

Closing the Gender Gap in Education: Is There Evidence of Short-term Declines in Adolescent Fertility?

Britain's recent pledge of US\$15 billion to fund education in developing countries over the next ten years comes as good news for the estimated 493 million school-age children who are not enrolled in school, the majority of whom are girls.¹ The gender gap—the difference between boys' and girls' school enrollments—is an indicator of gender equity and of a country's level of development. The gap is widest among countries in sub-Saharan Africa and a few Asian countries, including Yemen and Pakistan. Education has a profound impact on the future course of women's lives, influencing employment opportunities, earning potential and political participation. Access to quality education is also one of the best defenses against HIV infection, providing young people with the skills and knowledge to make informed decisions. Education is especially critical to HIV prevention in girls, as it reduces the power imbalances and social and financial dependencies that typically make females more vulnerable to infection.² Moreover, a large body of evidence suggests that education of girls is associated with their roles

in family decision-making and patterns of childbearing, resulting in improved maternal and child health, improved childhood nutrition,³ higher educational attainment among children, and a lower likelihood of experiencing unwanted and high-risk pregnancies.⁴



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A 1998 study conducted by researchers Shanti R. Conly and Nada Chaya at Population Action International (PAI), entitled *Educating Girls: Gender Gaps and Gains*, computed a gender gap score for each country with data available for 1985 and 1995, reflecting the average difference between primary and secondary level gross enrollment rates in those years for males and females. The PAI study found that between 1985 and 1995, access to education improved worldwide, particularly for girls. Overall, enrollment rates for girls rose more rapidly than for boys, narrowing the worldwide gender gap at both primary and secondary levels. The authors also showed that girls' secondary school enrollment is closely linked to lower teen birth rates.

The objective of this commentary is to review progress made in closing the gender gap since the publication of *Educating Girls*, and to determine if change in the enrollment gender gap has translated to lower rates of adolescent fertility. Alongside this analysis, we review changes in girls' secondary enrollment rates, and likewise, the sensitivity of adolescent fertility to this



indicator. Comparing these analyses—the gender gap in enrollment versus girls’ secondary enrollment rates—provides an opportunity to ask two fundamental questions about these indicators that could provide useful answers for further research: (1) Is a gender gap merely a reflection of low female secondary enrollment? (2) Are decreases in the gender gap more strongly associated with declines in adolescent fertility rates than are increases in female secondary enrollment rates—what matters more to fertility, equity or enrollment?

Methods

Data and Definitions

All countries with a population over one million for which enrollment and fertility data for the years considered are included. Gross enrollment rates are provided by UNESCO, and measure the number of children enrolled at primary and secondary levels for every 100 school age children, with primary school age defined as ages six to 11 years and secondary school age defined as ages 12 to 17. To compute gender gap scores, the authors average the differences between male and female enrollment rates at the primary and secondary levels for each year. For purposes of data analysis and scoring, the study caps all gross enrollment rates at 105 to minimize bias in countries with high out-of-age group enrollment. Countries with a score between -3 and 3 are considered to have an insignificant gender difference in enrollment and categorized as “no gap” countries. A score of 4 to 12 points is considered a “moderate gap,” and in excess of 12 points is labeled a “large gap.” Countries with a score of -4 or less (where female enrollment exceeds male enrollment) have a “reverse gap.” To assess changes in gender gap scores, the scores for 2002/2003 were compared with 1985 and 1995 scores taken from the previous PAI study (which were calculated in the same manner). Adolescent fertility data are drawn from those published by the United Nations Population Division.⁵

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Analyses

The degree of correlation between gender gap scores and adolescent fertility rates was determined using the product-moment correlation coefficient, r , for both 1995 and 2005. The relationship between gender gap scores, assumed as the independent variable (x_1), and adolescent fertility, the dependent variable (y), was identified by fitting curves to 1995 and 2005 data using a log-multilinear least-squares regression model. A similar log-linear model was then fit to the relationship described by female secondary gross enrollment, assumed as the independent variable (x_2), and again, with adolescent fertility as the dependent variable (y). To assess whether or not changes in either of

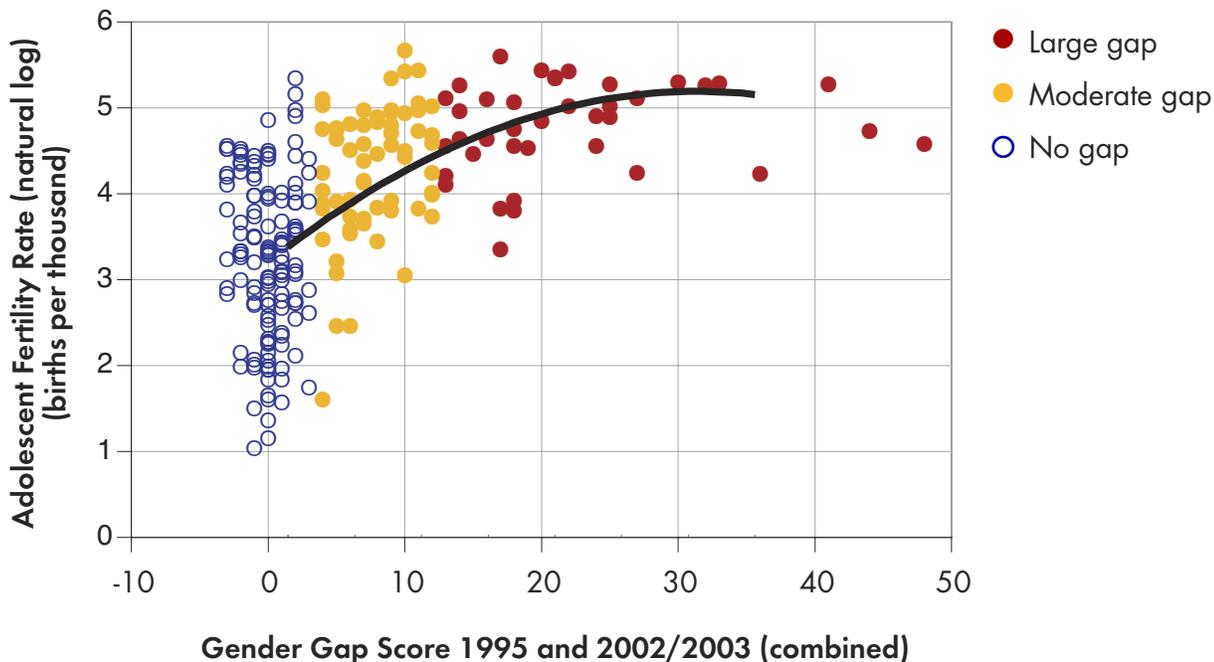
the independent variables were a likely influence on adolescent fertility, ten-year changes in adolescent fertility were graphed against changes in gender gap scores, and then against girls' secondary enrollment.

Results: Exploring Changes in the Gender Gap

Gender gap scores were moderately correlated with levels of female secondary enrollment (for 1995, $r = 58$ percent; for 2005, $r = 61$ percent). Thus, in answer to our first proposed question, a large gender gap is not merely a reflection of low female secondary enrollment. Rather, measuring the gender gap in school enrollment rates as an indicator of gender parity provides a perspective of women's status in a country that is, at least, somewhat independent of secondary gross enrollment statistics. This finding provided the basis for further inquiries into the relationships between fertility and the gender gap and fertility and enrollment as two substantially independent relationships.

An analysis of the most recent data finds 22 countries with a large gender gap in 2002/2003 and an additional 30 countries with a moderate gender gap. All 52 of these are developing nations. Another 76 countries do not exhibit a significant gender gap. This group is split

Figure 1: Adolescent Fertility Rates and the Gender Gap



Gender gap scores for 2002/2003 calculated with enrollment data from UNESCO, accessed online at <http://stats.uis.unesco.org/ReportFolders/reportfolders.aspx> on 3/20/2006. Gender gap scores for 1985 and 1995 are from a 1998 Population Action International report, *Educating Girls: Gender Gaps and Gains*. Fertility data from United Nations Population Division, *World Population Prospects: The 2004 Revision*, accessed online at <http://esa.un.org/unpp/index.asp?panel=2> on 3/20/2006. This graph does not include those countries with a negative gender gap (a score of -4 or less).

almost evenly between developing and developed countries (39 and 37, respectively). Eleven developing countries exhibit a reverse gender gap, with female enrollment exceeding male enrollment. Some of these 11 countries have high enrollment rates for both sexes, but in others, such as Lesotho and Bangladesh, secondary enrollment rates, while favoring girls, remain very low.

Between 1985 and 2002/2003, 32 countries significantly narrowed their gender gap; Nepal, Bangladesh, Algeria, Morocco and the Democratic Republic of the Congo displayed the biggest improvements in closing the gap. However, while these 32 countries progressed toward closing their gap, another group of 29 countries widened their gender gaps significantly. Among the countries that regressed the most were Chad, Sierra Leone, Ethiopia, Mali and Guinea—all in sub-Saharan Africa. The change in the gender gap could not be calculated for 36 countries, due to a lack of time series data. With almost an equal

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number of countries widening and narrowing their gender gaps in education over the past ten years, the global outcome is not hugely impressive and largely inconsistent. However, with populous countries like China and India making significant progress in closing their gaps, the total number of girls living in countries making progress is greater than the number of girls living in countries that are losing stride.

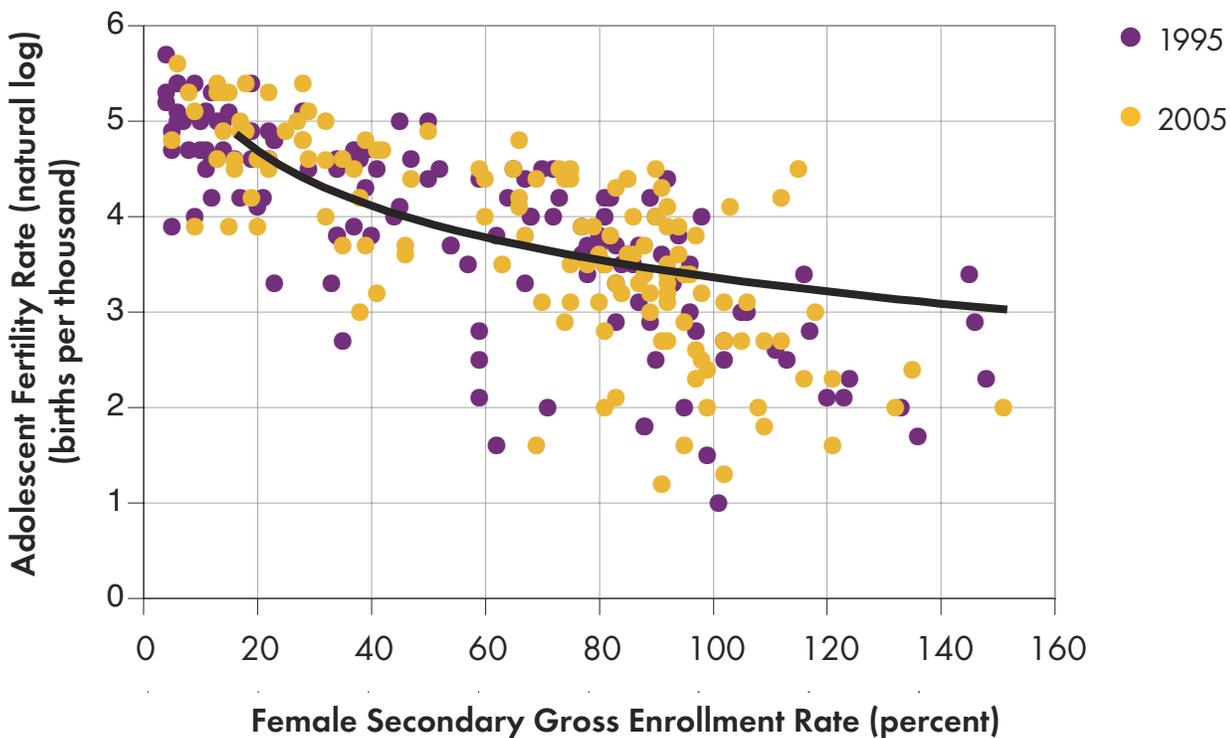
Our cross-national analysis indicates that for both periods (1995-2000 and 2000-2005), countries with larger gender gaps tend to have higher adolescent fertility rates [see Figure 1]. In both 1995 and 2005 the expected adolescent fertility rate of countries with “zero gender gap” was roughly equal at about 28 births per thousand female adolescents. The average adolescent fertility at moderate and high gender gaps deviates slightly over the ten year period. In 1995 fertility among moderate-gap countries averaged 71 births per thousand adolescent females, whereas in 2005 fertility among moderate-gap countries averaged 61 births. The difference remains about the same among the large-gap countries; fertility averaging 159 births per thousand adolescent females in 1995 and 169 births in 2005.

While this analysis suggests that a significant decrease in the gender gap—achieving a gender gap score of roughly 10 or less—would lead to lower adolescent fertility, an analysis of the change in the country gender gap scores over the past decade do not show corresponding short-term changes in adolescent fertility rates. Of the ten countries that made the most progress in closing the gender gap, adolescent fertility rates fell in seven of them (Algeria, India, Laos, Morocco, Nepal, Nigeria and Syria). There was no change to adolescent fertility rates in two of these countries (Democratic Republic of the Congo and Uganda) and the adolescent fertility rate actually rose in one country, Pakistan. Of the ten countries that widened their gender gaps the most over the same ten year period, adolescent fertility rates still fell significantly in seven of them (Armenia, Azerbaijan, Eritrea, Ethiopia, Guinea,

Mali and Niger) and there was no change in adolescent fertility rates in the remaining three countries (Burundi, Chad and Sierra Leone). Adolescent fertility among the group of ten countries that made the most progress in closing the gender gap declined, on average, by about 5 percent, while the average drop in adolescent fertility among the countries that widened their gender gap was roughly double—at 10 percent.

How does the gender-gap relationship compare to the relationship between female secondary enrollment and fertility? Globally (in cross-national analyses), as girls' secondary enrollment levels increase, adolescent fertility declines [see Figure 2]. The curve-fit that we chose implies that female secondary enrollment rates should reach a minimum of roughly 80 percent in order for adolescent fertility rates to decline below 30 births per 1,000 female adolescents, and full female secondary enrollment (100 percent) would achieve around 25 births per 1,000 female adolescents. The countries with highest enrollment, all European countries alongside Australia and New Zealand, experience adolescent fertility levels below 30 births per 1,000 female adolescents. Whereas countries with the very low female secondary enrollment rates are all in sub-Saharan Africa and have high rates of adolescent fertility—the exceptions are Burundi and Rwanda, both of which have extremely low enrollment but fertility is a moderate

Figure 2: Female Secondary Gross Enrollment and Adolescent Fertility, 1995-2005



Sources:

Gross enrollment data from UNESCO, accessed online at <http://stats.uis.unesco.org/ReportFolders/reportfolders.aspx> on 3/20/2006. Fertility data from United Nations Population Division, World Population Prospects: The 2004 Revision, accessed online at <http://esa.un.org/unpp/index.asp?panel=2> on 3/20/2006.

50 births per 1,000 adolescent females. There is also variation in the relationship in some South American countries such as Brazil, Uruguay, Guyana and Argentina, where both female secondary enrollment and adolescent fertility rates are relatively high. Variation is most likely due to regional and local differences in economic opportunities afforded by higher levels of educational attainment, as well as varied opportunity costs of childbearing. Undoubtedly, variation can also be attributed to differing degrees of access to affordable contraception, maintaining that education in and of itself cannot reduce fertility if barriers to services and contraceptive methods remain. There is also evidence that adolescent fertility rates have remained fairly constant over the past decade except in countries that have made it a political priority, as put forth in a [recent PAI publication](#).⁶

While there is a clear and consistent cross-national relationship between rates of female secondary gross enrollment and adolescent fertility (1990-95 and 2000-05), an analysis of ten-year changes in these data—much like our analysis of ten-year gender-gap changes—do not appear to contribute to short-term responses in adolescent fertility. Adolescent fertility fell significantly (by 18 to 20 percent) in Tanzania, Zimbabwe, Moldova and Armenia, and yet female secondary enrollment rates either stagnated or decreased over the ten year period 1995 to 2005. This trend is true to a lesser extent for a number of other Asian and African countries. Meanwhile, most developed countries, and in particular European countries, made insignificant progress in girls' enrollment and yet still experienced only slight declines in adolescent fertility. While the majority of the world's countries did in fact make progress along both fronts, the data from each end of this narrow time period do not show a discernable relationship between the increase in secondary enrollment and the decline in adolescent fertility rates.

Conclusions: Wondering Why We See No Response

While limited in their scope, these exploratory analyses suggest that country-level adolescent fertility is not extremely sensitive — at least, over relatively short periods of time—to either increases in female secondary enrollment rates or to the narrowing of the gender gap at that level (which answers our second research question). Nonetheless, cross-national data suggest that declines in adolescent fertility could be associated with both. The lack of sensitivity might be explained by several factors, including: (1) education is not the strongest factor—other more immediate influences upon adolescent fertility are positively correlated to female secondary enrollment, such as later marriage, access to contraceptives, urbanization and other social and economic factors; (2) we chose the wrong educational variable—adolescent fertility is more sensitive to levels of educational attainment than to gross secondary enrollment or educational indicators of equity; (3) the effects of girls' education on adolescent fertility are lagged—education-related changes in adolescent fertility are slow and systemic, rather than immediate.

Another interesting possibility: adolescent fertility might appear more sensitive to the independent variables if the sampling of countries were smaller and more selective, so as to limit the contextual variations. In a recent paper that looks at the gender-equity impact of teen fertility, the authors concluded that the payoff of reducing unintended pregnancies was most substantive within countries at an intermediate demographic development stage—defined as where childbearing during teen years had begun to evolve from being normative to being uncommon and selective.⁷ Another method for country selection might be to look at data for countries or regions where Demographic and Health Survey data show the widest fertility differentials by educational level, thereby narrowing the study to those countries where the relationship is likely to be the strongest. Should the selection of countries be more defined as in these cases, perhaps clearer conclusions could be determined and the expected pay-offs to reducing adolescent fertility from a gender parity intervention or from increases in secondary enrollment ratios overall could be more easily estimated. Regardless, the role of education in influencing adolescent fertility trends, as well as in preventing new HIV infections, needs to be further explored, especially now that the world, under Britain's leadership, is turning its attention toward the educational needs of its 493 million unenrolled children.

Notes

1 Calculation applies UNESCO's net enrollment ratio (NER) for 2001 to UN Population Division estimates of population aged 6 to 17 for 2001, from *World Population Prospects: The 2004 Revision*.

2 The United Nations Children's Fund (UNICEF). 2004. *Girls, HIV/AIDS and Education*. New York: UNICEF.

3 Smith, Lisa C. and Lawrence Haddad. 1999. "Explaining Child Malnutrition in Developing Countries: A Cross-Country Analysis." IFPRI Food Consumption and Nutrition Division Discussion Paper No. 60. Washington, D.C.: International Food Policy Research Institute.

4 For an overview of the documentation of maternal and child health benefits attributed to higher educational attainment, please see: Herz, Barbara and Gene B. Sperling. 2004. *What Works in Girls' Education: Evidence and Politics from the Developing World*, Executive Summary. New York: Council on Foreign Relations.

5 United Nations Population Division. 2005. *World Population Prospects: The 2004 Revision*. New York: United Nations.

6 Chaya, Nada and Jennifer Dusenberry. 2004. *ICPD at Ten: Where Are We Now?* Washington, D.C.: Population Action International.

7 Eloundou-Enyegue, Parfait M. and C. Shannon Stokes. December 8, 2004. *Teen Fertility and Gender Inequality in Education: A Contextual Hypothesis*. Demographic Research Volume 11, Article 11. Rostock, Germany: Max Planck Institute for Demographic Research.

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