



Population Series

No. 97, January 1998

Effectiveness and Cost-Effectiveness of Family Planning in the Philippines

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The Office of Population of the United States Agency for International Development (USAID) provided support for this publication under a cooperative agreement with the Program on Population of the East-West Center.

EFFECTIVENESS AND COST-EFFECTIVENESS OF FAMILY PLANNING IN THE PHILIPPINES

Eric R. Jensen

ABSTRACT

This study uses the 1993 National Demographic Survey (NDS) to examine issues of contraceptive effectiveness and cost-effectiveness in the Philippines. Sterilization and IUDs are attractive alternatives on both cost and effectiveness grounds. However, while sterilization is widely used in the Philippines, the pill is far more popular than the IUD, and injectable contraceptives are gaining in popularity. These "resupply" methods are relatively expensive, and, because they require positive action on the part of their users, they are more prone to failure than are sterilizations or IUDs. Users demand resupply methods, however, and a "cafeteria" of methods is generally thought to be one indicator of service quality. Therefore, resupply methods are likely to play important roles in most national family programs, including the program in the Philippines.

Focusing on pills, the analysis presented here indicates substantial performance differences among outlets delivering the same contraceptives to comparable populations. Women who most recently obtained pills from public hospitals tend to have poor success in avoiding pregnancy, with much shorter predicted birth intervals than those of comparable women supplied from barangay (local administrative unit) health stations or rural health units. Private clinical facilities (hospitals, clinics, and doctors' offices) and pharmacies hold an intermediate position in terms of their effectiveness as sources of pills, measured by predicted birth intervals.

On the basis of numbers of contraceptives distributed, public hospitals appear to be a cost-effective provider of all methods. However, if effectiveness is measured in terms of impact on fertility, public and private hospitals and private clinics are much less effective than barangay health stations or rural health units. To the extent that service provision is constrained by demand, rather than supply, allocation of resources toward these poorly performing facilities will lead to increased fertility. On the other hand, women who currently obtain pills from barangay health stations or rural health units might be encouraged to switch to less labor-intensive sources (such as community-based distribution) for their pill supplies, without a rise in fertility, if such policy opportunities arise.

NDS results also provide evidence that different sources of contraceptive pills attract different types of clients, and this, in turn, affects the observed performance of the sources. For example, women who obtain pills from private clinical facilities tend to have birth intervals that are slightly longer than

those of women who obtain pills from barangay health stations but shorter than those of women who obtain pills from rural health units. The data suggest that the performance of the private clinics is related to the characteristics of their clients, who tend to be wealthier and better educated than the clients of the two public sources and thus are likely to use pills successfully to extend their birth intervals. An analysis that separates the effects of the sources from the characteristics of the clients indicates that private clinics actually contribute less than barangay health stations or rural health units to helping pill users extend their birth intervals.

INTRODUCTION

In the Philippines, there are at least five important non-permanent means of contraception—pills, IUDs, injectables, condoms, and traditional methods—and a wide range of delivery sites. Traditional methods, consisting largely of rhythm and withdrawal, are widely used, accounting for 38 percent of all contraceptive use reported in the 1993 National Demographic Survey (NDS). Such methods create few demands for family planning resources, but they are very demanding of their users, and they show concomitantly high failure and discontinuation rates. Sterilization (which in the Philippines is overwhelmingly female sterilization) accounts for 31 percent of contraceptive use. Next most popular are pills, which account for 23 percent of all contraceptive use. Finally, IUDs account for 8 percent, and condoms account for 3 percent of use. Injectables, currently growing in importance, were not widely used during the period covered by the NDS.

Women reported obtaining contraceptives from public delivery sites including public hospitals, rural health units, and barangay (local administrative unit) health stations and from private delivery sites including private hospitals and clinics (both for-profit and not-for-profit), doctors, pharmacies, and other shops. Barangay health stations provide counseling, commodities, and referrals. Rural health units, or their urban counterparts (often contained in hospitals), have significantly more clinical capability than barangay health stations: their staff can fit women with IUDs, and some women report receiving sterilizations at these facilities. Hospitals have the surgical capabilities needed to provide sterilization on a regular basis. While public hospitals contain family planning counseling centers (which focus largely on potential post-partum clients), they supply less than 10 percent of all pill users. Barangay health stations account for more than half of all pills distributed, while public hospitals, private hospitals, clinics, and—to a much lesser extent—rural health units provide female sterilization.

A natural stratification between public-sector and private-sector clients emerges on the basis of their ability to pay for services, with private-sector sources catering to a relatively high-income clientele. Public and private sectors have roughly parallel vertical structures, with surgical contraception referred

to hospitals or private clinics, while midwives at public barangay health stations and private pharmacists provide contraceptive commodities and, at least at barangay health stations, some level of counseling. Rural health units fall somewhere in the middle of the public-sector grouping, and private clinics may be considered their private-sector counterparts¹. While not all outlets offer all methods, there is nonetheless a wide range of method/source combinations. Given this range, an obvious question to ask is how the various combinations of methods and sources compare in terms of cost and effectiveness.

Costs may be straightforward to define but are difficult to measure with precision because in many facilities costs are shared over several activities. For example, a hospital building is used for many things including the provision of family planning. Allocating the share of fixed costs—such as the expense of erecting and maintaining the building—incurred by a family planning clinic housed in a hospital is an important undertaking. Failure to assign such costs correctly could make hospital costs look artificially low or high compared with the more easily assigned costs of a specifically focused family planning clinic. This analysis employs a set of cost estimates and discusses the implications of costs varying within a plausible range around these values.

Effectiveness is a more difficult concept to define. Presumably, the point of providing women with contraceptives is to help them achieve their fertility desires by reducing unintended or mistimed births. Therefore, effectiveness of family planning must somehow be tied to observed reductions in fertility. Because fertility reductions are difficult to observe, however, measures of family planning effectiveness have generally consisted of counts of acceptors or of contraceptives distributed, often expressed in terms of couple-years of protection. There is evidence from Indonesia (Jensen 1996), however, that quality of service also matters. Women served by higher-quality sources of contraceptives experience fewer births than women who use the same methods but obtain them from lower-quality sources. This weakens the link between commodity counts such as couple-years of protection and fertility. In this paper, I use as an effectiveness measure the conception rate (or equivalently, the time until conception) for family planning users, a measure of contraceptive effectiveness that is tied directly to fertility.

The following sections describe the data and methods employed and then discuss estimates of effectiveness differentials, first among contraceptive methods and then among sources of contraceptive pills. The differentials among methods are consistent with those reported in the literature and are presented partly to demonstrate the usefulness of the method. After comparing the effectiveness of

¹ The correspondence is weakest here, as rural health units are homogeneous in their clinical capabilities compared to private clinics, which span the range from physicians' offices to institutions with full surgical capacity (perhaps with a specialization in providing sterilization).

sources, I then discuss cost estimates briefly before combining them with effectiveness estimates to make cost-effectiveness comparisons by method and source.

DATA AND METHODS

The data come from the 1993 National Demographic Survey (National Statistics Office 1994) and represent the responses of 15,029 women to a set of demographic and health questions. Because of the focus on contraception, only the responses of ever-married women were used in this study, reducing the potential sample by roughly one-third. For births occurring in the five years preceding the interview, detailed information is collected on live births and some information is collected on all conceptions. This information, together with information from a retrospective calendar on contraceptive usage, amenorrhea, and abstinence, is used to generate a new data set, for which each birth interval, rather than each woman, is a unit of observation.

A birth interval starts at the prior child's birth and extends through either the conception of another child or the survey date. Therefore, appropriate statistical controls for right-censoring must be implemented. Periods for which a woman reports amenorrhea or abstinence are excluded to make the birth interval a more accurate measure of months at risk of pregnancy. An ever-married woman can contribute no birth intervals, one birth interval, or (rarely) two or even three birth intervals to the final sample. The estimated regressions are based on samples of as many as 11,240 or as few as 7,575 birth intervals, depending largely on which family planning methods are included in the analysis and on whether or not continuous usage is required. Table 1 reports unweighted sample means of covariates used in this analysis for the full sample of birth intervals.

Regression-based statistical methods are needed to control for the possibly confounding effects of other sources of variation in conception rates. For example, more-educated women may be better able to comply with contraceptive usage protocols and therefore less likely to experience accidental pregnancies. If this is the case, then two sources of contraceptives, otherwise identical except that one serves a more-educated population, would appear to function differently purely because of the difference in their clientele. Regression-based methods make it possible to control for sources of variation other than those originating with the service-delivery point.

Survival regression, the specific method that will be employed for this analysis, allows a very straightforward treatment of censoring. For closed (i.e., non-censored) birth intervals, the dependent variable is the length of the birth interval. For open (censored) birth intervals, interval duration is still the dependent variable, but the contribution that such an interval makes to estimation is the information that

the actual birth interval is *at least* as long as the observed interval.² The probability that the transition to pregnancy occurs in a short time interval is referred to as the hazard rate.

Table 1. Descriptive statistics

Variable	Description	Mean	Standard deviation
Birth interval	Birth interval in months (censored at the survey date for open birth intervals)	27.7	23.1
CEB	Children ever born	3.4	2.8
Woman's education	Woman's educational attainment, in years	9.0	4.7
Husband's education	Husband's educational attainment, in years	8.07	4.6
Wealth 1	First factor score for household wealth, based on housing quality and ownership of assets	0.0	0.8
Wealth 2	Second factor score for household wealth, based on housing quality and ownership of assets	0.0	0.6
Woman's age	Woman's age in years	32.1	7.7
Pill	Pill usage in months	2.1	8.5
IUD	IUD usage in months	0.7	5.6
Condom	Condom usage in months	0.2	2.3
Traditional	Rhythm or withdrawal practice in months	3.5	11.1
Sterilization	Sterilization duration in months	3.7	13.8
No method	No family planning method used, duration in months	17.8	22.0

Hazard ratios, rather than raw regression coefficients, provide a useful way to express the impact a given covariate. In this case a hazard ratio is the ratio of the odds of contraceptive failure (i.e. pregnancy) if one unit is added to the covariate to the odds of contraceptive failure if the covariate remains at its mean value. Like regression coefficients, there is one hazard ratio for each covariate. For example, say that a covariate is estimated to have a hazard ratio of 0.90. This indicates that a one-unit increase in the covariate makes contraceptive failure 90 percent as likely as if the covariate were to remain at its mean level. If another covariate has a hazard ratio of 1.20, a one-unit increase in that covariate would make contraceptive failure 20 percent more likely. Thus, hazard ratios less than one are based on negative underlying regression coefficients, and those greater than one are based on positive underlying coefficients.

² That is, that the interval had not ended by the survey date.

Still another way to interpret survival regression results is to calculate survival or failure time ratios. These are like hazard ratios in that they express the impact of marginal changes in covariates in terms of proportional changes in the dependent variable. Because they are calculated in terms of time until failure, however, rather than in terms of the hazard of failing, they are reversed in their direction. Thus, a covariate with an estimated hazard ratio of 1.20 might have an estimated time ratio of around 0.80. In other words, a one-unit increase in such a covariate makes the hazard of contraceptive failure 120 percent as likely as would have been the case had the covariate not increased; or equivalently, the one-unit increase in the covariate shortens the expected time until contraceptive failure occurs to roughly 80 percent of the original interval. In either case, hypotheses about the impacts of covariates are tested in the usual way, using approximate t-tests.

The basic modeling strategy is to express the duration between conceptions as a function of contraception used, often decomposed by type and supply source. One woman may use pills supplied by a barangay health station, another pills supplied from a pharmacy, and the husband of a third woman may use condoms. For the purpose of this analysis, these would be considered three different contracepting protocols. The primary benefit of such an estimation strategy is that performance differences between supply sources for a given contraceptive method are indicated directly by differences in hazard or time ratios in just the same way that differences between methods are indicated.

For such an interpretation to be valid, adequate controls must be in place for other sources of variation in birth intervals. These controls include the following:

- Woman's education, where increases in education are expected to be associated with decreases in pregnancy rates under the assumption that more-educated women may place higher value on their time, may be more likely to demand good service from health personnel, and may be better able to use a family planning method properly than less-educated women
- Husband's education, where increases in education might be expected to be associated with increases in pregnancy rates if education is a proxy for income or, conversely, with decreases in pregnancy rates if increasing education more closely corresponds to declining fertility preferences
- Family wealth, which is another possible proxy for family income and so might be expected to be associated with either increases or decreases in pregnancy rates
- Woman's age, reflecting both the physiological effects of aging and the relatively higher costs of late-life pregnancies in terms of health and earnings foregone

A measure of underlying fecundity would be useful, as would a measure of how strongly motivated a woman is to avoid pregnancy. One candidate variable is children ever born, which reflects both past

fecundity and, through increasing parity, motivation to avoid future childbearing. These two effects operate in opposing directions. If large values for children ever born are associated with increases in pregnancy odds, the fecundity impact³ dominates. Conversely, if large values for children ever born accompany decreased pregnancy odds, the motivation effect dominates.

COMPARING THE EFFECTIVENESS OF FAMILY PLANNING METHODS

Figures 1 through 5 show the impact on fertility of contraceptive use by method. In the survival function of Figure 1, sterilization provides the benchmark level of survival, with essentially 100 percent of sterilized women surviving the entire calendar interval⁴ (of roughly 65 months) without becoming pregnant. Next most effective overall was the IUD, with roughly 90 percent of users surviving the entire calendar interval. Pill users were somewhat less successful at avoiding births, with less than 65 percent surviving the entire calendar period.⁵ Slightly less than half of the women using traditional methods survived without becoming pregnant, along with about one-third of the women who used no method or whose husbands used condoms. Evidently, couples who rely on the pill, traditional methods, or condoms experience either very high failure rates, or discontinuation rates, or both.

An alternative way of viewing the impact of contraceptive use on fertility is to predict the number of months a birth interval would be expected to last, given the method used and individual characteristics of the user. Figure 2 presents median predicted birth intervals based on survival regressions that include children ever born, woman's and husband's education, woman's age, and measures of family wealth. The underlying regression results are presented in Table 2, which reports estimated time ratios and p-values⁶. Sterilization intervals are predicted, sensibly enough,⁷ to be longer than expected lifetimes and so are not reported here. The pattern is clear among non-permanent methods. IUD users experience a median birth interval of roughly nine years, corresponding to their high odds of surviving without a birth. Women who used no method have a predicted median birth interval of 32

³ There is more at work here than pure physiology, as women who wanted (and bore) more children in the past may well be those who want (and bear) more now. A more accurate, but awkward, term for the physiological impact might be the joint effect of fecundity and persistent high-fertility preferences.

⁴ One woman reported becoming pregnant after being sterilized.

⁵ The sample on which this figure is based includes women who discontinued or switched methods, however, and so it should not be inferred from the figure that the five-year failure rate of pills was 35 percent.

⁶ The p-values are the probabilities of obtaining estimated time ratios, given a null hypothesis of no effect (i.e., a time ratio of one). Values below .05 are typically interpreted as statistically significant.

⁷ Because only living women are interviewed, the birth intervals of all but one sterilized women are censored. The only information available for these women is that the intervals without a pregnancy are at least as long as the intervals observed between the sterilization operation and the survey date.

months. Use of any contraceptive method other than IUD (or sterilization), given the very broad definition of “usage” employed in this figure, generates increases in birth intervals of less than one year. Use of the pill appears to be least effective, but this is because the sample on which Figures 1 and 2 are based includes users who voluntarily discontinue use, a group in which pill users are disproportionately represented.

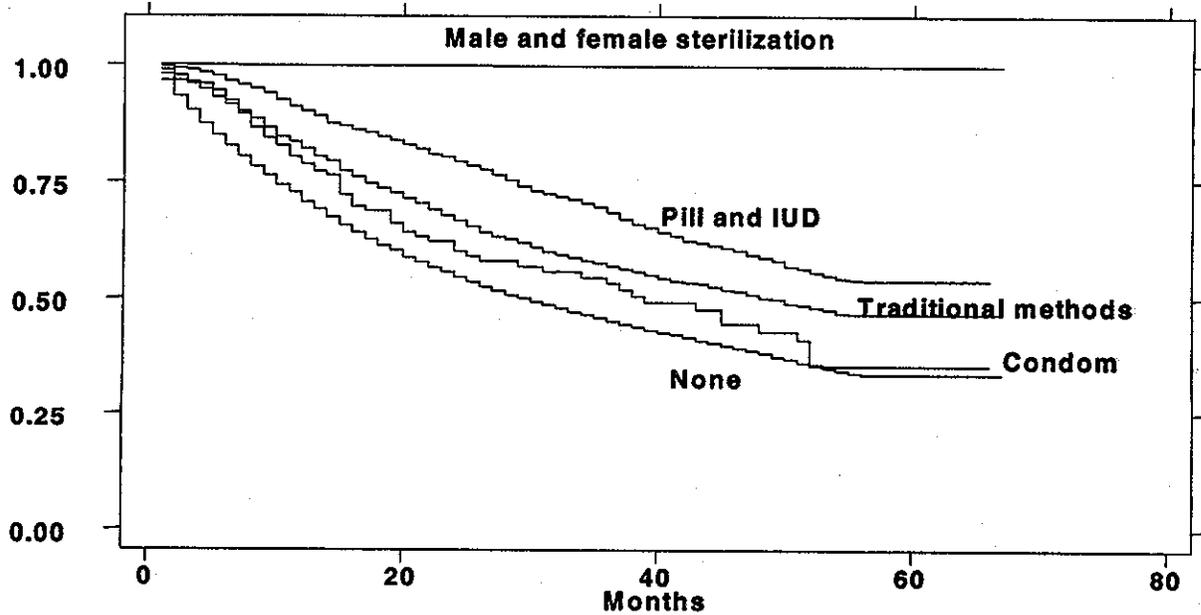


Figure 1. Kaplan-Meier survival curves for birth interval duration by method, all users

A more useful measure of the performance of a method is to assess how well users fare who are more committed to success. One way to accomplish this is to tighten the definition of a user to require continuous use throughout the birth interval, that is, to require that the method under examination be used for every month at risk. Clearly, for such users, a pregnancy can be more readily attributed to contraceptive failure. Figure 3 shows survival curves by method for women who used the method consistently throughout the interval. Here, the pill emerges as a method much more like the IUD in terms of the success (i.e., the survival odds) that its users enjoy. Figure 4 shows median predicted birth intervals for continuous users. The fertility impact of all methods has increased compared to the levels

shown in Figure 2. Use of the pill now increases the period without a pregnancy by about two years compared with use of no method. The advantage of the pill over condoms and traditional methods is less pronounced here than in Figure 3, however. This is because the background characteristics of users are controlled in Figure 4 but not in Figure 3.

Table 2. Impact of contraceptive method choice and individual characteristics on birth intervals

Variable	Time ratio	<i>p</i> value
Children ever born	0.86	.00
Woman's education	0.97	.00
Husband's education	1.00	.23
Wealth 1	1.18	.00
Woman's age	1.08	.00
Pill	1.04	.00
IUD	1.05	.00
Condom	1.02	.00
Traditional	1.03	.00
Sterilization	1.21	.00

An idea of the relative importance of these characteristics emerges from an examination of Figure 5. This figure replicates the histogram of Figure 4, then adds some counterfactual⁸ predictions. The set of points marked by triangles shows the predicted median birth interval by method were the users all to have the characteristics of pill users (in terms of mean age, wealth, and so forth). Similarly, the set of points marked by circles shows predicted birth intervals were all users to have the characteristics of traditional method users. Both sets of points are connected by lines to construct what could be termed "contraceptive user profiles." Their shapes are arbitrary, since they are based on the arbitrary ordering of methods along the horizontal axis, but their relative positions are informative. The profile for pill users always lies below the profile for traditional method users. This means that, regardless of method chosen, individuals with the typical characteristics of pill users are likely to have shorter birth intervals than are individuals with the typical characteristics of traditional method users. The differences can be sizable, taking more than one year off of the median predicted birth interval for traditional method users, for

⁸ Counterfactual predictions are predictions made by deliberately assuming that one or more parameters describing a real-world situation are different than their actual values. Differences between counterfactual and actual predictions are therefore attributable to differences between actual and counterfactual parameters.

example. As Figure 6 shows, these predicted differences in birth intervals are not necessarily due to huge differences in individual characteristics. Women who use traditional methods have had more births and are slightly older, but otherwise are not that different from pill users.

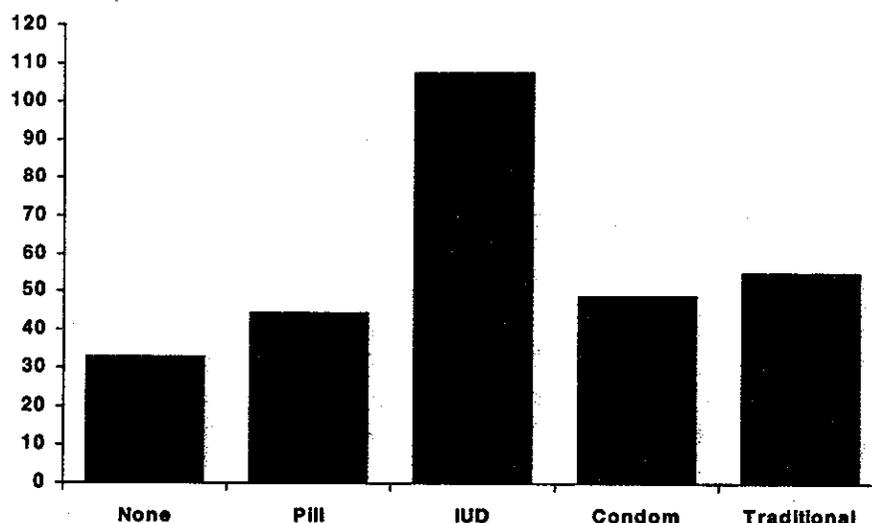


Figure 2. Predicted median birth interval duration in months by method used: Any use during the interval

A comparison of Figures 2 and 4 (for partial-interval versus continuous users) yields several observations. For continuous users, five-year failure rates for IUDs fall below 10 percent. Pill failure rates are also nearly halved compared with the partial-interval results. By contrast, the survival curve given in Figure 3 shows that even continuous use of traditional methods or condoms is insufficient to yield significantly lower failure rates than use of no method at all. Because pill and IUD failures are reduced but not eliminated by restricting the analysis to continuous users only, it appears that both discontinuation and failure play a role in accounting for pregnancies among women using these two methods. By contrast, among women who use traditional methods or whose husbands use condoms, failures remain high even after the analysis is restricted to continuous users. This suggests that failure alone accounts for almost all pregnancies among these groups.

Some self-reported discontinuation of pills and IUDs probably represents failure, as a suspiciously high proportion of women report becoming pregnant the month after discontinuing use. So a reasonable minimum estimate of the annual failure rate for pills is on the order of 6 percent, and a plausible maximum might be as high as 9 percent. The annual failure rate for IUD is only about 1

percent, which is low enough not to cause great concern. The range of plausible failure rates for pills is high by developed-country standards,⁹ however, and points to a need to investigate the cause. For this reason, much of the rest of this paper will be devoted to seeking out the sources of variation in use-effectiveness among pill users.

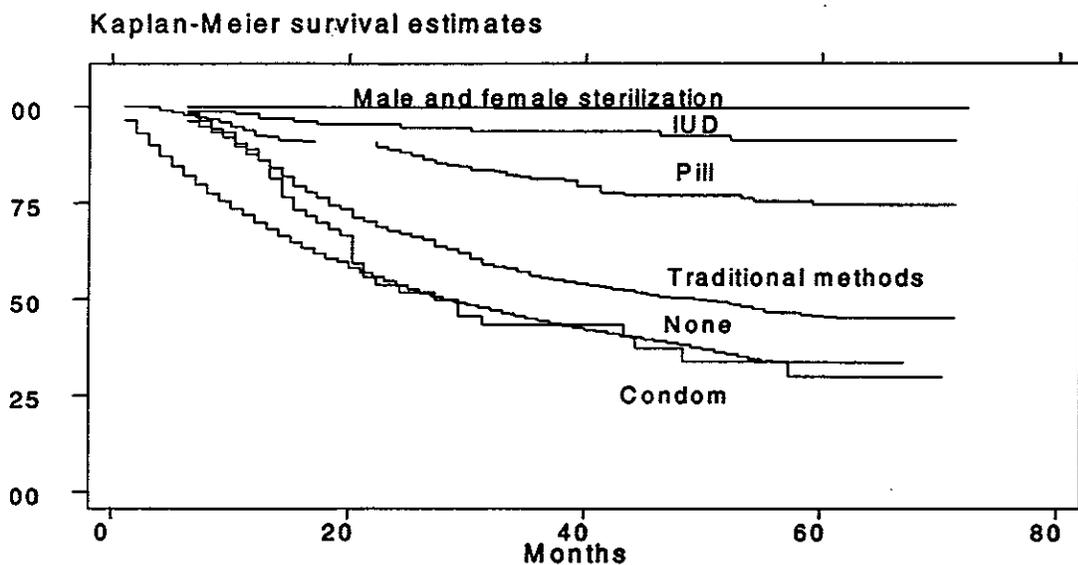


Figure 3. Kaplan-Meier survival curves for birth interval duration, by method: Continuous users only

⁹ For example, estimates for the United States based on the National Survey of Family Growth are approximately 3 percent (Trussell and Kost 1987).

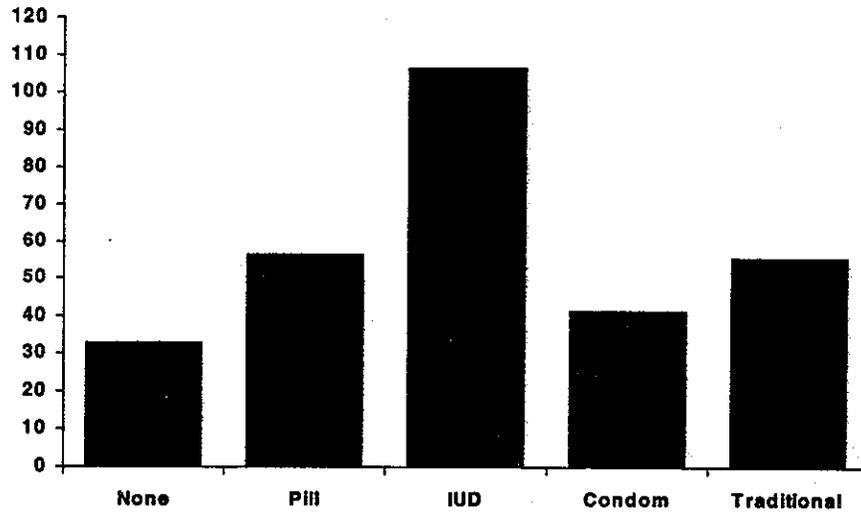


Figure 4. Predicted median birth interval duration in months by method used: Continuous users only

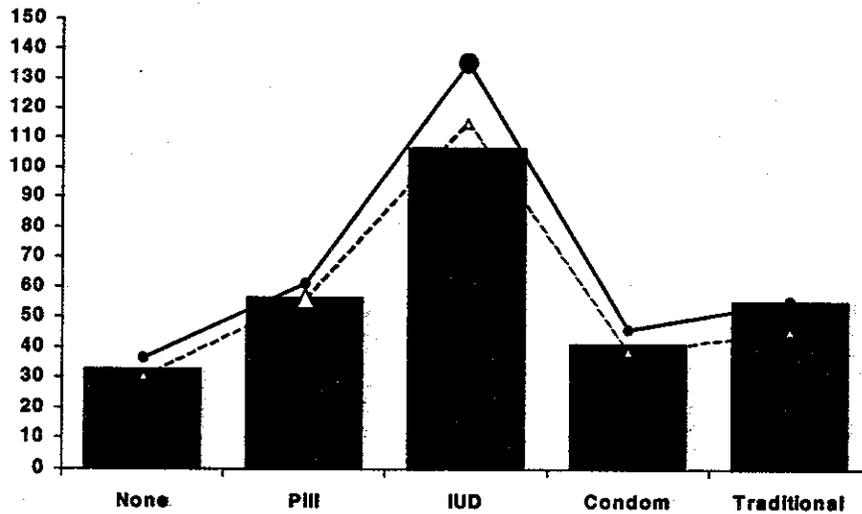


Figure 5. Predicted median birth interval duration in months by method used: Continuous users only

COMPARING THE EFFECTIVENESS OF SOURCES FOR PILLS

Figure 7 shows predicted median birth intervals for each major pill supply source for continuous pill users.¹⁰ This figure shows that the expected birth interval for continuous users is very short for women supplied pills most recently at government hospitals and very long for women supplied at rural health units. For women supplied pills at barangay health stations, expected birth intervals are longer than those of women supplied at government hospitals but shorter than those of women supplied by private-sector outlets or rural health units. The difference in median birth intervals between pill users supplied at barangay health stations and those supplied at rural health units is not robust, however.



Figure 6. Sample means of covariates, by method

Figure 8 shows that the pattern of short birth intervals for women supplied pills at public hospitals persists regardless of the definition of the client population. The leftmost bars, which replicate Figure 7, show predicted median birth intervals for women who said that they used pills during every month they were at risk of pregnancy. The middle bars show predicted median birth intervals for women who used some combination of pills and no method during the period at risk, and the rightmost bars show predicted median birth intervals for women who used any combination of methods (or no method) that included at least some pill usage. Intervals are expected to be shorter for the two groups of women who

¹⁰ The basis for the prediction is the set of survival regressions reported in Table 3. In every case, reported differentials are based on statistically significant estimates.

did not use pills exclusively because both of these groups are likely to include women who discontinued pill use deliberately in order to become pregnant. The difference between continuous and noncontinuous pill users is most pronounced among women supplied at rural health units. It is also evident among women supplied at private hospitals, clinics, doctors' offices, and, to a lesser degree, pharmacies. By contrast, continuous pill users supplied by government hospitals and barangay health stations do no better at avoiding pregnancy than noncontinuous users supplied from the same sources.

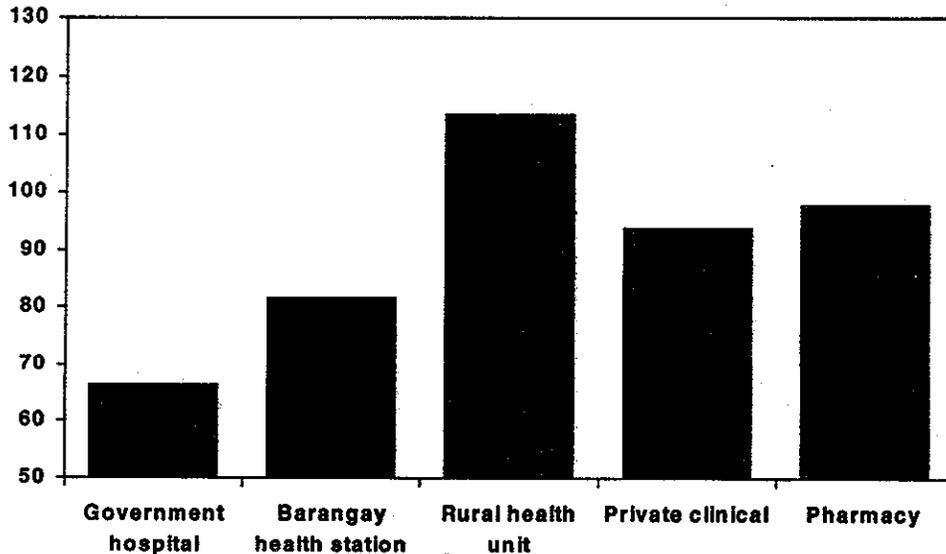


Figure 7. Predicted median birth interval in months for women with continuous pill use, by supply source

While government hospitals are not a very important source of pill supply, accounting for 5 percent of all continuous pill users, barangay health stations provide pills to more than half of all continuous pill users. For this reason, the short predicted median birth intervals for women who obtain pills from barangay health stations is potentially worrisome.¹¹

¹¹ However, this problem must be considered in context. The NDS data have one serious limitation as a basis for this analysis: it is impossible to identify a woman's source of supply, month by month, through the year. All that is known is what method she used each month and her most recent supply source. Technically, all that it is possible to say is that continuous pill users who most recently used barangay health stations or public hospitals were more likely to become pregnant than were other continuous pill users. Still, the pattern seems striking enough that coincidence (happening, most recently, to have visited a barangay health station or a public hospital) is unlikely to account for it.

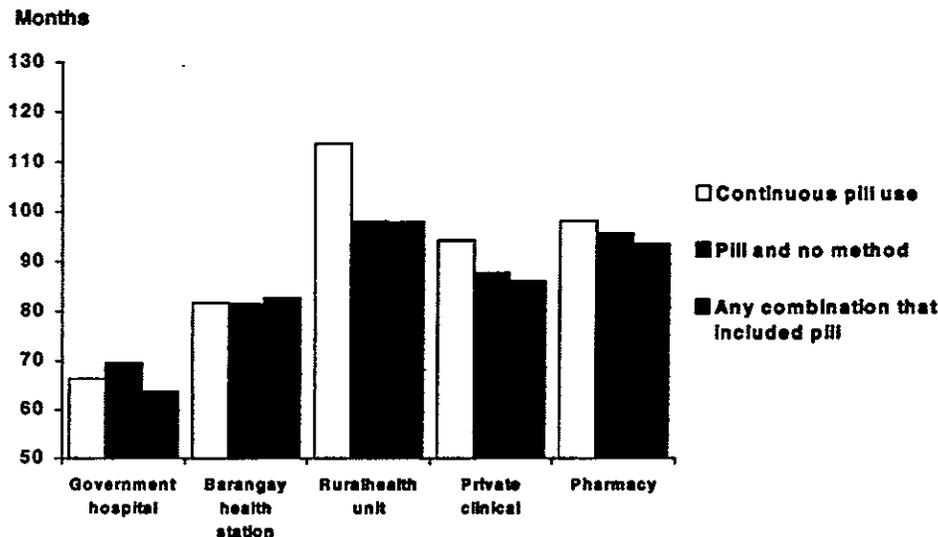


Figure 8. Predicted median birth interval in months for pill users, by supply source and type of usage

Why do continuous pill users supplied by public hospitals experience relatively short birth intervals? This finding may be due to special characteristics of the facilities themselves or to special characteristics of the women who use these facilities. Barangay health stations serve a large proportion of all pill users, making it unlikely that their clients are very different from pill users as a whole, but the question bears examining for their users as well. Table 3 presents survival regression results for a sample of women including nonusers and continuous users of the pill and IUD.¹² Pill supply source is highly disaggregated in this table, including barangay health stations, rural health units, public hospitals, private clinics, and pharmacies. Every pill supply source variable is highly statistically significant. Other covariates include children ever born, woman's and husband's education, two measures of family wealth, and woman's age. With the exception of husband's education, all are statistically significant, and many are associated with sizable differences in birth intervals. In other words, these variables account for a significant share of the variation in birth intervals (or underlying risks of pregnancy) of continuous pill users.

Even after controlling for these user-related factors, however, the birth intervals for women supplied pills by public hospitals are very short. Thus, it does not appear that public hospitals do badly simply because they serve a particular category of women. In contrast, the barangay health stations seem

¹² Effective use diminishes the odds of pregnancy and so should result in a relatively low hazard ratio and (equivalently) a relatively large time ratio. So, for example, the hazard ratio for IUD users is less than 0.90, while the time ratio is 1.05.

to do a little better when user characteristics are accounted for, resulting in an estimated birth interval that is statistically no different from that of IUD users.

As Figure 9 shows, pill users who obtained their contraceptives from various sources are often not very different in terms of personal characteristics, at least not when comparing public to public or private to private sources. Public hospitals attract a slightly better-educated and clearly wealthier clientele than do other public supply sources, and similarly, users supplied at private sources are strikingly better educated and wealthier than users supplied at public sources.

Table 3. Impact of contraceptive method choice, individual characteristics, and pill supply source on birth intervals

Variable	Time ratio	<i>p</i> value
Children ever born	0.87	0.00
Woman's education	0.98	0.00
Husband's education	1.01	0.18
Wealth 1	1.20	0.00
Wealth 2	1.06	0.01
Woman's age	1.08	0.00
Pill supplied by government hospital	1.03	0.00
Pill supplied by barangay health station	1.06	0.00
Pill supplied by rural health unit	1.05	0.00
Pill supplied by private hospitals, clinics, or doctors	1.03	0.00
Pill supplied by private pharmacy	1.05	0.00
IUD	1.05	0.00
Condom	1.02	0.00
Traditional	1.03	0.00
Sterilization	1.20	0.00

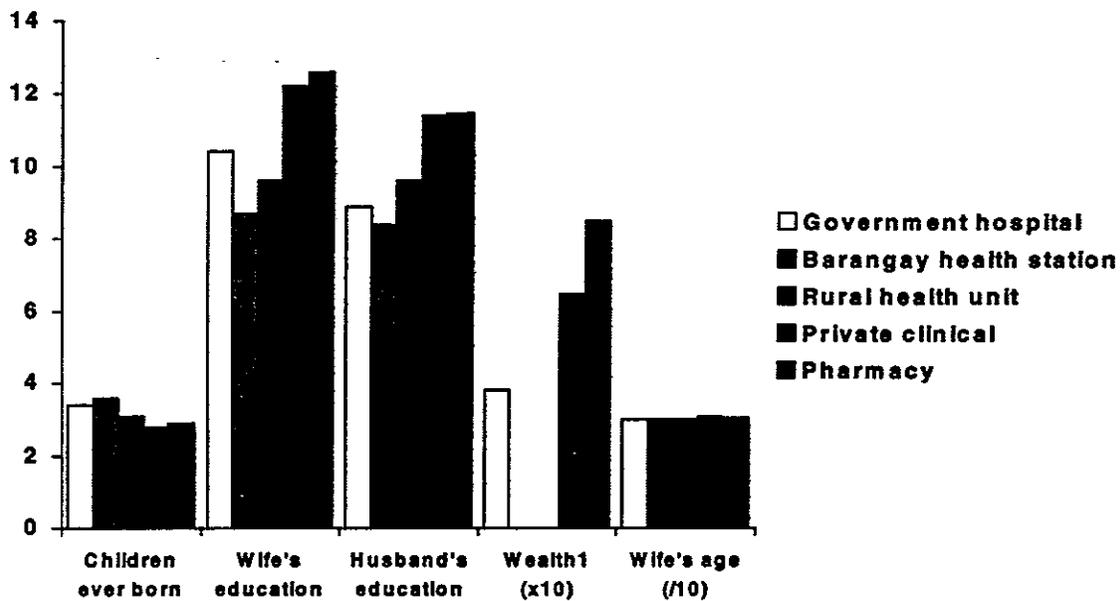


Figure 9. Personal characteristics of pill users, by supply source

Figure 10 expands upon Figure 7 by projecting the performance of pill users were they to employ different supply sources. For each curve, the enlarged point represents the mean expected birth interval of users supplied pills at the supply point they actually use, as denoted on the horizontal axis. The counterfactual projection of what their mean birth interval would be, were they to use other supply sources, is represented by the other points along the curve. As in Figure 5, these curves may be termed “user profiles.” As before, the arbitrary ordering of supply points along the horizontal axis makes their shapes meaningless. The relative vertical position of the curves, however, indicates the potential success of typical clients of one supply source, were they to use other sources.

Two very clear patterns emerge in Figure 10. First, for any given supply point (on the horizontal axis), pill users with the typical characteristics of private-sector clients would be expected to have the longest birth intervals. Secondly, all the “typical” clients¹³ have relatively short birth intervals if they obtain pills from government hospitals or private clinical sources. Clients of government hospitals do badly even though they would be predicted, all else constant, to do slightly better than typical barangay health station or rural health unit clients. Even more striking, the good overall performance of clients supplied by private hospitals, clinics, and doctors seems to be due almost entirely to the characteristics of the clients themselves. If the typical clients of a barangay health station or rural health unit were to

¹³ Any one of the five profiles defines a “typical client”.

switch to private clinics, their expected birth intervals would be projected to fall by roughly one third, or 30 months. Conversely, typical clients of private clinics or pharmacies would be projected to increase their birth intervals if they switched to barangay health stations or rural health units for their pill supplies.

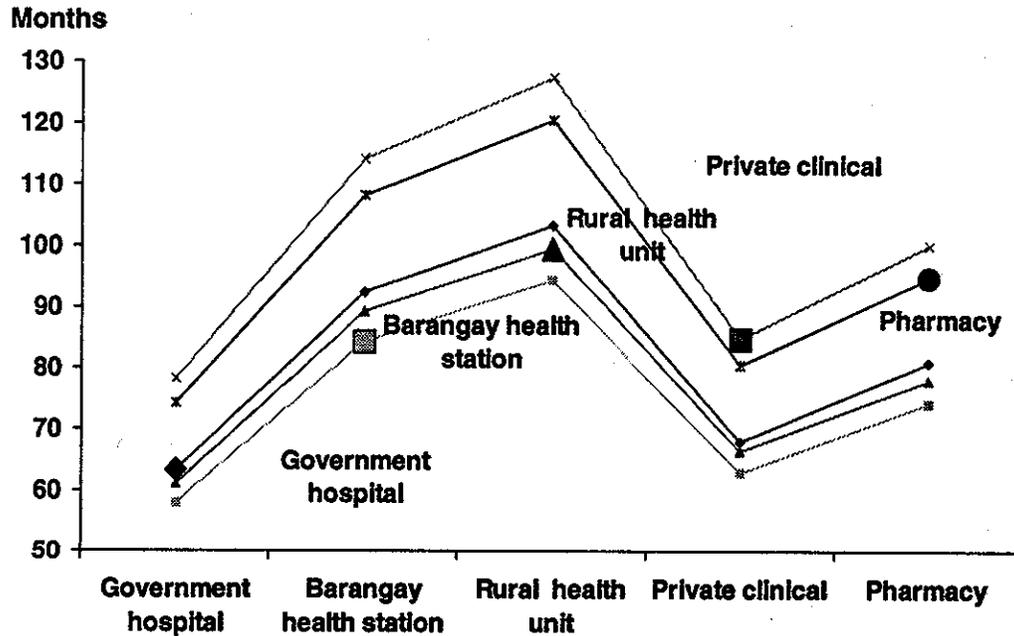


Figure 10. Predicted median birth-interval profiles for exclusive, continuous pill users, by actual and counterfactual supply sources

The most striking finding from Figure 10 is that women who obtain pills from public hospitals or private clinical sources would be expected to have relatively short birth intervals. Perhaps it is because providing pills is not central to the activities of these facilities. At any rate, if pill users currently supplied by barangay health stations or rural health units were to switch to clinical private-sector sources, their odds of becoming pregnant would increase by roughly 25 to 35 percent. Expressed differently, their average birth intervals would decrease by the same percentages.

Some women covered in the survey had been using pills since their most recent birth but had not used family planning in the preceding (closed) birth interval. Perhaps they had wanted to use family planning before their last birth but for some reason did not. Alternatively, perhaps they had not wanted to use family planning before their last birth, but did wish to at the time of the survey, as evidenced by their

continuous use of the pill since their last birth.¹⁴ These two assumptions yield results that differ in scale, but the general pattern of differences among sources in terms of contraceptive effectiveness persists. Figure 10 is based on the first assumption, while Figure 11 is based on the second. The general shape of the curves is similar in both figures, with barangay health stations and rural health units apparently performing in comparable fashion and private clinical sources and government hospitals doing very poorly. The main differences are in terms of scale. The predicted birth intervals for women who obtain pills from the best-performing sources are more than twice as long in Figure 11 as in Figure 10. Also, women who obtain pills from pharmacies do much better in the second figure. In fact, under the assumptions used to create Figure 11, typical pill users supplied by pharmacies are about as successful in delaying or avoiding pregnancies as users supplied by barangay health stations or rural health units. The policy result remains that a shift of users toward public hospitals or private clinical sources would generate an increase in fertility, if all other factors remain constant.

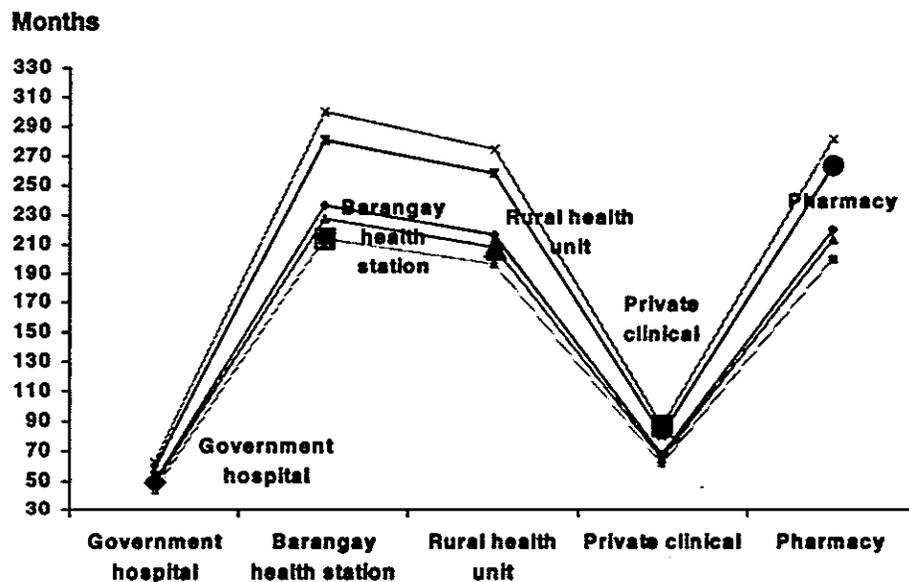


Figure 11. Predicted median birth-interval profiles for exclusive, continuous pill use, by actual and counterfactual supply sources, excluding closed intervals when contraceptives were not used

¹⁴ These are *not* women who experienced a contraceptive failure in their previous birth interval because they were not using contraception.

COMPARING THE COSTS OF CONTRACEPTIVE METHODS AND SUPPLY SOURCES

Herrin and coauthors (1997) surveyed health and family planning facilities in the Philippines and calculated estimates of the labor, equipment, facility, and commodity costs of delivering contraceptives. Their categorization of sources is somewhat different from that used elsewhere in this discussion, with much more attention paid to clinics run by nongovernmental organizations (NGOs) than was the case in the NDS. They were able to isolate labor costs by commodity because each delivery activity is discrete. Their results are summarized in Figure 12, which reports labor costs for the delivery of pills, IUDs, and condoms by various sources as a percentage of the labor costs incurred by barangay health stations. The labor costs for providing pills are essentially identical for barangay health station and rural health units. Public hospitals, whether operated by the national or the provincial government, have lower estimated labor costs for providing pills, ranging from 41 to 55 percent of the cost incurred by barangay health stations and rural health units.

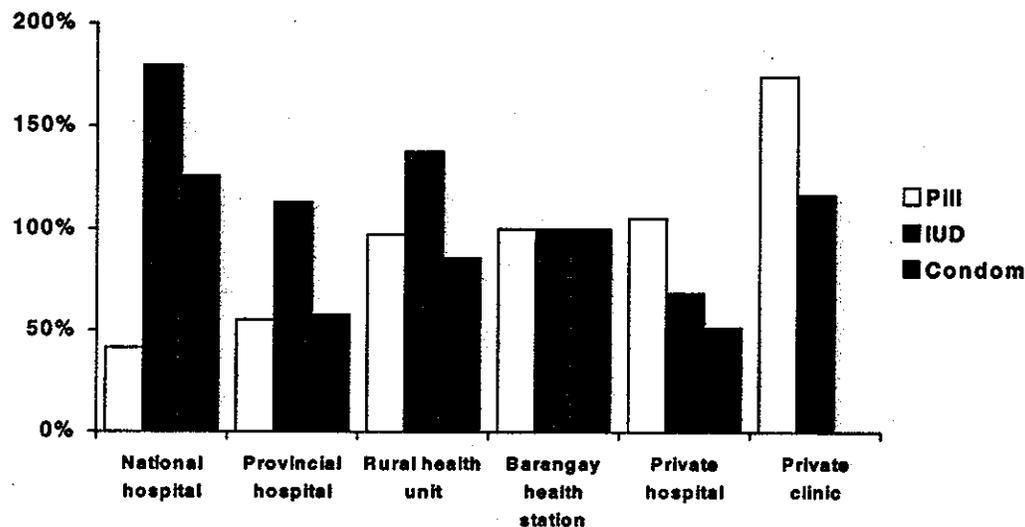


Figure 12. Annual labor costs for delivering family planning methods, by commodity and source, as a percentage of labor costs for barangay health stations

Source: Herrin et al. 1997.

Assuming that for an essentially nonclinical method such as the pill any delivery facility requires essentially the same equipment and physical space, and assuming that the commodities cost the same, at least at all public facilities, then the differences in labor costs can be translated into differences in the

overall costs of pill delivery. According to Herrin and his colleagues, the cost of delivering a one-year supply of pills at a barangay health station includes 188 pesos for labor (John Stewart, personal communication, 1997) and 70 pesos for equipment and facilities. Assuming a cost of 75 pesos for the commodities yields an estimated total annual cost of 333 pesos.

In hospitals, facility and equipment costs are divided over a wide range of activities, yielding very small facility and equipment costs for delivering a one-year supply of pills, typically much less than 1 peso. The commodities themselves cost the same, so the estimated total cost of delivering a one-year supply of pills at a government hospital is very low, in the range of 150 pesos.

Of course greater cost savings would be generated by shifting family planning users from relatively expensive methods such as pills to less expensive methods such as IUDs or sterilization. Herrin and others (1977) estimate labor cost savings per couple-year of protection from 75 percent (for public hospitals) to 92 percent (for rural health units) if users switched from pills to IUDs. Among IUD providers, Figure 12 shows that private hospitals are the least expensive, with labor costs about half those of rural health units and one-third those of public hospitals.

ESTIMATING COST-EFFECTIVENESS

Figure 13 shows cost-effectiveness ratios for two possible measures of effectiveness. The first set of bars is calculated in terms of cost per couple-year of protection and the second in terms of cost per month of birth interval, with predicted birth-interval months based on the profiles of rural health unit clients given in Figure 10.¹⁵ To facilitate comparisons, cost-effectiveness ratios are normalized by the cost-effectiveness figures for barangay health stations. The patterns are somewhat dissimilar. Using a calculation of cost per acceptor based simply on the cost per couple-year of protection for a single method, public hospitals appear to be cost-effective sources for the supply of pills. When the calculation is based on birth intervals, however, rural health units and barangay health stations appear more attractive. Public hospitals, barangay health stations, and rural health units are all roughly equal in terms of the cost effectiveness of lengthening birth intervals. Private hospitals and especially private clinics, through a combination of high costs and high failure rates, are the least cost-effective source of pills, both in terms of providing couple-years of protection and lengthening birth intervals¹⁶

¹⁵ The marginal cost per birth-interval month is the ratio of cost to marginal birth-interval months generated by consistent use of the method. The values are insensitive to the particular user profile chosen because of the subsequent normalization employed.

¹⁶ Herrin and coauthors break costs down according to several categories of NGOs and other privately operated clinics. The results used here refer only to non-NGO, non-industrial (i.e., within the workplace) clinics because, based on subsequent family

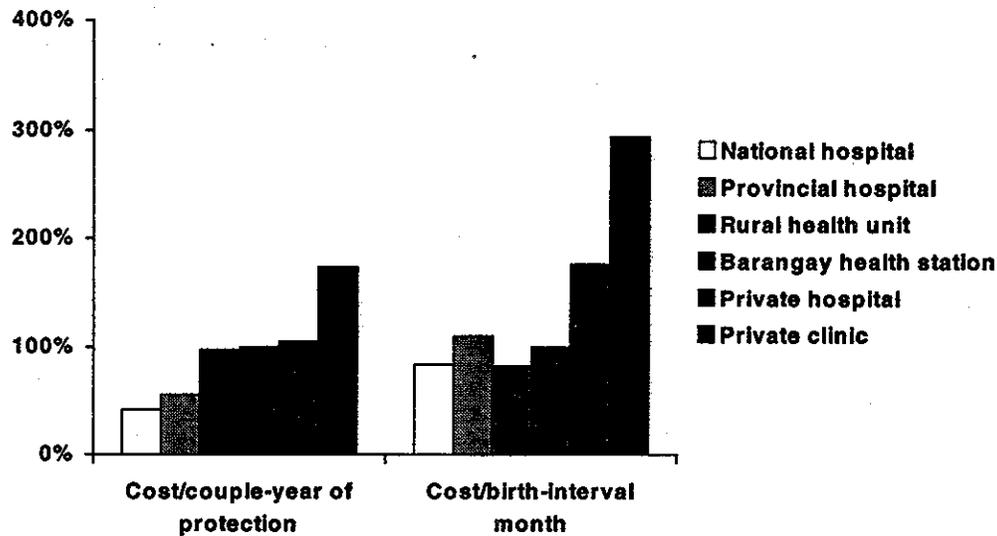


Figure 13. Cost to provide pills per couple-year of protection and projected months of birth interval, by supply source, as a percentage of the cost incurred by barangay health stations

POLICY CONSIDERATIONS

Always a concern in a simulation-based study such as this is how closely actual behavior mimics the simulation's predictions. It goes without saying that the findings presented here are merely an indication of possible policy avenues worth pursuing.

Contraceptive methods

Although sterilization and IUDs are both more effective and less expensive than oral contraceptives, the pill is a popular method among women in the Philippines. In fact, pill use is gaining, both in absolute terms and relative to other methods. In the 1993 National Demographic Survey, 9 percent of currently married women (and 23 percent of contraceptive users) reported using the pill. More recently, a Family Planning Survey (National Statistics Office 1997) showed that pill use had risen to 12.5 percent of married women, or roughly 27 percent of contraceptive users. This is not necessarily good news for fertility reduction, as one of the key results of this paper is that pill users in the Philippines are not particularly effective at reducing their fertility. Controlling for the characteristics of users, the projected

planning surveys, it was found that NGO and industrial clinics account for a very small proportion of the private clinic response. It should be noted that in the Herrin data, NGO clinics were found to be very costly.

birth interval of pill users is only slightly longer than that of traditional method users. Projected birth intervals for IUD users are nearly twice as long as those of pill users.

An assessment of the effectiveness of family planning methods shows clearly that couples who use condoms are not successful in delaying or avoiding pregnancies. In fact, women who report that their husbands use condoms have the same fertility levels as women who do not use family planning at all. With the emergence of HIV/AIDS as a health concern in the Philippines, there is a temptation to tap potential AIDS and family planning synergies in condom provision. The consequences for fertility of an emphasis on condoms for family planning would be unfortunate, however.¹⁷

Similarly, traditional methods such as rhythm or withdrawal show a very limited potential to have a real impact on fertility. Couples who use these methods have lower fertility than couples who use no method at all, but women who report consistent use of such methods have the same fertility levels as women who report only intermittent use. This suggests that it is much more difficult to use these methods successfully than it is to use modern methods. The best estimates for the fertility impact of these traditional methods never exceeds the worst estimates for the impact of the pill.

Sources

Resupply methods are an important part of the method mix. Recent surveys have shown that pill use is increasing in the Philippines, while use of the more-effective IUD is declining (National Statistics Office 1997). Clearly, pills need to be provided as cost-effectively as possible. The evidence presented here, however, indicates that there are substantial performance differences among sources providing pills to comparable populations. Women who most recently received their pills at public hospitals tend to have poor success in postponing or avoiding pregnancy. Even if they report using pills continuously, such women have much shorter predicted birth intervals than comparable women who obtain pills from any other source.

At the same time, different sources attract different clients, and this, in turn, affects the observed performance of the sources. Clients who currently obtain pills from private clinical facilities—including hospitals, clinics, and private doctors—are relatively successful in terms of contraceptive use, as indicated by their relatively long birth intervals. The NDS data suggest, however, that this apparent success is largely due to the fact that these women are wealthier and better educated than women who obtain their pills from the public sector. If the women who currently obtain pills from barangay health

¹⁷ Note that the high observed failure rates of condoms are typically attributable to intermittent usage rather than to physical problems with the condoms themselves.

stations or rural health units were to switch to private clinics, the data suggest that they would experience more contraceptive failure that they do at present.

In the National Demographic Survey, all private clinics are grouped together, including profit-making establishments as well as clinics run by NGOs. Thus it is not possible to assess the performance of NGOs in family planning provision. It may be that clients who obtain pills from NGO clinics (or other private facilities that focus on pill distribution) are extending their birth intervals successfully, but their experience is masked in the survey by poor results reported by clients of other private clinics (for example, clinics that specialize in sterilization or even general health practitioners).

It does seem clear, however, that clients who obtain pills from public hospitals are not very successful at extending their birth intervals. The costs of providing family planning in public hospitals are extremely low because these hospitals can distribute labor and facility costs over the wide range of health services they provide, yet their performance is so poor in terms of the birth intervals of their clients that their large cost advantage disappears in calculations of cost-effectiveness. As a result, the cost of supplying pills per birth-interval month is roughly equivalent for public and private hospitals, barangay health stations, and rural health units. The question of what emphasis to give to public hospitals as a source of pills and other family planning methods depends on whether family planning is constrained by supply or demand. If there is slack time in the typical day of a family planning provider (casual observation in the field suggests that this is often the case), then family planning resources are not being fully utilized and the constraint to reducing fertility lies on the demand side. If this is the case, the key to reducing fertility lies in lengthening birth intervals for the limited number of users as efficiently as possible. If users switch from an expensive but efficient source of contraceptives to a source that is less expensive but less efficient, then costs may decline—in terms of birth-interval months, births averted, couple-years of protection, or other measure—but fertility will rise. At present, it appears that if a new family planning user is recruited, the predicted impact on fertility will be larger if she goes to a barangay health station, a rural health unit, or perhaps a pharmacy, rather than to a public hospital.

Put another way, if one more family planning worker is hired in a public hospital, the impact on fertility will be less than if the same worker is recruited by a barangay health station or rural health unit. However, this situation needs to be examined carefully before any resource-allocation decisions are taken. It may be that family planning workers at public hospitals have less slack time than similar staff at other facilities because clients see hospitals as higher-quality facilities and swamp them, ironically diminishing the quality of the services provided. Clearly, if this is true, the remedy would involve increasing—rather than reducing—resources expended on hospital-based family planning clinics.

This study shows that there may be a potential for pharmacies or some other market-style facility to play a greater role in providing pills and other contraceptives to women in the Philippines. At the time of the survey (1993), pharmacies charged full market prices and served primarily wealthy, well-educated, low-parity clients. Such users tend to have long birth intervals due to their own personal characteristics. Counterfactual predictions, however, indicate that women who currently obtain pills from barangay health stations would not have dramatically shorter birth intervals if they switched to pharmacies. If women who currently obtain pills from government hospitals switched to pharmacies, they would be predicted, on average, to have longer birth intervals.

Some sort of pseudo-market facility, perhaps subsidized but operating at lower cost than public sources, could potentially provide a cost-effective supplement to current public programs. Since the completion of the NDS, the "Trust" condom has become available in pharmacies at below-market prices. A companion line of "Trust" pills was introduced in 1997, and a "Couples Choice" program was initiated that makes pills available commercially at a low cost. As data become available, it will be interesting to assess how women who previously obtained pills free from public sources are responding to the Trust and Couples Choice programs. Low-income users clearly are of special concern.¹⁸

ACKNOWLEDGMENTS

I thank Alex Herrin, Rachel Racelis, John Stewart, and David Guilkey for sharing their family planning cost data. Any blame for its misuse rests with me. I also thank Carol Carpenter-Yaman, Ephraim Despabiladeras, Andrew Kantner, and Trinidad Osteria for helpful comments Liz Muego for arranging a helpful visit to service provision points in Pangasinan, and Sidney B. Westley for editorial support.

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¹⁸ As would be expected, Indonesian family planning users at the lower end of the income scale displayed the greatest sensitivity to price increases (Jensen et al. 1994).

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