	0.418	0.420	0.422	0.424	0.426	0.018	4.42%	NO
Nigeria 1999	0.671	0.683	0.695	0.707	0.720	0.732	0.745	0.758	0.771	0.784	0.797	0.126	18.78%	YES
South Africa 1998	0.967	1.006	1.045	1.086	1.128	1.172	1.217	1.263	1.311	1.361	1.412	0.445	46.02%	NO
Tanzania 1996	0.754	0.767	0.780	0.794	0.807	0.821	0.835	0.850	0.864	0.879	0.894	0.140	18.57%	YES
Togo 1998	0.305	0.316	0.328	0.340	0.352	0.364	0.377	0.391	0.404	0.418	0.433	0.128	41.97%	YES
Uganda 1995	0.354	0.383	0.412	0.444	0.477	0.512	0.548	0.587	0.628	0.670	0.715	0.361	102.0%	YES
Zambia 1996	0.526	0.546	0.567	0.589	0.611	0.633	0.657	0.681	0.706	0.731	0.758	0.231	43.9%	YES
Zimbabwe 1994	0.673	0.680	0.687	0.694	0.701	0.708	0.715	0.722	0.729	0.737	0.744	0.071	10.55%	NO