Determinants of Contraceptive Method Choice in Rural Tanzania Between 1991 and 1999

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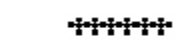

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Determinants of Contraceptive Method Choice in Rural Tanzania Between 1991 and 1999

Susan Chen, David K. Guilkey

Abstract

Four pooled Demographic and Health survey data sets are used to examine the determinants of contraceptive method choice in rural Tanzania in the period 1991 to 1999. The individual data is linked to facility surveys conducted in the same communities so that the impact of Tanzania's family planning program can be examined. The very large sample size allows us to disaggregate method choice into five categories, including a separate category for condoms, even though this is a very low prevalence country. In addition, we are able to examine the impact of pharmacies. The focus of the paper is an examination of the impact on method choice of the three major components of Tanzania's program: logistical support, trained providers, and communications programs. The statistical methods employed correct for the potential endogeneity of message recall by joint estimation of an equation explaining contraceptive method choice and equations explaining family planning message recall and recall of having heard a radio drama. Simulations are used to quantify the impact of the important policy variables.

I. Introduction

Except in the area of family planning, the general health status of the Tanzanian population has been stagnant or improved only slightly over the last ten years. Tanzania is one of the poorest countries in the world with a GNP per capita of about US $240 per year (World Bank 1999). With a very low per capita expenditure on health of about US $36 per year, Tanzania is ranked 174 among 191 countries (WHO, 2000). Like many countries in Sub-Saharan Africa, Tanzania has been coping with the HIV epidemic spreading throughout the country and infecting 8 percent of the adult population by the late 1990s. Available data on health statistics (such as mortality, morbidity, and nutrition) reflect these trends. They suggest that only limited or no improvement has been made in the general health of the Tanzanian population in the last decade. Family planning however, appears to run contrary to this trend with a decrease in the total fertility rate from a high of 6.7 children per woman in 1980, to about 5.5 in 1995, and an increase in contraceptive prevalence for modern methods from 6.6% in 1991 to 15.6% in 1996.[1] This more than doubling in the contraceptive prevalence however masks the fact that most of the gains in family planning growth in modern methods occurred between 1992 and 1996. Between 1996 and 1999 contraceptive prevalence grew by only 2.3 percentage points (Tanzania Reproductive and Child Health Survey, 1999). One reason for this countervailing trend may be

[1] Fertility rates are taken from World Health Statistics Annual (1998) and modern methods prevalence is taken from United Nations (2000).

the initiation of programs by the government of Tanzania which has undertaken an intensive effort to control population over the past decade. With funding from a host of donor agencies, the government formulated a new family planning initiative that significantly upgraded the family planning services in existing facilities and carried out an information and education campaign that provided family planning messages through the media (with radio dramas) and directly to the public. This paper will inform the debate on what features of the family planning program seem to have affected contraceptive method choice in Tanzania. It provides a contribution to the literature on family planning program evaluation for five reasons. First, the research is based on a period of time that encompasses the entire life of one donor agency's family planning initiative — the United States Agency for International Development (USAID). USAID has been one of the largest donors to the family planning program in Tanzania over this time and provided a significant portion of its budget.[2] Our data start in 1991, a year **before** the initiation of Government of Tanzania's family planning program, and continue through 1999. We can therefore assess and inform the debate on the impact that donor funding and program decisions (choices) can have on the success of family planning programs.

Second, the data contain demographic, socioeconomic and family planning information on women as well as data on the facility characteristics of family planning services available to

[2] Internal memo at MEASURE *Evaluation* estimates that about US 4.5 million in 1998 was given to family planning programs.

women within their communities. The data is made up of four pooled cross-sections gathered in 1991, 1994, 1996, and 1999. Because our data is "longitudinal" in the sense that many of the same facilities were visited in all four survey panels, we are able to investigate the issue of leveling off of contraceptive use in Tanzania. In particular, we can study both supply and demand factors that may explain both the initial surge in contraceptive use and the slower rate of increase in later years of the program.

Third, pooling all four cross-sections of the data set enables us to focus on rural women only even though this is a very low prevalence country. When we consider family planning characteristics such as access to services, women in urban areas typically face a family planning supply market with a choice of many facilities located close by work and home. This means that access to family planning is a vague concept because it is difficult to distinguish what she perceives her market to be since identifying her market is difficult and concepts such as distance to a facility are hard to define. With rural women, we are more likely to be able to disentangle the effects of access. The market they face is a lot more obvious because their choices are restricted by the density of facilities and geographic distance. Characteristics such as distance to the nearest facility are therefore easier to measure.

Fourth, the wealth of data allows us to go a step further than previous studies on the effect of family planning program components on contraceptive method choice in Tanzania. In past research, all modern methods were aggregated into one outcome. This was necessary because of the very low prevalence of contraceptive use in Tanzania especially in the early 1990's. In our analysis, the large sample size obtained by pooling four data sets allows us to

disaggregate the modern methods category into type of modern methods and hence consider condoms separately from other types of modern methods. With the evolving AIDS epidemic in East Africa and the dual role that family planning programs now play in both encouraging healthy sexual behavior and providing family planning, this type of analysis is extremely timely since we are able to assess the impact of different components of the family planning program on condom use in Tanzania over the 1990s.

Finally, over the last decade, the government of Tanzania has undertaken a decentralization campaign to encourage the private provision of family planning services. Within the private sector, pharmacies have been cited as an increasing source of contraception for many users (Tanzania Reproductive and Child Health Survey, 1999). Since we have facility information on pharmacies for our first and last surveys (1991 and 1999), we are also able to study the impact that access to pharmacies has on contraceptive choice.

The plan of this paper is as follows. In the next section, we provide background information on the family planning program in Tanzania and its evolution into a reproductive health program. Information on trends in source of contraceptive method are also present. Section III presents the conceptual framework for our empirical analysis, describes the data sets, and provides descriptive statistics on both the individual level data and the facility level data. Multivariate results and simulations are presented in Section IV and we conclude in Section V.

II. Background

Components of the Program

In 1992, the government of Tanzania developed its first National Population Policy (NPP). The policy was developed to address a very high total fertility rate of about 6.3 children (DHS 1991), an under five mortality rate of 141 per 1,000, and a low per capita GNP (equivalent to 110 US dollars) in an overall population of 27 million people. With substantial funding from donor agencies, the NPP and subsequent population policies have been implemented by the Ministry of Health through its Reproductive and Child Health Unit (RCHU) which later became the Reproductive and Child Health (RCH) Section,

The major donors for family planning in Tanzania are the United States Agency for International Development (USAID), the United Nations Population Fund (UNFPA), the British Overseas Development Administration , the German Association for Technical Cooperation, and the International Planned Parenthood Federation (IPPF). Most of the assistance provided by the USAID and the UNFPA is channeled through the RCH Section, while the IPPF assistance is centered around its own set of clinics that provide family planning in urban areas.[3] The RCH section oversees a large network of government-run hospitals, health-centers, and dispensaries throughout the country.

[3] In addition to the IPPF or UMATI clinics, some urban areas are also served by Marie Stopes clinics. However, neither of these organizations have clinics in rural areas of Tanzania which is the focus of this paper.

The UNFPA provided $21 million of support over a five-year period during the mid-nineties. The funding from USAID began in 1990 and had an initial bilateral funding level of $20 million over seven years. Over the subsequent decade, USAID was one of the largest donors in support of the population, health, and nutrition initiatives in Tanzania, providing an average allocation of $11 million US dollars per year.

In 1998 the two main programs receiving ongoing support from USAID in Tanzania were the FPSS program and the Tanzania Aids Project (TAPS). At this time, 6.5 million dollars were allocated towards the FPSS budget (30% for child survival activities and 70% for family planning). The overall goal of the FPSS project was to "improve the health and well being of women and children by enhancing the opportunity to choose freely the number and spacing of children" (Shutt, et. al., 1994). The major components of the program were to train health providers in the provision of family planning, to provide logistical support for the provision of family planning supplies, and to develop an information, education, and communication (IEC) program to promote family planning. Over the decade, with these objectives in mind, the government of Tanzania has made a substantial effort to integrate family planning programs into maternal and child health programs. By 1997, the government had taken several steps to integrate family planning programs into maternal and child health programs, including the initiation of a reproductive and child health program. This program was continued through 1999.

The remaining 4.5 million of funding supported the TAP. TAP worked largely through the NGO sector, however, they also supported the National AIDS Control Program (NACP) with a goal of preventing the further spread of HIV and improving the welfare of AIDS orphans. TAP

activities included establishing NGO networks and clusters, supplying information along with condoms in social marketing efforts to encourage HIV preventive practices, and improving health care providers' diagnosis and treatment of HIV/AIDS and other sexually transmitted diseases.

The government of Tanzania has been slow to respond to the epidemic. The NACP was set up within the Ministry of Health by the government of Tanzania in 1987. Their aim was to address the increasing HIV prevalence. They set up three medium-term campaigns: 1987-1991; 1992-1996; and 1998-2002, however, shortage of funds and lack of political commitment has hampered the implementation of the campaign through much of the nineties.[4] During the initial stages of the AIDS epidemic, government sponsored activities focused on mobilizing the health sector through training health workers and ensuring blood safety. The focus then expanded to increasing knowledge and awareness of healthy sexual behavior to the sexually active population.

The Salama brand of condom was introduced by the NACP and social marketing programs were begun in 1988 with funds from the USAID Aidscom project. Sales, however, were very low, with about 150,000 units over a one-and-a-half-year period. In 1993, Population Services International took over the condom program. They launched a new and innovative social marketing program that included package-redesign, increasing the number of local distributors, and increasing the number and type of retail outlets that sold condoms. They also used modern marketing techniques and advertising campaigns. These efforts increased the sale

[4] "AIDS in Africa During the Nineties: Tanzania" 2001 MEASURE *Evaluation* Project Special Report.

of condoms to over 10 million between 1995 and 1997 (Population Services International, 2000).

A national mass media campaign promoting family planning was launched as part of the family planning initiative. The radio drama *Twende na Wakati* began broadcasting in July 1993 and airing of *Zinduka!* began in October of 1993. Both dramas are still ongoing, with *Twende* being supported by the UNFPA and *Zinduka* by USAID. Since 1993, a number of new radio dramas targeting youth have been introduced. Radio is still considered to be one of the best sources for disseminating family planning messages. Another component of the IEC effort was the Greenstar logo that was introduced in 1993. The objective of this IEC campaign was to promote family planning services through identification with a logo or brand. Promotional messages were launched using both print and electronic media. This campaign continues today.

Trends in Source for Family Planning

In the ten years since the inception of the FPSS program, the number of rural women going to government facilities for their modern methods of family planning services seems to have leveled off or decreased slightly (see Table 1). Between 1991 and 1996 there was an increase in the use of government facilities but by 1999 they had decreased to 76% in rural mainland Tanzania. This plateau in contraceptive availability began to be recognized in the middle of the decade. Investigation of the phenomena at that time revealed that two things were happening. First, family planning facilities were experiencing stock-outs and supplies were not

getting from the warehouse to the clinics, and second, trained providers in family planning facilities were scarce in rural areas. At this time, there seemed to be a lull in program activity as the focus of the program became more logistic and the orientation of the program moved from provision of services to logistical or management issues.

The role of the private sector in providing family planning in rural areas has been increasing over the last decade. The decentralization of the health care system has led to the privatization of health services throughout Tanzania. Table 1 shows that over the decade, there was an increase from 1.1% in 1991 to 2.4% in 1999 in the number of women reporting medical private facilities as the source of their current modern method of family planning. Therefore, private for profit facilities are becoming somewhat more important in the provision of services as the government moves to decentralize public services and enhance private investment. Also noticeable is the increasing role of pharmacies as an alternative source of modern methods. In 1991 only 2% of women listed pharmacies as a source whereas 4.3% listed them as a source in 1999 in rural areas.

III. Conceptual Model and Data Sources

Conceptual Framework and Statistical Methods

In Tanzania, improvements in the family planning sector have taken place on both the supply side and on the demand side over the last ten years. As outlined above, the government

and the private sector have worked to increase the availability of family planning services while at the same time undertaking information and educational campaigns set up to influence the demand for these services. Our analysis is guided by structural models of fertility in which contraceptive use is an endogenous determinant of fertility. These models take into account both demand and supply side factors that affect contraceptive use and ultimately fertility (see, for example, Easterlin and Crimmins 1985; Rosenzweig and Schultz 1985; Schultz 1989; and Buckner, Tsui, Hermalin, and McKaig, 1995). The simple form of these models hypothesize that exogenous individual background factors (such as the woman's age and education), household background factors (such as household assets), and family planning program variables, all affect the woman's fertility preferences. Along with the direct effects of household and family planning program variables, fertility preferences affect contraceptive practice which, in turn, affects fertility.

The outcome that we model in this paper is one of the more important proximate determinants of fertility: contraceptive method choice. Our focus is on total program effects on contraceptive method choice and we are not concerned about the pathways through which a program variable affects contraceptive preference. For example, an educational campaign may affect fertility preferences which in turn alter the choice to use contraception. To examine the causal pathways we would have to estimate a model in which fertility preferences are first affected by the education campaign and then preferences are allowed to affect contraceptive method choice.

We model choice of contraceptive method type using the multinomial logit model. This statistical specification (**Equation 1**) is as follows:

$$\ln\left[\frac{P(C_{tij}=k)}{P(C_{tij}=1)}\right]=X_{tij}\beta_k+t_k\alpha_k+P_{tij}\gamma_k+M_{tij}\delta_k+u_{tj}^{C}+\varepsilon_{tij}^{C}$$

where the dependent variable is the log odds that woman i ($i=1,2,...,N_{tj}$) from panel t and community j used contraceptive method k relative to contraceptive method 1. The X's represent characteristics of the respondents such as age, education, and religion. The t's represent a set of three dummy variables for the 1991, 1994, and 1996 panels with the 1999 panel arbitrarily chosen to be the reference category. The P's represent program variables that measure various aspects of family planning services such as availability of contraceptive methods, trained providers and pharmacies near the community in which the respondent lives. The M represents whether or not the respondent recalled having heard a family planning message or one of the radio dramas. The final terms in Equation 1 are a community specific error term (u^{C}) that is allowed to vary through time and an individual level error term (ε^{C}). The community specific error term allows individuals within the same community to have correlation in their choice of contraceptive method due to unobserved community level factors (attitudes of community leaders towards contraception, for example). The statistical implications of this specification are that standard methods will yield correct point estimates of the coefficients, but standard errors will be biased downwards which means t statistics will overstate significance (see Angeles, Guilkey, and Mroz, 2002). The random effects method we discuss below corrects this problem and also corrects for the potential endogeneity of the message recall variables.

Ideally, we would simply estimate Equation 1 and then use simulation methods to gauge the impact of the policy variables. Unfortunately, it is well known that message recall is a potentially endogenous determinant of contraceptive method choice (see Figueroa, Bertrand, and Kincaid, 2002). For example, it may well be the case that women that recall having heard a family planning message are also more likely to be motivated to use a method of contraception. Since motivation is unobserved and cannot be controlled in the statistical model, simple methods that ignore the endogeneity of message recall may result in upward biased measures of the impact of the message variables. The standard solution to this problem is to use a simultaneous equations estimation procedure to correct for the bias (see Bollen, Guilkey, and Mroz, 1995). The simplest simultaneous equations method is instrumental variables or two-stage least squares. Unfortunately, these methods are not appropriate if both dependent variables are binary or categorical. Therefore, the method we use is full information maximum likelihood where we estimate contraceptive method choice equation jointly with an equation that explains message recall. We call the estimation procedure where we estimate the two recall equations jointly with the contraceptive method choice equation a structural estimation procedure. However, its purpose is simply to correct for bias due to message recall and we are still examining total program effects on contraceptive method choice since the message variables along with the logistic and training variables are placed directly in the method choice equation.

The statistical specification of the message recall equation (**Equation 2, below**) is similar to Equation 1:

$$\ln\left[\frac{P(M_{tij}=1)}{P(M_{tij}=0)}\right] = X_{tij}\beta + \alpha_t + \gamma Z_{tij} + \varepsilon_{tj} + \varepsilon_{tij}$$

where dependent variable is the log odds that individual i from community j and panel t recalls having heard a family planning message (in the empirical work we estimate separate recall equations for having heard a family planning message and whether the respondent specifically recalls having heard a radio drama). The X's and t's are as discussed in Equation 1 and the Z's represent variables that we assume uniquely affect message recall and do not have a direct effect on contraceptive method choice. These variables are necessary for statistical identification of the model and include whether or not the household owns a TV or radio.

We assume that the error terms in Equations 1 and 2 are correlated and this correlation is what causes simple methods to yield biased estimates of message recall on contraceptive method choice. Our solution is joint estimation of Equations 1 and 2 by full information maximum likelihood methods. Specifically, we use an extension of Heckman and Singer's (1984) semi-parametric method that does not impose any specific distributional assumptions on the unobserved heterogeneity, but instead assumes that it can be approximated by a discrete probability distribution where both the mass points and the probabilities are estimated. This approach has been used successfully by Mroz and Weir (1990) to estimate discrete time hazard models for child spacing, and by Guilkey and Riphahn (1998) to estimate the mortality hazard for young children in Cebu, the Philippines. A comparison of the assumption of normal errors

with that of non-parametric error term distributions in structural equations models was done by Mroz and Guilkey (1992). They found that when the true distribution of the errors was approximately normal, the parametric and non-parametric estimators gave very similar results. When the true distribution was far from normal, the non-parametric estimator generated much more accurate parameter estimates. The specific estimation procedure that we use does not restrict the mass points for the discrete distributions to be the same across equations. Instead, using a generalization due to Mroz (1997), each mass point is estimated separately for each equation. This more general specification allows more flexibility in the pattern of correlations across the error terms. For more details, see Mroz (1997) who refers to the more general specification as nonlinear heterogeneity.

Our study expands upon the unpublished work of Dietrich et al (1998) which used the first three panels of the Tanzania data sets. In their study, data limitations restricted the analysis to a more aggregated dependent variable: contraceptive method defined as a choice of traditional, modern, or none, without controls for the endogeneity of message recall. The richness of our data, however, allows us to go a step further and examine a more disaggregated variable: contraceptive type. We are therefore able to study the determinants of oral contraceptives, condoms, other modern, and traditional types of contraception in Tanzania. By disaggregating, we are able to actually study how program effects, and access to facilities affect the actual type of contraception used. In light of the AIDS epidemic where barrier methods are now promoted as methods of both disease and birth control, our research will help to determine what affects contraceptive type chosen. In our research, for example, we are able to determine what factors

influence the use of condoms, and how the influence of these factors have changed over the last 10 years.

We now turn to a discussion of the facility level data that provides our supply side information, and the individual level data that provides the demand side variables and individual level control variables.

Facility Level Data

The facility data comes from three facility surveys known as the Tanzania Service Availability Survey (TSAS) conducted between 1991-1996, and a fourth survey, the Tanzania Reproductive and Child Health Facility Survey (TRCHS facility supplement), conducted in 1999. The TSAS survey was carried out in 1991, 1994, and 1996 and was introduced to assess the availability, or supply, of family planning and health services in communities or enumeration areas from the 1988 census that were selected for the individual level data. Facilities were selected if they were reported by a group of knowledgeable village leaders as being a source of health and family planning services for their community and if they were within 30 KM (about 5 hours walking distance) of the community center. The closest facility of each type was visited and the relevant facilities for rural areas were dispensaries, health centers, and hospitals. In later surveys, Marie Stopes and UMATI clinics were visited but these facilities are exclusively in urban areas and were not relevant for this analysis of rural contraceptive method choice. Pharmacies were also visited in 1991 and 1999 (but not in 1994 or 1996), and some of these

pharmacies were sufficiently close (within 5 KM) to rural clusters so they are used in the analysis.

These three data sets are longitudinal in the sense that they are for the most part from the same facilities so that comparisons can be made across time for exactly the same set of facilities. The survey collected data on health services and health care provision and included information such as the availability of medications, the presence of equipment and supplies, the level and training of family planning providers, the availability of family planning methods and the number of clients visiting each facility.

The 1999 facility supplement has a new improved sampling methodology. Whereas the TSAS surveyed one facility of each type that was closest to the cluster center (but not exceeding 30 KM), the TRCHS facility supplement surveyed all the health facilities within two concentric cluster rings of the cluster center. This means that unlike the TSAS, we now have information on the entire market potentially supplying family planning services for women in the center of the two rings.[5] The TSAS and the TRCHS facility supplement are comparable across time because the TRCHS sampled a subset of clusters (about two-thirds of the rural clusters) sampled by the TRCHS in 1996. This means that the facilities in previous surveys were surveyed again in 1999 if they fell within two concentric rings of the cluster center, along with new facilities considered to be within two concentric cluster rings of the surveyed cluster. The topics covered in the 1999 survey were the same as in the previous facility surveys, however, the design changed substantially in 1999 to meet the needs of "stakeholders." The wording of key questions,

[5] See Appendix A of Tanzania Reproductive and Child Health Facility Survey 1999 for a more in depth explanation of the sampling methodology.

however, remained the same, so comparability across years is not meaningfully impaired.

Table 2 shows the sample sizes of the facilities surveyed for mainland Tanzania. The samples are for all facilities since a facility could serve both an urban and a rural cluster. Note that the number of each type of facility is less than the total number of clusters. The main reasons for this are that there were no facilities within 30 kilometers of the community or a facility served more than one community in the survey. In addition, in a small number of cases, facilities refused to participate in the survey. However, these were typically large urban facilities. In addition to the total number of facilities surveyed in each year, Table 2 provides information on the sample size of matched facilities. We see that a very high percentage of facilities of all types were surveyed in 1991/92, 1994, and 1996. Unfortunately, the new sampling strategy that was used in 1999 and the fact that the survey was only done in a subset of clusters made it impossible to construct a reasonable sample size if we attempted to match 1999 facilities with all three previous surveys. Therefore, we only matched the 1999 data with the 1996 survey.

Only the TSAS 1992 and the TRCHS 1999 collected data on pharmacies. In 1999, pharmacies were once again surveyed because — among other reasons — of anecdotal evidence suggesting the growing importance of the role played by the private sector in the provision of family planning services. More will be said on pharmacies below.

Using the matched facility level data across years allows us to look descriptively at two key components of Tanzania's family planning program: logistics and training. Table 3 presents

information on the percentage of facilities of each type (hospital, health center, and dispensary) where the three major types of modern methods of contraception (pill, injection, and condom) were seen in stock the date of the facility survey. The results for all methods and facility types show a clear pattern: An initial increase in contraceptives seen in stock between 1991/92 and 1994 during the early years of the FPSS program, a leveling off or decrease between 1994 and 1996, and some further decrease in most cases in 1999.

Table 4 displays information on trends in staff training from the 1996 and 1999 surveys. Prior to 1996, the facility survey did not have questions on when the facility staff were trained or by whom. However, in 1996 and 1999, specific questions about whether or not staff had received the 1992 in-service training update were asked. The tables report the percentage of facilities in the matched sample with at least one provider with the 1992 training update. Across this three year period, there was a significant increase in the number of facilities with at least one trained provider with large increases for all property types including an almost tripling of the percentage for dispensaries.

While pharmacies are typically only found in urban areas in Tanzania a significant percentage of the rural clusters were within 5 KM of a pharmacy. In a matched set of clusters in 1991 and 1999, the number of women that had a pharmacy within 5 KM increased from 13% to 15% between the two time points. While pharmacies mainly stocked condoms, by 1999, 18% of the pharmacies had the pill in stock and 4% had injections in stock. Unfortunately, in the 1991/92 facility survey, condoms were listed under medications and interviewers were asked

whether or not they were available at the facility but the interviewer did not verify that condoms were actually seen in stock. We know from comparing the availability question results to the seen in stock question results for contraceptive methods, that the availability questions overstate whether or not the method is actually in stock in the facility. In 1999, the survey only asked whether or not condoms were seen in stock and so we have no direct comparison of the actual availability of condoms in the facilities between 1991/92 and 1999. However, 64% of the facilities said that condoms were available in 1991/92 which is probably an overstatement of actual availability, and 68% of the facilities had condoms seen in stock in 1999. Thus there is evidence that the actual availability of condoms in pharmacies has in fact increased between the two surveys. We control for differences in the wording of the questions in 1991/92 and 1999 in the multivariate analysis reported below.

Individual Level Data

The data for these analyses is made up of three sources: the Tanzanian Demographic and Health Survey (TDHS), the Tanzania Service Availability Survey (TSAS), and the Tanzania Reproductive and Child Health Survey 1999 (TRCHS) facility supplement. The TDHS conducted four population based national surveys between 1991 and 1999. The first DHS survey was conducted in 1991/92. This was followed by the Tanzania Knowledge, Attitudes, and Practices Survey (TKAPS) in 1994 and two more DHS surveys in 1996 and 1999. All four surveys have the same questions, but the two later surveys included more detailed sections of

questions on AIDS, maternal mortality, and female circumcision. This analysis uses the Woman's Questionnaire which collects information from eligible women aged 15-49. The topics included in this questionnaire of interest to our research are basic background characteristics, and use of family planning.

The sample was created by merging all four panels of the TDHS data with the various facility surveys for the same time periods. We restrict our sample to rural women between 15 and 34 years of age within mainland Tanzania and in clusters that can be matched with the facility data.[6] Women with missing information on key variables in our analysis were dropped.

Our final sample is made up of 12,816 women living in rural areas. The sample size by survey is given at the top of Table 5 where we provide descriptive statistics on all variables used in the analysis. The reason for the small sample size in 1999 is because facility surveys were only done in a subset of the survey clusters and so we could not link some women to facility information. Table 5 first provides descriptive statistics on the endogenous variables: respondent heard a family planning message; respondent heard a radio drama; and contraceptive method choice. We then have information on three facility level policy variables followed by information on individual and household level control variables.

We see that the percentage of women who recalled having heard a family planning method from any source remained relatively stable across the four surveys, averaging around 40% of respondents. Note that the radio dramas had not yet started in 1991 but we see an

[6] All clusters in Zanzibar were dropped from the sample.

upward trend in the number of women who recalled having heard a radio drama across the three later surveys.

The next variable in the table is contraceptive method choice.[7] We see that non-use has decreased from 93.5% to 83.2% from 1991 to 1999. However, more than half of the decrease occurred between 1991 and 1994 and the rate of decrease has slowed considerably since then. By far the largest increase by method is the 8-fold increase in other modern methods which is predominately injection in Tanzania. However both injection and condom started with a very low base. Pill use doubled over the period while the use of traditional methods grew at a much more moderate pace. Again, we see large percentage increases for pill, condom, and other modern methods between 1991 and 1994, and then typically more gradual increases in later years.

The next three variables presented in Table 5 are policy variables related to logistics and training. Note that in Table 5, we are averaging over respondent and not facility even though these are facility level variables so that we can gauge access by our sample of respondents to contraception. Contraceptive stock questions were asked about five modern methods: pill, IUD, condom, injection, and foam and this information was aggregated in a manner similar to Stephenson and Tsui (2002) by simply adding up the number of times a method was seen at facilities within 5 KM of the community. Thus the maximum possible value for number of times

[7] Since we examine the effect of methods available at pharmacies, we keep the pill as a separate category since condoms and pills are the predominant methods available at pharmacies. To keep the number of categories manageable we then grouped injection, IUD, and foam into the "other modern" category. The dominant method in this category is injection.

method seen in stock is 15, if all three types of facilities serviced the community. In reality, the maximum in the data is 10, and this occurs very rarely. In fact the modal value is 0 for all four surveys and the next most frequent value is 1, 2, 3, 2 respectively for the four surveys. The averages in this table may not appear to be consistent with Table 3 where we see an increasing problem with stock-outs starting in 1996. The reason the mean is greater in 1996 and 1999 than in 1994 is that there has been an increase in the number of facilities offering family planning across the decade. However, we see that most rural women have very limited options when it comes to choice of contraception and the situation has improved only marginally between 1991 and 1999.

As stated earlier, the detailed training questions were only asked in 1996 and 1999 and pharmacies were only visited in 1991/92 and 1999. We see that in spite of the increase in the number of facilities with trained providers seen in Table 4, only a small percentage of rural women have access within 5 KM to providers with post-1992 training. The pharmacy results again must be viewed with caution because of wording changes between 1991/92 and 1999 that are discussed above.

The rest of the variables in Table 3 are control variables. We see from the means that the distributions of all variables is virtually the same across all four surveys. There was an increase in radio ownership between 1991/92 and 1994 but then ownership has remained fairly stable since then. Note that for television ownership we report actual number of households with television sets since the numbers are so small. Remember that television ownership is used as a predictor of having heard a family planning message and is used as an identifying variable in the

estimation of the system of equations. We include this variable because there is evidence from Monte Carlo experimentation that even weak instrumental variables improve the estimation of structural equation models (see, Angeles, Guilkey, and Mroz, 2003).

We now turn to a discussion of the empirical results.

IV. Multivariate Results and Simulations

Because the training and pharmacy information was only gathered in 1994 and 1999 and 1991/92 and 1999 respectively, we estimated three models. The first model uses all time periods and estimates the full model equations model laid out in Equations 1 and 2. The results for the estimation of the contraceptive method choice equation are presented in Table 6 and the results for the two method recall estimations are presented in Table 7. We then estimated two versions of reduced from equations for contraceptive method choice. The first estimation used the 1996 and 1999 surveys and included the training variable and the second estimation used the 1991/92 and 1999 surveys and included the pharmacy variable. We only estimated reduced form models with radio and television ownership replacing the message recall variables because of the limited sample size that results when only two of the four surveys can be used. We do not present the large number of estimated regression coefficients for these two reduced form estimations but instead use the estimated coefficients in policy simulations to determine the impact of trained providers and methods available at pharmacies on contraceptive method choice. All simulations are presented in Table 8.

We discuss estimation of the structural model first.

Structural Equations Results

Table 6 presents the results for choice of contraceptive method. We use the choice not to use a method as the base category and so the coefficients represent the effect of the variables on the log odds of choosing a particular method to the choice of no method. As is well known for the multinomial logit model, the choice of the base method is arbitrary and all other comparisons can be generated by simple subtraction. Table 7 presents logit results for the two message recall variables. The dependent variable in each case is the log odds of recall of having heard the message relative to not having heard the message.

We first discuss the results for the estimated heterogeneity parameters presented at the bottom of the two tables. The estimated model has four community and four individual level mass points. Since the first mass point is set to zero, a total of 18 community and 18 individual level mass points are estimated. The estimated probability weights for the community level points are .18, .10, .36, and .36 while the estimated probability weights for the individual level mass points are .54, .23, .14, and .09. A joint test of significance of the heterogeneity parameters yields a p value of essentially zero indicating strong evidence of the endogeneity of the two message recall variables. We also see that almost all of the community level heterogeneity parameters are strongly significant across the three equations while the individual level heterogeneity parameters are strongly significant for the message recall equations and much less significant in the contraceptive method choice equation. Thus there appears to be a strong correlation in the unobservable community level variables that affect the three outcomes but

most of the correlation in individual level unobservables is concentrated in the two recall equations. We will quantify the effect of the endogeneity correction on the impact of the message recall variables in the simulations presented below when we perform simulations with and without the endogeneity correction.

The estimation method that we use is highly non-linear and the structural equations estimator is identified without exclusion restrictions. However, it is well known that more stable parameter estimates are obtained if one is able to employ valid exclusion restrictions (see Bollen, Guilkey, and Mroz, 1995). We exclude radio and television ownership from the contraceptive method choice equation and it is important to demonstrate that these two variables have a significant impact on the two message recall variables and no direct effect on contraceptive use. A joint test of significance of the four estimated coefficients for radio and television ownership in the two message recall variables yields a p-value of essentially zero and so there is clear evidence that these variables are important predictors of message recall. Because the estimation method is identified without exclusion restrictions, we can include radio and television ownership in the contraceptive method choice equation then test to see if these variables have direct effects on method choice. The p-value for a test that the eight estimated coefficients are jointly significant is .08 and so the evidence is marginal as to whether the exclusion restrictions are valid. However, the other estimated coefficients were quite stable with and without these variables included and so we feel confident in our results and conclude that the model is identified.

Our estimation sample contains data from four surveys and so we include three dummy variables (1999 is reference year) to control for differences across years that cannot be captured by our observed variables. We see that the estimated coefficients for the survey-year dummies are always negative with 1991/92 always the most negative followed by 1994 and then 1996. Thus we see, other things being equal, higher levels of any type of contraceptive use relative to non use in later years. We also tried interacting these year dummies with the message recall variables, and the logistical variables. While the message/year interactions were frequently significant in models that were estimated without controls for endogeneity, the interactions were not significant when endogeneity was controlled. This may not be surprising since the message recall variables as well as the logistical variables are all time varying.

With these preliminary specification issues out of the way, we now turn to a discussion of the important substantive results. The top of Table 6 presents results for the three policy variables. We see that the number of methods seen in stock has a positive coefficient for all comparisons indicating an increased probability of using a method versus non use. In terms of magnitude, the largest effect is for other modern method versus no method followed by condom versus none, pill versus none, and finally traditional versus none. However, the p-values for the reported t statistics are .11 for pill, .16 for condom, 0 for other modern, and .45 for traditional indicating strong significance only for other modern and marginal significance for pill. The fact that other modern methods (which is predominantly injection coupled with some IUD) is most sensitive to availability of methods at fixed facilities is not surprising since these methods are rarely available from other sources, especially in rural areas.

The results for respondent recall of a family planning message are similar in the sense that the strongest effect is for the other modern versus no method comparison followed by pill versus no method. The point estimate for condom versus none is of a reasonable magnitude but this estimated coefficient is imprecisely measured as is evidenced by the small t statistic. If one fails to correct for the endogeneity of message recall, the estimated coefficients are highly significant for all comparisons and the point estimates of the coefficients are also larger except for the point estimate in the other modern versus no method comparison. We see that the radio drama recall variable is not significant for any of the comparisons, and even though the point estimates for pill and other modern are fairly large, they are imprecisely measured. In contrast, the estimated coefficients for this variable are highly significant in the three of four comparisons when endogeneity is not controlled. Thus it appears that the estimated impact of the message recall variables is quite misleading if endogeneity is not controlled. We will quantify the magnitude of the bias in the simulations discussed below.

The results for the control variables are much as expected. The omitted category for age is the 30-to-34 age group and we see that the dummies for the other age groups have negative coefficients for all comparisons except condoms. Thus, older women are more likely to be users of pill, other modern, and traditional methods than younger women. This result is reversed for condom where we see women in the 20-to-24 year age group more likely to use condoms followed by the 25-to-29 age group. The omitted category for education is zero years of education and we see consistent positive and highly significant estimated coefficients for all the education categories across all comparisons. The largest point estimates are for women with

eight or more years of education, unfortunately, we see from Table 5 that there are very few women that achieve this level of education and there is no discernable upward trend in education for the women in our sample over the period of our survey years. We include whether or not a woman has a partner and the partner's level of education, given that the woman has a partner, as controls for socioeconomic status. We see positive and typically significant effects for partner's education across all comparisons. Unfortunately, partners have fared no better than our respondents in terms of improved education across the survey years. We also tried to include other asset measures in the model but, after controlling for partner's education, these additional variables were not significant.

The results for the message recall variables reported in Table 7 are much as expected. Women in the 15-to-19 year age range are less likely to recall having heard a message than older women and the more education a woman or her partner has, the more likely she is to recall having heard a message. The radio ownership variable is highly significant for both message recall variables but has a much larger point estimate for recall of a radio drama. This result is quite reasonable as is the fact that the point estimate for television ownership is much larger for recall of a family planning message relative to recall of a radio drama. However, the estimated coefficient for television ownership is imprecisely measured for both equations. We note that the year dummies are not very significant for recall of a family message and this is not surprising given the results in Table 5 where the percent who recalled a message has remained pretty stable over the period. The radio dramas did not start until 1991 and so estimation of the recall a radio

drama is only for the three later panels. We see strong negative coefficients for the 1994 and 1996 dummies which is again not surprising given the higher percentage of respondents who recalled having heard a radio drama in 1999.

The results for the two message equations, while interesting, are simply estimated so that we can control for the endogeneity of message recall in the contraceptive method choice equation. We now quantify the size of the effect of these variables with simulations.

Simulations

Simulations were done as follows. We used the actual values for all variables for each of the 12,816 respondents and the estimated coefficients to predict contraceptive method choice for each respondent. We then averaged the predicted probabilities across individuals. The first row of Table 8 reports the results of this simulation. These percentages duplicate almost exactly the frequency distribution for method choice in the actual data. We would expect this to be the case and it would be an indication of an error if it were not the case. We then kept all variables at their actual values except for one variable and predicted method choice with that one variable set to zero and then a positive value (typically one but additional values for number of methods seen in stock). This procedure allows us to quantify the impact of each important variable on method choice.

For the message recall variables, we report simulations based on the estimations with and without corrections for endogeneity for purposes of comparison. In general, we see that whether or not one corrects for endogeneity of message recall, the direction of the impact on contraceptive method choice is the same: decreased non-use and at least a small increase in use for all methods. However, the magnitude of the impact is larger when one fails to correct for the endogeneity of message recall. In other words, the impact of message recall is overstated. For example, we see that with the endogeneity correction, moving from no to yes on recall of a message causes a reduction of 3.1% (91.1 - 88.0) in non use. However, when no correction for endogeneity is used, the reduction is 4.8% (91.8 - 87.0), a major difference. It is interesting to note however, that the major contributor to the overstatement is use of traditional methods and the degree of overstatement for modern methods is substantially less. The results for recall of a radio drama must be viewed with caution since the point estimates of the coefficients were imprecisely measured especially when corrections for endogeneity were employed. However, they tell a similar story. We see that moving from no recall of a radio drama to recall reduces non use by 3.6% (90.1 - 86.5) when no correction is used and only by 0.8% when a correction is used.

We now turn to simulations for the number of methods seen in stock within 5 KM. In the data, this variable varied between 0 and 10 but values above 5 were very infrequent. Therefore we preform simulations for 0, 2, and 5 methods. As we move from no methods available to 5 methods, we see a substantial reduction in the simulated percentage of non-use and a corresponding across the board increase in simulated use for all methods. The largest increases

are for other modern method and the pill. We also see encouraging results for the training variable. Remember that this variable is only available for 1996 and 1999 and we simply estimate a reduced form model for method choice and then perform simulations. We see that as we move from no provider with the post-1992 training update to one trained provider, we get a substantial reduction in non use. It is interesting that almost all of this reduction is associated with an increase in the use of other modern methods. This is not surprising since injection was a focus of the FPSS program.

The pharmacy simulations are also based on reduced form estimations except that the 1991/92 and 1999 surveys are used. Remember that there was a wording change about the availability of contraceptives at pharmacies between 1991/92 and 1999 which probably causes an overstatement of availability in 1991/92. Thus it is not surprising that an interaction term between number of methods at pharmacies and survey year was strongly significant. Therefore, we present simulated effects of no method and one method available at pharmacies separately for 1991/92 and 1999. We see that in 1991/92, there is little impact of contraceptive availability at pharmacies on use. However, in 1999, there is a substantial impact that is focused on a more than doubling of the simulated probability of condom use. There is also a substantial increase for other modern and the pill, two other methods that were found to be available in some pharmacies by 1999.

The final simulations presented in Table 8 show the impact of respondent's education on contraceptive use. We present these results so that we can gauge the size of the impact of the policy variables relative to the impact of female education, a variable that is almost universally considered to be of major importance. As a woman is simulated to have more years of education, we get the expected result that non-use decreases and use of all methods increases. However, it is interesting to note that the largest increase is for traditional methods. Except for the eight plus category which is very rarely attained by women in Tanzania, we see impacts very similar in magnitude to our policy variables.

V. Conclusions

In the early years of the 1990's, there was a concerted effort by the government of Tanzania and several donors to try and reduce fertility in Tanzania through a substantial upgrade to the family planning delivery system. The program had three main components: 1.) Better logistical support for fixed facilities so that they would have a variety of methods available; 2.) Improved training for family planning providers; and 3.) An information campaign with family planning radio dramas — an important component. The result of this effort was a major increase in modern contraceptive use between 1991/92 and 1994 and then smaller rates of increase for the rest of the decade.

This paper uses unique data to try and examine the determinants of a woman's choice of contraceptive method during this period. Using a combination of structural equations and

reduced form estimation methods, we show that all three components of the family planning program played a role in the increased use of modern contraceptive methods. With respect to logistics, we find that the number of methods seen in stock with 5 KM of the community had a positive effect especially for the other modern method category which is predominantly injection. However, the descriptive tables at the facility level indicate that stocks-outs of modern methods became an increasing problem in the second half of the decade and, as a result, the number of methods available in the communities was still at a low level in 1999. A positive and promising result, however, is that methods available at pharmacies had little impact in 1991/92, probably at least partly due to the wording of the availability question in the survey, and had a strong impact, especially on condoms in 1999. Unfortunately, few rural respondents had access to this private supply source even in 1999.

Another promising result is that simulations based on reduced form estimation of the contraceptive method choice equation for 1996 and 1999 with access to family planning providers with the 1992 training update had a positive effect on use of other modern methods. We see from the facility results reported in Table 4, there has been a substantial increase in the number of facilities with these trained providers. Unfortunately, the rural women in our sample still have limited access to these providers as the emphasis in the program was to train providers in high volume urban facilities first.

Finally, even after correcting for bias due to reliance on respondent recall of a family planning message, we see that respondents who recall having heard a family planning message were more likely to use a modern method of family planning, especially the pill or other modern

methods, a category dominated by injection use. Unfortunately, the percentage of women that recall having heard a message has been relatively stagnant over the decade and while the percentage that recall listening to a radio drama has increased, especially between 1996 and 1999, this variable has a smaller impact on method use after correcting for endogeneity.

Thus, in spite of the strong impact of our policy variables on contraceptive use as well as other variables such as female education, it is easy to see why contraceptive use has not increased at a faster pace in the later half of the 1990's: Table 5 clearly shows that there have not been very meaningful improvements in the areas of logistics, training or communications for rural women in Tanzania. In addition, female education and socioeconomic levels as measured by partner's years of education have been stagnant. While increasing education levels is clearly an important long run strategy, the simulations show clearly that renewed efforts on the three components of the program can yield substantial dividends as well.

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Table 1. Source of Supply for Modern Contraceptive Methods for Rural Women (percent)				
Year	**1991/92**	**1994**	**1996**	**1999**
Sample Size	7088	3042	5626	1968
Public	74.81	78.72	83.64	76.38
Medical Private	1.13	1.6	2.04	2.36
Private Pharmacy	1.88	2.13	2.42	4.33
Other	22.23	17.55	11.9	16.93

Table 2. Sample Size in Facility Surveys			
Year	Hospitals	Health Centers	Dispensaries
1991/92	81	89	218
1994	89	118	230
1996	90	123	253
1999	88	62	255
Matched 1991/2, 1994 & 1996	78	82	194
Matched 1996 & 1999	64	38	90

Table 3. Percent of Family Planning Facilities Where Contraceptives Seen in Stock												
	Hospital				Health Center				Dispensary			
Survey year	91	94	96	99	91	94	96	99	91	94	96	99
Pill	92	98	97	91	83	94	95	86	84	96	88	92
Injection	84	97	82	84	34	90	80	84	20	84	81	82
Condom	82	89	83	84	97	82	87	78	97	87	75	80

Table 4. Percent of facilities with at least one or two trained family planning providers, matched mainland facilities		
	1996	1999
Hospitals	58	75
Health Centers	34	50
Dispensaries	8	21

Table 5. Descriptive Statistics				
Year	1991/92	1994	1996	1999
Sample Size	5115	2216	4053	1432
Endogenous Variables				
Respondent Heard a Family Planning Message	0.36	0.44	0.43	0.38
Respondent Heard a Radio Drama	---	0.16	0.21	0.33
Contraceptive Method Choice				
No Method	93.5	87	87.4	83.2
Pill	1.8	3.3	4.7	3.6
Condom	0.5	2.1	0.9	2.2
Other Modern	0.5	1.6	2.9	4.3
Traditional	3.7	6	4.1	6.4
Policy Variables				
Number of Times Method Seen in Stock within 5 KM	0.64	1.11	1.97	1.39
Number of Facilities within 5 KM with at least Two Trained Providers	---	---	0.11	0.12
Number of Times Method Seen at Stock at Pharmacy within 5 KM	0.2	---	---	0.18
Individual Level Control Variables				
Woman's Age 15 to 19 Years	0.33	0.27	0.29	0.33
Woman's Age 20 to 24 Years	0.27	0.28	0.27	0.25
Woman's Age 25 to 29 Years	0.23	0.26	0.24	0.25
Woman's Age 30 to 34 Years	0.17	0.19	0.2	0.17
Woman's Education 1 to 6 Years	0.2	0.2	0.2	0.26
Woman's Education 7 Years	0.5	0.51	0.55	0.52
Woman's Education 8 or More Years	0.02	0.02	0.03	0
Woman Has a Partner	0.62	0.67	0.63	0.65
Partner's Education 1 to 6 Years	0.21	0.21	0.15	0.17
Partner's Education 7 Years	0.49	0.54	0.6	0.44
Partner's Education 8 or More Years	0.06	0.04	0.06	0
No Religion	0.17	0.14	0.11	0.15
Household Owns Radio	0.3	0.39	0.41	0.4
Number of Households That Own Television	3	1	21	4

Table 6. Multinomial Logit Results for Contraceptive Method Choice								
Comparison	**Pill vs None**		**Condom vs None**		**Other Modern vs None**		**Traditional vs None**	
Policy Variables	**Coef**	**t**	**Coef**	**t**	**Coef**	**t**	**Coef**	**t**
Number of Times Method Seen in Stock within 5 KM	0.593	1.6	0.06	1.39	0.09	2.88	0.03	0.76
Respondent Heard a Family Planning Message	0.581	1.68	0.301	0.62	0.791	3.09	0.138	0.47
Respondent Heard a Radio Drama	0.252	0.86	0	-0.1	0.336	1.2	-0.1	-0.4
Individual Level Control Variables								
Woman's Age 15 to 19 Years	-2.18	-8.86	0.339	0.9	-2.3	-6.9	-1.07	-6
Woman's Age 20 to 24 Years	-0.34	-2.35	0.836	2.72	-1.06	-5.6	-0.35	-2.9
Woman's Age 25 to 29 Years	-0.16	-1.18	0.671	1.95	-0.62	-3.9	-0.13	-1.1
Woman's Education 1 to 6 Years	0.39	1.96	0.174	0.49	0.418	1.51	0.342	2.05
Woman's Education 7 Years	0.399	2.18	0.681	2.24	0.718	2.85	0.671	4.55
Woman's Education 8 or More Years	0.712	1.85	1.283	2.48	1.289	3.08	1.588	4.26
Woman Has a Partner	-0.79	-2.98	-0.42	-1.01	0.515	1.93	0.263	1.47
Partner's Education 1 to 6 Years	0.756	3.06	-0.1	-0.18	-0.17	-0.6	0.189	1.07
Partner's Education 7 Years	1.314	5.42	0.527	1.34	0.22	1.04	0.466	2.98
Partner's Education 8 or More Years	1.65	4.77	1.322	2.6	0.661	2.07	0.158	0.56
No Religion	-2.14	-3.64	-1.05	-1.94	-0.78	-1.7	-0.44	-2
Year 1991/92	-0.97	-3.3	-1.85	-5.69	-2.27	-6.8	-0.74	-3.9
Year 1994	-0.43	-1.9	-0.33	-1.43	-1.22	-4.8	-0.24	-1.4
Year 1996	-0.27	-1.3	-1.4	-5.6	-0.8	-4.4	-0.71	-4.3
Constant	-4.19	-9.9	-5.16	-7.81	-4.99	-9.6	-2.87	-8.4
Community Heterogeneity								
	1.829	4.97	1.255	2.5	2.165	4.68	0	0
	0.43	0.83	-0.5	-0.61	0.884	1.75	-0.94	-3.3
	1.316	3.71	0.983	2.25	2.23	5.25	-0.14	-0.4
Individual Heterogeneity								
	-0.63	-0.69	-0.75	-0.64	-0.48	-0.6	0	0
	-0.41	0.41	-0.44	-0.31	-0.47	-0.5	0	0
	1.119	1.27	1.63	1.48	-1.02	-0.9	1.39	1.56

Table 7. Logit Results for Message Variables				
Dependent Variable	**Respondent Heard a Family Planning Message**		**Respondent heard a Radio Drama**	
	Coef	**t**	**Coef**	**t**
Woman's Age 15 to 19 Years	-1.237	-7.56	-0.459	-2.72
Woman's Age 20 to 24 Years	-0.155	-1.47	0.039	0.26
Woman's Age 25 to 29 Years	-0.075	-0.71	-0.167	-0.96
Woman's Education 1 to 6 Years	0.58	4.67	0.85	4.45
Woman's Education 7 Years	1.264	9.6	1.507	7
Woman's Education 8 or More Years	2.134	8.96	2.336	5.92
Woman Has a Partner	0.154	1.18	-0.051	-0.29
Partner's Education 1 to 6 Years	0.403	2.9	0.391	1.82
Partner's Education 7 Years	0.617	4.92	0.461	2.56
Partner's Education 8 or More Years	0.945	4.35	1.203	3.74
No Religion	-1.385	-6.8	-1.696	-5.11
Household Owns Radio	1.631	9.87	2.153	9.51
Household Owns Television	0.883	1.4	0.573	0.79
Year 1991/92	-0.12	-0.82	---	---
Year 1994	0.288	1.74	-2.174	-8.81
Year 1996	0.124	0.87	-1.774	-8.07
Constant	-4.786	-10.77	-5.907	-6.86
Community Heterogeneity				
	2.417	7.87	4.112	7.4
	1.218	6.21	1.91	5.82
	1.626	7.41	1.65	4.51
Individual Heterogeneity				
	2.962	3.85	2.684	6.21
	3.541	4.18	2.801	4.91
	5.588	5.37	5.619	6.4

Table 8. Simulations					
	No	**Pill**	**Condom**	**Other**	**Traditional**
All Variables at Actual Values	89.5	3	1	1.9	4.6
Respondent Heard a Family Planning Message					
No	91.1	2.3	1	1.2	4.4
Yes	88	3.7	1.2	2.4	4.7
No (No Endogeneity Correction)	91.8	2.2	0.8	1.3	3.9
Yes (No Endogeneity Correction)	87	4	1.3	2.4	5.3
Respondent Heard a Radio Drama					
No	89.7	2.9	1.1	1.7	4.6
Yes	88.9	3.6	1	2.3	4.2
No (No Endogeneity Correction)	90.1	2.7	0.9	1.8	4.4
Yes (No Endogeneity Correction)	86.5	4.8	1.5	2	5.2
Number Of Times Method Seen in Stock within 5 KM					
0	90.1	2.8	1	1.6	4.5
2	89.3	3.1	1.1	1.9	4.6
5	87.9	3.5	1.3	2.4	4.9
At Least one Provider with post-1992 Training Update					
No	87.7	4.4	1.2	3	4.7
Yes	84.9	4.4	0.8	5.1	4.8
Number of Methods At Pharmacy with 5 KM					
1991 No Methods	94.7	1.6	0.5	0.5	3.7
1991 One Method	92.5	2.3	0.5	0.51	4.1
1999 No Methods	84.8	3.4	1.8	3.7	6.2
1999 One Method	78.2	4	3.7	6.7	7.3
Years of Education					
0	92.8	2.3	0.7	1.2	3
1 to 6	90.3	3.3	0.8	1.6	4
7	88.3	3.1	1.2	2.1	5.3
8 Plus	80.3	3.5	1.9	3.1	11.2