

perspective paper  
**POPULATION**

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# **Perspective Paper on “Population Growth” for Copenhagen Consensus 2012**

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This perspective paper provides reactions to the Assessment Paper on population growth prepared by Hans-Peter Kohler for the 2012 Copenhagen Consensus. I begin with some overview comments on Kohler’s review of previous literature on population growth and economic development. I then raise some concerns about the estimates of the cost of averting births that are used in his analysis. I also raise concerns over the benefit side of the calculations. My conclusion is that I am quite skeptical of the benefit cost ratios of 90:1 to 150:1 provided at the end of his report. While family planning may be a good investment, especially in many African countries, I don’t think these estimates provide a sound basis for comparing investments in family planning to other potential investments.

## **Population growth, the demographic transition, and economic development**

One of the great strengths of Kohler’s paper is its comprehensive overview of research on the links between population and development. Kohler provides a very nice summary of the key demographic details, including an overview of the demographic transition and the rapid declines in fertility that have taken place in most parts of the developing world in the last 50 years. As Kohler notes, the big exception to this dramatic fertility decline is sub-Saharan Africa, where fertility has fallen much more slowly and where population growth rates are still very high. Kohler provides a good summary of the history of economists’ views of the links between population and development. For the most part I agree with Kohler’s assessment that the consensus view of economists toward family planning has changed somewhat in recent years. While most economists have argued that fertility decline was almost entirely due to changes in the demand for children, with family planning programs facilitating but not driving the decline, more recent evidence has suggested that programs such as the Matlab program in Bangladesh (Joshi and Schultz 2007) and the family planning program in Colombia (Miller 2010) have had measurable direct effects on fertility, with resulting indirect effects on outcomes such as health and education.

This comprehensive overview provides a useful background for Kohler's discussion of the costs and benefits of investments in family planning. His analysis concludes that investments in family planning have very large payoffs. Table 4 in his conclusion combines several components of the benefits to come up with a benefit cost ratio ranging from 90:1 on the low side to 150:1 on the high side. In the end I am not convinced that these are plausible estimates of the benefit cost ratio. Below I raise some concerns on both the cost and benefit side of the calculations. I expect that the costs of averting births are considerably higher and the benefits considerably lower than Kohler estimates. On the benefit side there are difficult conceptual issues that make it hard to do a careful accounting. Many of the benefits that are included in Kohler's paper do not seem appropriate for calculating the social benefits of investments in family planning.

### **The cost of meeting unmet need for family planning**

One of the most important components of Kohler's cost-benefit calculations (and indeed any cost-benefit analysis of this kind) is the cost of reducing fertility. Kohler focuses on eliminating "unmet need," an approach that has some appeal since it is arguably the least controversial way to expand family planning services. If we simply make sure that "every birth is a wanted birth" then we do not need to deal with the complicated issue of whether couples' private decisions about fertility deviate from the socially optimal level of fertility. Kohler draws heavily on the Alan Guttmacher Institute's "Adding it Up" report (Singh et al. 2010), an attempt to estimate the costs and benefits of providing family planning services to the estimated 215 million women with unmet need for modern contraception. While Kohler's paper is extremely thorough in many dimensions, it gives surprisingly little attention to discussing key concepts such as unmet need and is much too uncritical of the Guttmacher Institute's estimates.

As Kohler points out, the approach in the Guttmacher report (using the standard approach in the literature) is that "women with unmet need are those who are fecund and sexually active but are not using any method of contraception, and report not wanting any more children or wanting to delay the next child." While this definition seems straightforward, the term has been frequently criticized by economists (e.g., Pritchett 1994) and deserves some discussion. The definition assumes that it is lack of access to family planning services that explains why some women who want no more children are not using contraception. While this might be the case, the assumption merits some discussion given the critical role it plays in the cost-benefit calculation. One of the criticisms of the concept of unmet need is that many women who report that they want no more children and are not

using contraception in the Demographic and Health Surveys (DHS) go on to report some reason for not using contraception. These reasons include religious reasons, concern over side effects, infrequent sexual activity, opposition from their husband, or some other reason other than lack of availability. In other words, some significant fraction of women seem to choose not to use contraception in spite of its availability. Bongaarts and Bruce (1995) make a similar point, arguing that simply expanding supply may not lead to increased use by many of these women.

The problem can be illustrated in recent DHS data. Figure 1 shows the reason for not using contraception among women classified as having unmet need for contraception in the 2008 DHS for Ghana, Kenya, and Nigeria. I have classified the reasons into what I call supply issues, demand issues, and health issues (definitions given below the figure).<sup>1</sup> Health considerations, including fear of side effects, are among the most frequent reasons given. These arguably could be included among demand-side factors, since they prevent women from using contraceptives that may be readily available. A recent Guttmacher report (Sedgh et al. 2007) actually includes them among supply-side factors, on the argument that these are often misplaced fears that can be addressed by effective family planning education. I therefore put them in their own category rather than classifying them as either demand or supply.

Figure 1 shows that among women classified as having an unmet need in the 2008 Kenya DHS, 12% report some kind of supply issue (lack of access, lack of knowledge, or high cost) as the reason for not using contraception, 52% give a health reason, and 31% give what I call a demand reason (they or their husband are opposed, they have a religious objection, or they have infrequent sex). If we consider the health issues as limiting demand, then 83% are not using contraception due to lack of demand. In Nigeria 22% give supply-side reasons, 29% give health reasons, and 43% give demand-side reasons (17% say they are opposed to use of contraception, a category that is somewhat difficult to interpret). In Ghana, 13% give supply reasons, 42% give health reasons, and 29% give demand reasons.

The evidence in Figure 1 suggests that it is questionable to assume that simply scaling up family planning services will cause all women classified with unmet need to start using contraceptives and have fewer births. The percentage of women who report lack of access is relatively small. Women who report that they or their family members object to using

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<sup>1</sup> These are my estimates using DHS sampling weights and using women classified by the DHS as having unmet need for spacing or timing reasons (they either want no more children or don't want any children for the next two years and are not using contraception). Women can list any number of reasons for not using contraception, so the categories are not mutually exclusive.

contraceptives (a larger group than those listing supply factors in all three countries) are unlikely to be affected by simply expanding service provision. If we assume that expanded services are no better at dealing with health concerns than are existing services, then there is little reason to think that a simple scaling up will increase utilization among those with health concerns. The bottom line is that the kind of scaling up discussed in the Guttmacher “Adding it Up” report is unlikely to translate into the adoption of contraception among the 215 million women with unmet need.

The issue of supply versus demand determinants of contraceptive use among those classified as having unmet need is not a minor technicality. It is arguably a first-order concern in developing a cost-benefit analysis of the type Kohler provides. Figure 1 suggests that demand side issues are several times more important than supply side issues. If we only take women who explicitly mention issues related to knowledge, access, or cost, the number of women with unmet need in the countries shown might be as low as 12% of the total number classified with unmet need. In other words, the Guttmacher report’s estimates of the number of women who would be affected by expansion of supply could plausibly be eight times too large. Of course this means that the cost of expansion might only be 12% as large as well, but it is not clear how hard it would be to get services to the particular group of women who give supply-side explanations for their lack of use.

In general, the use of unmet need as measured in surveys like the DHS is probably not the best way to estimate the cost of expanding contraceptive use. Economists are more likely to be convinced by direct evidence that increasing supply actually leads to increased use of contraception. The evidence on this is mixed. Some of this evidence is reported in Kohler’s paper and some is not. Miller’s (2010) study of family planning expansion in Colombia is cited by Kohler as an example of evidence that family planning services do affect fertility. But the impact of Colombia’s large family planning program was relatively modest, leading to a decline in fertility of about 1/3 of a child, 6-7% of the overall decline in fertility over the 1964–93 period. While we cannot line these estimates up exactly with what an estimate of unmet need might have been in 1964, such an estimate would have probably been quite high. Given that, an estimate of the impact of the kind of expansion in family planning that Colombia had between 1964 and 1993 would have been considerably larger than 0.3 births. The point isn’t simply that other factors were much more important than family planning in driving Colombia’s fertility decline. The point is that estimates of unmet need and the cost of meeting that unmet need would almost surely lead to substantial overestimates of the actual impact of expanding family planning on fertility.

Another way to frame the issue is to ask whether an estimate of the cost of averting a birth in a program such as Colombia's can be extrapolated to the cost of averting additional births. In other words, if Colombia had spent twice as much money on its family planning program, would fertility have fallen twice as much? There is good reason to think that the answer is no. Colombia might have gotten a bigger and faster decline with a bigger family planning program. But Colombia's fertility decline, which was associated with a very large family planning program, was about the same pace and magnitude as that of Brazil, which had virtually no organized family planning program (Lam and Duryea 1999, Potter et al. 2002). Demand for fertility control was more likely to have been a binding constraint in Colombia than the supply of family planning services, whatever measures of unmet need might have indicated during the period of fertility decline.

An interesting recent paper not mentioned by Kohler is the study by McKelvey, Thomas, and Frankenberg (2012) on the impact of fluctuations in contraceptive prices on demand for contraception in Indonesia. Demand for the pill and IUDs showed little sensitivity to large changes in prices caused by the Indonesian financial crisis. The price of the pill almost doubled between 1998 and 2000, yet there was little change in use of the pill. While this result may be peculiar to the Indonesian setting, with high contraceptive use already in place at the time of the shock, it suggests that a direct experiment in demand sensitivity showed little response of demand to prices.

Another interesting recent paper is the study by Ashraf, Field, and Lee (2010) of the impact of a randomized family planning intervention in Zambia. The best known result of this paper is that the take-up rate for the family planning services that were offered was higher when the voucher was given privately to the woman than when the voucher was given to the couple. Another interesting result of the paper, however, is the comparison of the couples who were given vouchers (the vouchers provided free guaranteed access to contraceptives and nurses in a setting where wait times are ordinarily long and stockouts are common) to a control group that was only given information about family planning. While the couples that were given vouchers were 18 percentage points more likely than the control group to try a new form of contraception, this did not translate into a reduction in unwanted births 9-14 months after the treatment. The authors interpret this as evidence that "women positioned to take advantage of the more convenient and affordable method were those who were already fairly successful in preventing unwanted births." While women who were given the means to access family planning without the involvement of their husbands did have fewer unwanted births, the otherwise identical program that did not have this provision had no impact on

unwanted births. While this is just one study in one particular setting, it is one of the few pieces of direct evidence from a randomized program designed to improve access to family planning in an area with considerable unmet need. It suggests that even a substantial improvement in access may not lead to a decrease in unwanted births.

### **Estimating the benefits of averted births**

The discussion above suggests that the cost of averting births may be greatly understated by estimates such as those in the Guttmacher “Adding it Up” report. I turn now to Kohler’s estimates of the benefits of averting births. This is conceptually difficult road to go down, and Kohler has laid out many of the key issues. Some of the challenges are worth highlighting, however, and raise concerns about his cost benefit calculations.

In Section 6.2 Kohler focuses on the impact of reduced fertility on expenditures on things like schooling and health care for children. While at first glance this seems like a reasonable approach, given the public provision of these services, it is worth thinking about the assumptions required for this to be a good measure of the social benefit of averting births. A useful frame of reference is to consider a regime in which all of the costs of health and education are private costs paid by parents. Most parents would still have children in that case, although they might have fewer children given the increase in their (private) cost. While parents would save the cost of education and child care if they had fewer children, they presumably consider the benefits of children (most of which are non-pecuniary) to be worth the cost for the number of children they choose to have. Starting from this regime, suppose education and health care were to become publicly provided at the same level that was previously chosen by parents. If there were no change in the number of children then it would be odd to argue that the social benefit of averting a birth should now be measured by the public savings in education and health care. Parents were willing to pay that cost when it was up to them, so presumably the socially optimal level of fertility, schooling, and health care are the same as the ones that were chosen privately by parents.

The answer becomes more complicated if parents choose higher fertility when schooling and health care are publicly provided, but it would still be a substantial overstatement to say that the social benefit of reducing fertility is the reduced education and health care expenses. Or, put another way, that calculation ignores the private (and therefore social) benefit of the child. The bottom line is that I don’t find the accounting of the benefits of family planning programs in Section 6.2 to be compelling. For example, Kohler cites an estimate that family planning expenditures of

\$71 million from 2005-15 are associated with social sector cost savings of \$271 million – “a benefit-cost ratio of 4:1.” For any couple the cost of averting a birth is presumably much smaller than the costs of raising a child – it doesn’t follow that they should be having fewer children. Just because some costs of children are publicly provided, it does not follow that these should be included in the social benefit of averting a birth. The right counterfactual is to think of what parents would have been willing to pay privately for those costs in order to have a child.

The argument might be more compelling in the case of unwanted births. But even that is not entirely clear. Even if we could identify a birth as an unwanted birth, it is not obvious that we would want to count all the costs that would have been spent on that birth as benefits of averting the birth. Suppose a couple is almost indifferent between having another birth and not having another birth, but on balance reports that they would prefer not have another birth in the next two years. In the DHS “unmet need” perspective, any birth this couple has within two years is considered an unwanted birth and any couple in this situation that is not using contraception is a case of unmet need. For a proper cost-benefit analysis an economist would like to know the couple’s willingness to pay to avert that birth. One of Pritchett’s (1994) arguments is that this cost must in many cases be quite low, since many couples seem to be aware of contraceptive methods, could access those methods at some modest cost, but choose not to. If the couple had a birth within two years rather than after two years then they may they might be very happy to pay the cost of education and health for the child if those costs were private. They might be much happier having the child within two years than not having the child at all. In other words, the fact that they choose not to use contraception suggests that they don’t view the costs of having a child as greatly exceeding the benefits. It seems odd, then, that the analysis of the social planner would end up with something like a 50:1 benefit:cost ratio from averting the birth. While it’s true that the couple does not bear all the costs of publicly providing education and health, that does not mean that the couple would not have been willing to pay those costs and it does not follow that these costs should be counted as net social benefits of averting a birth.

There is one final point to make about counting the costs of schooling and health care as benefits of averting a birth. If we want to do this kind of calculation then we should evaluate the full set of revenues and expenditures that children will generate over their entire lifetime. Expenditures on schooling and health care should be offset against the tax revenues the child will generate as an adult, along with all other positive and negative public transfers, all discounted back

to birth. This is one of the issues that Lee and Mason look at extensively in their National Transfer Accounts (Lee and Mason 2011). It is a complicated problem both conceptually and empirically. The main point for these purposes is that it is not appropriate to simply pull out one set of expenditures, such as those on health and schooling, and look at them in isolation as a cost of a child that should be put on the benefit ledger of a cost-benefit analysis. Even if we only care about the government budget, which is a very narrow way to think about the problem, this is not a complete accounting of the costs and benefits of a birth. It is not clear exactly how the accounting is done for the estimates that are mentioned by Kohler in Section 6.2, but it appears that these are based on a very partial accounting.

Section 6.3 looks at benefits from a different perspective, focusing on reduced infant and maternal mortality. I found this section more appealing conceptually, though I was not persuaded by the specific numbers used for the calculations. The estimates once again rely on the assumption that a proportional expansion of family planning services will reduce births based on the estimated unmet need discussed above. The estimates in this section are built around the estimates in the Guttmacher “Adding it Up” report that expanding family planning programs to eliminate unmet need would result in 640,000 fewer newborn deaths, 150,000 fewer maternal deaths, and 600,000 fewer children who lose their mother. Given these estimates, Kohler’s valuation of these averted deaths is a reasonable application of the Copenhagen Consensus guidelines. But I’m not persuaded that the Guttmacher estimates are reasonable, given the problems with the concept of unmet need.

In Section 6.5 Kohler looks at contributions of reduced fertility to per-capita income growth. This is another very tricky conceptual area. It is once again worth thinking about the cost-benefit analysis that couples make on a regular basis when women are in their childbearing years. Most births, even in Africa, are “wanted” births, with couples presumably having decided that the benefits exceeded the costs of having the birth. Yet an additional birth almost surely lowers the per capita income of the family for many years, and probably lowers it forever in discounted present value. So couples seem to routinely reject the maximization of household per capita income as a criterion in deciding whether to have another child. Given that, it seems questionable that a social planner should use per capita income as a criterion in evaluating the costs and benefits of averting births. Computer simulation programs such as the RAPID program mentioned by Kohler (a program that goes back several decades) have always had the feature that slower population growth produces higher growth of per capita income in part simply because the denominator grows more

slowly while the growth of the numerator (total GDP) is unaffected. Kohler points out this fundamental feature of these sorts of models, but seems to accept that they may be telling us something useful. I don't think most economists would take these sorts of simulations very seriously as the basis for a cost-benefit analysis of family planning. A model that assumes a constant 6% growth rate of aggregate GDP and then looks at how per capita income will be affected by different population growth rates cannot be considered a serious economic model of population growth and economic development. Even if we thought it was exactly the way the world works, the logical conclusion of such a model is that we should have the most negative growth rate possible if we want to maximize per capita GDP.

It is worth recalling some of the earliest and arguably most influential cost-benefit analyses of family planning done in the 1960s. The economist Stephen Enke wrote a series of papers analyzing the costs and benefits of family planning (for example, Enke 1960, 1966, 1971). In his 1960 paper Enke argued "An economy is having too many births for the economic welfare of the existing population if the estimated present value of infants born this year is negative." Enke's approach was to compare the cost of averting a birth, thereby lowering the denominator for per capita income, with the return on investments in economic growth that would increase the numerator. He concluded that payments to men to get vasectomies "are several hundred times more effective in raising per capita income say over a ten year period than are resources of equal value invested in traditional development projects" (1960: 339).

Most economists would find this a questionable way to analyze the costs and benefits of family planning. As Krueger and Sjaastad (1962) wrote in a critique, Enke's assumption of per capita income as a social welfare function would imply that all births are sub-optimal in any population, even when parents bear all the costs. In his 1966 *Economic Journal* paper, Enke provides a more detailed version of his argument. He writes that "output per head ( $V/P$ ) can be increased by investing resources in making the output numerator larger or the population denominator smaller than they would otherwise be in, say, 1975." He then discusses investments that might raise  $P$  or lower  $V$ , and concludes "If economic resources of given value were devoted to retarding population growth, rather than accelerating production growth, the former resources could be 100 or so times more effective in raising per capita incomes in many L.D.C.s." (1966: 56). The logic is essentially the following: If per capita income is \$5,000, and if the cost of averting a birth is \$50, then the benefit cost ratio of averting a birth is 100:1. Enke's papers were noticed by U.S. administration

officials and were reportedly responsible for President Lyndon Johnson's (1965) well-known remark in a speech to the United Nations, "Let us act on the fact that less than \$5 invested in population control is worth \$100 invested in economic growth."

Enke's papers, though published in good journals, have not stood the test of time. It is interesting that they are almost never cited in reviews such as Kohler's, in spite of the considerable impact they seem to have had on the large U.S. investment in international family planning programs beginning in the 1960s. Presumably the fact that these papers are rarely cited is because most economists recognize that this is not a serious way to think about the costs and benefits of family planning programs. Enke became involved in the TEMPO program of the General Electric Center for Advanced Studies (described in Enke 1971). The TEMPO computer simulation model looked at the impact of population growth in a somewhat more complicated way than his earlier work, although Enke's 1971 article makes it clear that the mathematics of rising numerators versus falling denominators still drive the model. USAID's RAPID model, first developed in 1978, drew heavily on the TEMPO models. USAID continues to use the RAPID model to simulate the impact of population growth on economic growth, and Kohler mentions recent versions in his review. While these models may be useful in analyzing the dynamics of population growth, age structure, and dependency ratios, they are not the basis for a theoretically sound analysis of the costs and benefits of family planning. At their heart they are still heavily driven by Enke's original logic that it is cheaper to lower the denominator in per capita income than it is to raise the numerator.

More rigorous economic models such as Ashraf et al. (2011) deserve much more serious consideration. But these models still raise the question of whether maximizing per capita income is an appropriate objective function for thinking about investments in family planning. As noted, couples systematically reject this criterion when making their own fertility decisions, and presumably would do so even if all the costs and benefits of childbearing were entirely private (that is, if there were no implicit subsidies working through publicly provided schooling, etc.). So it is not clear that showing that per capita income growth would be 1% higher if population growth were 1% lower is an adequate basis for evaluating the costs and benefits of family planning. While we might agree that everyone could be better off if *unwanted* births were prevented, these models are not really aimed at addressing the question of averting unwanted births.

## **Conclusions**

My point here is not to argue that a country like Nigeria should not be concerned about its continued high rate of population growth, or that investments in family planning are not

worthwhile. My own view is that Nigeria and other African countries should be concerned about high fertility and the consequences of rapid population growth. The countries and their populations will almost surely be better off if Africa makes the same transition toward smaller families with larger investments in children that has occurred in most Asian and Latin American countries. I also agree with the view that providing women the means with which to choose their ideal family size is a high priority mission for any public health system.

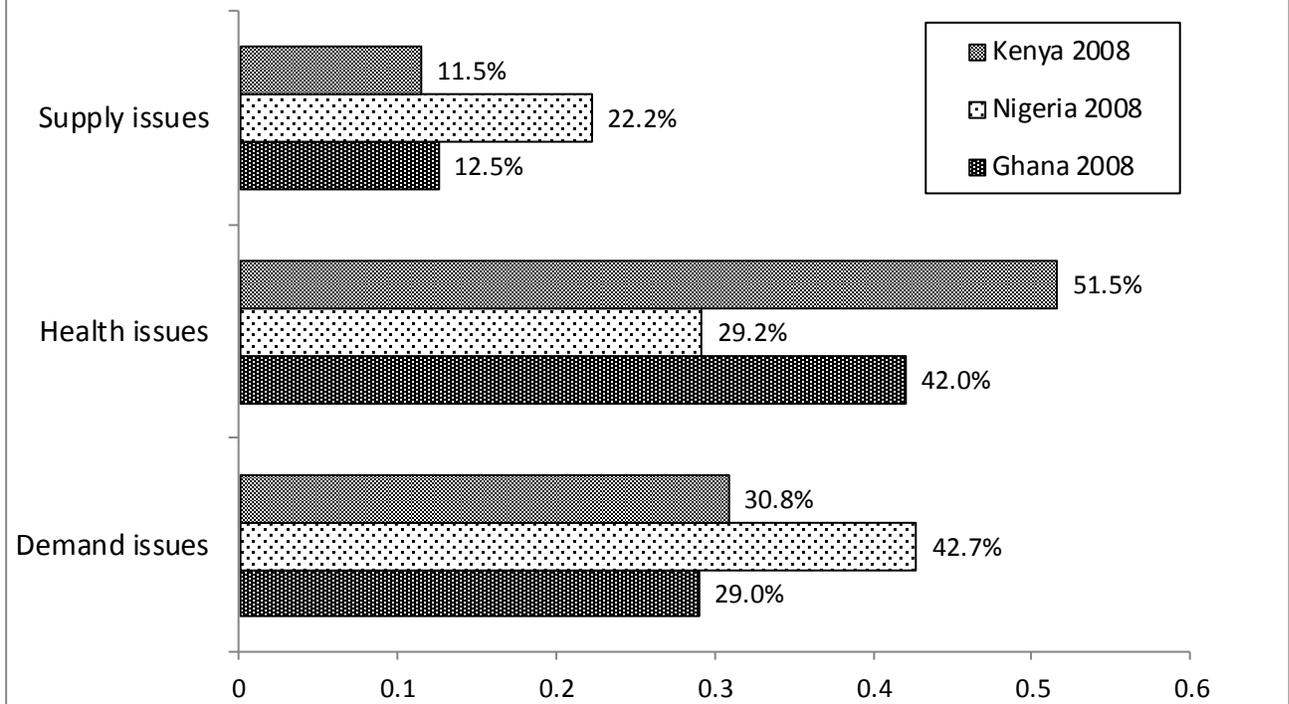
I'm skeptical, however, that the benefit cost ratios of 90:1 and 150:1 presented in Kohler's conclusions are plausible. I have raised concerns on both the cost and benefit side of the calculations. On the cost side, it is not clear that simply scaling up family planning services will lead to large reductions in fertility. As the DHS data show, many women in these countries have access to family planning services and choose for various reasons not to use them. While more effective service delivery might increase usage, simply expanding services as they currently exist seems unlikely to dramatically lower fertility in the absence of social and economic changes that would change the demand for children. The estimates of the benefits of family planning also raise a number of issues. Conceptually they seem to include components that I would argue are not appropriate for estimating the benefits of family planning. Counting the costs of health and education, for example, without doing a full calculation of lifetime taxes and benefits, is misleading, even if we accepted the very narrow calculus of evaluating the impact of a child on the public purse. The calculations of the impact of population growth on per capita income growth do not seem to be grounded in any theoretical arguments about why private decisions about fertility are sub-optimal. Unless there are externalities to childbearing, simply showing that lower fertility would increase per capita income is not a sound basis for investing in family planning.

There is almost surely a need for more and better family planning services in many countries, especially in Africa. How to balance this need against the many other needs in these countries is a difficult policy question. If the benefit cost ratio for investments in family planning is really 90:1 or 150:1 then there are probably few other investments that should come first. Unfortunately I think these estimates are flawed on both the cost and benefit side. As a result I don't think they can really convince us that a marginal dollar spent on family planning has a higher payoff than a marginal dollar spent on education, malaria eradication, improved sanitation, or the elimination of corruption.

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**Figure 1. Reason for not using contraception among women with unmet need, Demographic and Health Surveys**



*Note:* Supply issues include: knows no method, knows no source, lack of access, costs too much; Health issues include: health concern, concern over side effects, inconvenient to use, interferes with body processes; Demand issues include: infrequent sex, husband opposed, respondent opposed, religious beliefs. Women could list any number of reasons, so categories are not mutually exclusive.