Household Bargaining and Excess Fertility: An Experimental Study in Zambia

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Abstract

This paper tests the role of spousal discordance in explaining unmet need for contraception and excess fertility through a field experiment with a large public family planning clinic in Lusaka, Zambia. We randomly assigned married women to receive a voucher, which guaranteed ease of access to a range of modern contraceptives, either alone ("Individual" treatment) or in the presence of their husbands ("Couples" treatment). The voucher amounted to a sudden and unexpected reduction in the price of fertility control, and the manipulation gave a random set of women greater ability to conceal take-up of contraception from their husbands. Women in the Individual treatment were 19% more likely to visit a family planning nurse and 27% more likely

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to ask for a concealable form of contraception, leading to a 59% reduction in unwanted births 9-14 months later. These findings provide evidence of inefficiencies in household bargaining over fertility, which have the potential to generate a higher level of fertility than is socially optimal. These findings also help explain why some efforts to involve men in family planning have been unsuccessful in reducing unmet need.

1 Introduction

The ability to control fertility through modern contraception is one of the most important technological developments of the 20th century, with broad social and economic consequences for women and society. Recent evidence from the United States and Colombia suggests that the ability to optimally time births through access to modern birth control methods results in large increases in female schooling investments and labor force participation at childbearing ages (Goldin and Katz, 2002; Bailey, 2006; Miller, 2005). Despite the value to individuals and society of fertility control, there are significant and poorly understood barriers to the diffusion of contraceptive technology in the developing world. Although modern methods of birth control have been around for almost half a century, many countries still report substantial unmet need for contraceptives and high rates of unwanted births.[1]

Unmet need and excess fertility, typically defined by outcomes or behaviors relative to women's reported desires, are often attributed to an insufficient supply of appropriate contraceptive methods, a lack of information or misinformation about those methods, or restrictive social norms governing fertility control.[2] Others have argued that, since the cost of preventing births using any method must be small even without complete access to modern contraception, these figures must reflect systematic mismeasurement of fertility desires in survey data (Becker, 1991).

An alternative hypothesis is that unmet need and excess fertility reflect the outcome of bargaining between partners with divergent fertility preferences or different levels of demand for fertility control. In particular, data from surveys such as the Demographic and Health Surveys (DHS) indicate that in many countries, men tend to report larger ideal family sizes and less demand for contraception than their wives (Becker, 1999).[3]

[1] Unmet need is defined as the difference between the share of women who report wishing to discontinue childbearing or space and the share of women who report currently using a contraceptive method.

[2] Excess fertility is defined as residual live births above and beyond a woman's reported ideal family size.

[3] Although the first implies the second, (Biddlecom and Fapohunda, Biddlecom and Fapohunda) note that men may express greater willingness to have a large number of children simply because of a stronger aversion to contraception.

This paper explicitly tests the role of spousal discordance in explaining unmet need for contraception and excess fertility in the context of a field experiment with a large public family planning clinic in Lusaka, Zambia. In our study, 836 married women received a voucher guaranteeing ease of access to a range of modern contraceptives through a private appointment with a family planning nurse, which amounted to a sudden and unexpected reduction in the price of fertility control. Our experimental manipulation involved randomizing women to either receive information about this opportunity in private ("Individual" treatment) or in the presence of their husbands ("Couples" treatment). The manipulation gave a random set of women greater ability to conceal take-up of contraception from their husbands. If women have an incentive to hide birth control usage, women who are given greater opportunity to conceal should be more likely to respond to the price change. Hence, by comparing rates of take-up of contraceptives and birth across treatment arms, we can examine the extent to which intra-household disagreement over family planning lowers take-up of modern contraceptive methods and leads to unwanted births.

Our study is motivated by evidence from qualitative studies and survey data, which indicates that women in Zambia and elsewhere frequently hide contraceptive use from their partners (Biddlecom and Fapohunda, Biddlecom and Fapohunda; Castle, Konate, Ulin, and Martin, Castle et al.; McCarraher, McCarraher), suggesting strategic behavior within the household in response to spousal disagreement over fertility. In the context of our study, baseline survey data also indicate a high fraction of women hiding contraceptive use from their husbands: among the 23% of men in our sample who claim they are currently "not doing anything to prevent pregnancy", 59% have wives who separately report using some method of birth control, including 18% who are on the pill and 12% who are using injectables. The desire for concealability in the face of spousal control has been shown to be strong in intra-household financial decision-making Ashraf (2009) and has potentially even greater societal implications for child-bearing. A remaining question is how many women are on the margin of adopting birth control given simple changes in institutional or technological features that would increase their ability to control fertility without their husbands' knowledge.

Our results suggest that intra-household discordance over family planning plays a significant

role in contraceptive use and fertility outcomes. When women are given greater opportunity to hide birth control, they are 19% more likely to respond to changes in the price of birth control by visiting a family planning nurse and are 27% more likely to ask for a relatively concealable form of contraception, leading to a 59% reduction in unwanted births.

Results from our experiment shed light on whether intra-household decision-making leads to efficient outcomes in a particularly important type of household production – reproduction. Standard unitary or collective models of the household imply that fertility should not respond to whether husbands or wives are given nominal control over access to contraceptives, or the availability of concealable contraceptives. The fact that women appear to have an incentive to hide birth control is evidence against standard cooperative bargaining models of the household, and suggests that household bargaining over fertility is unlikely to lead to efficient outcomes.

Our findings suggest that incomplete contracts with sunk investments is a more appropriate analytical framework for studying household decision-making. Furthermore, fertility possesses features which make an incomplete contracts approach, such as Rasul (2004), a particularly attractive way to model bargaining over this outcome: fertility investments are sunk in the sense that children are not liquid, investments in fertility are relationship-specific, and it is difficult for couples to write contracts that condition division of marital surplus on number of children. Previous empirical evidence in support of this framework comes from Rangel (2005) and Field (2003), who finds that the partial inclusion of women on formal land titles in Peru lead to significantly fewer pregnancies in the year following the titling program, consistent with a bargaining model in which threat points influence fertility outcomes.[4] Our study changes fertility outcomes not through changing threat points, per se, but by changing the degree of asymmetric information.

Results from previous quantitative studies on the topic of involving men in family planning outreach have been mixed: Over the past 40 years, only three randomized studies – Fisek and Sumbuloglu (1978), Terefe and Larson (1993), and Wang et al. (1998) – have found any evidence

[4]One potential problem with this interpretation is that assignment of ownership rights was potentially endogenous to household demand for children.

that providing education about family planning to husbands raised adoption of contraception, and one very large study (Freedman and Takeshira, 1969) found no effect. Our study helps explain these mixed results by showing that a negative effect of male involvement among couples with conflicting fertility preferences may on balance offset a positive effect of providing family planning education to men. In addition, it shows that a small positive or zero average effect of efforts to include men in family planning decisions may mask important heterogeneity based on differentials in fertility preferences or the distribution of bargaining power in the household. This finding motivates caution in implementing programs to increase male involvement in the policy context, as such programs may make a significant fraction of women worse off if they are not implemented carefully. This insight not only has the potential to explain observed regularities in existing data, but potentially should inform policy proposals which change the outcome of the bargaining process in ways that systematically advantage the priorities of one gender over another.[5]

Section 2 describes the context of the study. In Section 3, we lay out in detail the experimental design. In section 4, we discuss related literature and lay out a theoretical framework for the contraceptive adoption decision. Section 5 describes the data we use in this study, and Section 6 discusses the results. Section 7 discusses further directions and concludes.

2 Context

Our study took place in Lusaka, Zambia, a setting with high reported unmet need for contraception and high maternal mortality. According to the 2001/2002 Zambia DHS, 51% of currently pregnant women in the sample report that the pregnancy was not wanted at the current time (not wanted at all or wanted later). While 99% of women reporting unwanted pregnancies reported being familiar with at least one method of modern contraception, only 26.8% reported ever having used any

[5]For example, by prioritizing availability of longer-term methods which allow for greater control by the woman and concealability, such as injectable contraceptives or contraceptive implants.

modern method of contraception.[6]

In Lusaka, contraceptives can be obtained through public clinics, private clinics, or pharmacies. Some methods, such as the pill and condoms, can be purchased in pharmacies while others, such as injectable contraceptives and contraceptive implants, are typically only available in clinics. In principle, the full range of methods is available for free through public clinics, although resource constraints manifest themselves in long waiting times for appointments and periodic stockouts of expensive or popular methods. Prior to the inception of this study, the clinic in our study had been out of stock of contraceptive implants for over a year. In addition, for certain methods such as contraceptive implants, women are required to supply some of the materials necessary for the procedure such as surgical gloves and disinfectant. Officially, women are not required to provide spousal consent in order to obtain contraceptive methods through public clinics anywhere in Zambia, although anecdotally health care providers in rural Zambia, as in other parts of rural Africa, still commonly refuse to give contraceptives to women without the explicit consent of their husbands. For long-term methods such as implants and IUDs, this practice extends into urban areas as well.

3 Experimental Design

3.1 Sample recruitment

Figure 1 shows a timeline illustrating the various stages of our experiment. We first recruited 1723 women to participate in our study from the catchment area of Chipata Clinic, a large government clinic that serves low- and middle-income peri-urban neighborhoods of Lusaka, Zambia. Community health workers (CHWs) from the clinic were hired to recruit subjects for the study through home visits. Women were invited to participate in the study if they: (1) were married and their husband currently resided with them; (2) had last given birth between January 2004 and December 2006; (3) were not currently pregnant; (4) had neither been sterilized nor had a hysterectomy;

[6]Authors' Tabulations.

(5) were between the ages of 18 and 40; (6) were not known to have health conditions for which hormonal contraceptives are contraindicated; and (7) agreed to have both themselves and their husband participate in a survey and information session about family planning. The first four criteria relate to the study objective while criteria (5) and (6) are medically motivated.[7][8] Although the intervention only required husband presence for women in the "Couples" arm of the study, criteria (7) was imposed on all study participants in order to ensure a similar distribution of couple characteristic across treatment arms, and to prevent higher rates of attrition among those assigned to the "Couples" relative to the "Individual" treatment arm.

Recruitment was conducted in two stages using two different sampling frames. In the first stage, which took place in July and August of 2006, subjects were recruited from the roster of women who, according to clinic obstetric records, met inclusion criteria (2) and (6), and who resided at the addresses listed in the records. Only around 50 percent of those women could be located, largely because of false or missing addresses and high rates of mobility within the city [9]. Therefore, in addition to women on the roster, some women whose names were not in the clinic's obstetric records were also invited to participate in the study if they resided at the house number listed for the intended respondent and met all of the seven inclusion criteria. Of the 440 women recruited at this stage, 74% were taken from obstetrics records and 26% were alternates residing at the addresses listed in the records. To expand the sample, in the second stage of recruitment, which took place

[7]Age is medically relevant since bone accretion is particularly important in young women and there is a greater risk of osteoporosis in older women. Date of last birth ensured that women were less than 8 weeks postpartum which is important since the medication in hormonal contraceptives is excreted in breast milk and it is not known whether this could affect child development. Other disqualifying health conditions included diabetes, heart disease and high blood pressure.

[8]Each of these inclusion criteria was screened by the CHW during recruitment visits. In addition, women were thoroughly screened for health conditions in criteria 3, 4 and 6 if and when they visited the family planning nurse at Chipata clinic.

[9]The clinic staff reported that false addresses were often given by women who resided outside of the official catchment area in order to obtain obstetric services at Chipata clinic, which is larger and much better equipped than other clinics in Lusaka.

from August 2006 to April 2007, women were recruited by randomly sampling house numbers in the neighborhoods that comprise the catchment area of the clinic.[10] Women residing at sampled house numbers were invited to participate if they met all of the seven inclusion criteria. If more than one eligible woman resided at a sampled address, only one of the women - the one whose first name came first in alphabetical order - was invited to participate. In total, 1283 women gave consent to participate at this stage.

3.2 Baseline Survey

Among the 1283 women who gave consent for the study, a baseline survey visit was attempted by a team consisting of one survey enumerator and one CHW.[11] During this visit, CHWs first re-screened women to ensure that they continued to meet all of the inclusion criteria and still agreed to participate. At the time of the baseline visit, 576 women were disqualified due to changes in eligibility, dislocation, and voluntary drop-out.[12] The remaining 1147 women compromised the final sample of experimental participants.

During this initial visit ("First Visit", Figure 1), all women in the sample were administered a one-hour survey in their homes that collected detailed information about marriage and child-bearing, school enrollment of children, fertility preferences, decision-making in the household, and

[10]The catchment area is approximately 8 square kilometers and densely populated, encompassing an estimated 107,107 people.

[11]Women recruited in the last two months of the recruitment period were an exception to recruitment taking place separately from the survey. In order to speed up the procedure and therefore reach as many women as possible, in the recruitment visit they were asked if they were willing to do the interview at that moment or if they prefer to schedule an appointment on a different day.

[12]The high dropout rate (33%) between recruitment and baseline reflects the fact that these two visits were up to 6 months apart with an average lag of roughly 4 months, a period over which it is reasonable to expect a third of women to have either become pregnant, sick, relocated, or separated from their husbands. For instance, our follow-up survey data indicate that in the 24 months between baseline and follow-up surveys, the rate of pregnancy in the sample was 43%, rate of relocation was 33% and rate of marital separation was 9%.

contraceptive use. Immediately following the survey, CHWs were responsible for delivering health information about the prevention of sexually transmitted diseases (STDs) and condom use, and distributing a three-pack of condoms.[13] In addition, CHWs gave participants information about the benefits of family planning, the range of family planning methods available at Chipata clinic, specific information about injectable contraceptives and contraceptive implants including contraindications and side effects, and counseling about dual protection. Husbands were not present during either the survey or the information session of the first visit.

3.3 Voucher Intervention

The experimental manipulation discussed in this paper took place during a second visit in which women and their husband were visited concurrently. On that occasion, all women received a voucher that could be redeemed for free and immediate access to a menu of modern contraceptives through an appointment with a dedicated family planning nurse at Chipata clinic. This voucher guaranteed a maximum wait time of one hour and guaranteed access to two methods - injectable contraceptives and contraceptive implants - that had been regularly out of stock at the clinic. According to clinic personnel, in 2006 injectable contraceptives were out of stock more than half of the time and contraceptive implants were almost never available.[14] Although patients could purchase these outside the clinic and bring them in to be administered, according to nurses at Chipata, average wait times for family planning visits are typically more than two hours.

In order to provide wait-free appointments with guaranteed access, we hired a dedicated nurse for the study and purchased sufficient stocks of injectable contraceptives (Depo-Provera) and contraceptive implants (Jadelle) to treat all women in the sample for at least one year. These stocks and the nurse were reserved exclusively for women in our study. Hence, the primary benefit of the

[13]Community health workers (CHWs) all have previous relevant experiences: they worked with the clinic to implement information campaigns and homecare programs. The script and talking points for the information covered in this visit is in Appendix 3.

[14]Interview, Nurse Grace Mschilli, Chipata Clinic, July 2009.

voucher was to significantly reduce the cost of contraception. The voucher, a copy of which appears in Appendix 1, was valid for one month from the day it was issued.[15] To ensure that vouchers were not used by individuals outside of our sample, the wife's name and national id numbers were written on the voucher by enumerators, and women were instructed to bring their national ID cards to the clinic at the time of the visit for the nurse to verify.

Our experimental manipulation involved varying the manner in which the voucher was distributed. In particular, all 1147 women in the sample were randomly assigned to either "Individual" or "Couples" treatment arms. Women in the "Individual" treatment group were given the voucher alone while those in the "Couples" treatment group received it in the presence of their husband. Treatment assignments were made within batches of surveys collected from enumerators approximately each day, and balanced on the following variables collected in the baseline: wife's age, wife's education, current number of living children, reported desired number of children, reported differential in fertility desires between the woman and her husband, whether the woman was currently using injectables, and whether the woman was currently using the pill.[16] In total, 558 women were assigned to the Couples treatment arm and 589 women were assigned to the Individual treatment arm.[17] Table 1a presents summary statistics on a wide range of variables available in the baseline broken down by treatment assignment. The first seven variables in the table were those used to balance treatment assignment, so not surprisingly, means of these variables are very similar across treatment groups. Comparing means of the remaining 30 variables across treatments provides a

[15]To minimize confusion over the offer period, the expiration date was written clearly on each voucher by the CHW on the day of the second visit.

[16]CHWs and surveyors were responsible for ensuring adherence to the experimental protocol, monitored daily by supervisors.

[17]Individuals assigned prior to March 12, 2007 were assigned to the treatment arm with a 2/3 probability, while those assigned following March 12, 2007 were assigned to the treatment arm with a 1/2 probability. The Individuals arm is slightly bigger than the Couples arm due to the fact that random assignment was done in more than 100 small batches, and the computer program automatically assigned Individual treatment status to more than half of the observations when the batch size was odd.

check on our randomization. Only one difference in means out of 30 variables - use of an IUD or contraceptive implant at baseline - is statistically significant at a level below 10%, and a chi-square test of joint significance indicates that the samples are balanced on observables. Furthermore, since only a handful of women in the sample were using an IUD or contraceptive implant at baseline, imbalance across treatment arms for this variable is not surprising.

The experimental protocol was as follows: When the field team arrived at the participants' home for the second visit, the couple was told that the team would be conducting short surveys of both the husband and wife. To ensure confidentiality of answers, they were surveyed separately and in private. The husband survey gathered information on sensitive variables such as fertility preferences and income. The wife survey during this visit was extremely brief and contained only questions about whether the woman had visited a clinic since the time of the baseline survey and whether she had seen or heard about the voucher. Compensation for participation was given to the husband and wife separately, i.e. after their respective interviews.[18] The wife survey was included in this visit as an excuse to get women alone so that those assigned to the Individual treatment could be given the information session and voucher while away from their husbands.

Treatment assignment was revealed to the survey team by prior stapling of the voucher to either the husband (indicating Couples assignment) or the second wife survey sheet (indicating Individual assignment). In the case of women assigned to the Couples treatment, first men were surveyed alone, then the voucher and information session were administered to the woman in private, and then a very brief survey was administered to the wife in private. In the case of women assigned to the Individual treatment, first the husband was interviewed alone, then the husband and wife were brought back together to receive the information session and voucher, and then the wife was

[18]Initially, women were given a choice between two compensations of similar value: cash and a piece of printed cloth known as a chitenge that can be used as a skirt or a wrap. Later in the study, women were only offered chitenges as compensation, due to concerns over enumerators carrying too much cash and the fact that most women chose cloth over cash. Men were given the choice of compensation in cash or in cell phone minutes of equal value. Compensation was described to participants as an "appreciation of their time".

given the short survey. Appendix 2 describes the protocol in depth. Based on responses to debriefing surveys conducted among 48% of women in our study, we estimated a 1.1% rate of non-compliance with treatment assignment.[19] Throughout the paper we consider only treatment assignment rather than treatment received.

3.4 Sample attrition

Not all 1147 women assigned to a study arm completed the study. Our choice to balance treatment assignment on baseline characteristics prevented us from randomizing on the spot at the time of the voucher intervention. Hence, we faced the problem of women dropping out of the study between baseline and intervention, even though all had agreed to participate in the intervention at the time of baseline. In total, 310 women attrited from the experiment for two reasons: First, 74 women either chose to drop out or became ineligible between the first (baseline survey) and second visit (intervention).[20] Second, since fieldwork had to be completed by a set date (May 24, 2007) due to personnel and resource constraints, 236 women could not be located to complete the second visit by the deadline.[21] Throughout the paper, we exclude the 310 attritors and therefore compare outcomes

[19]Mistakes were caught through debriefing surveys conducted at the clinic in which supervisors asked women to describe their protocol. If it did not match the treatment assignment, they would probe, and report the non-compliance to the project manager. In each reported case of non-compliance, the project manager then spoke to the CHW/enumerator team to confirm it was noncompliance. In a few instances, the project manager also visited respondents in the field to probe further and confirm whether they were given a faulty treatment. In total, 9 cases were discovered this way among the 407 women who were debriefed.

[20]Although these two visits were usually close together, in a few cases husbands and wives could not be reached together for several weeks after the baseline survey. Of the 74, 35 women refused the final visit, 18 husbands refused the final visit, 11 individuals had moved, 7 had separated, 2 were pregnant, and one was found to not meet the original inclusion criteria and dropped form the study.

[21]These cases were largely women recruited near the end of the study. In the majority of cases, although women could be located for a second visit, enumerators were unable to carry out the intervention after multiple attempts because husbands' work schedules made it extremely difficult for them to schedule and keep appointments. For a few households no attempt had been made to conduct the second visit by the fieldwork deadline while for the majority

for 427 women who were reached in the Individual treatment to those for 409 women who were reached in the Couples treatment.

Attrition post-treatment assignment raises concerns over differential selection into the study across treatment groups. In particular, our comparison of final participants will produce a valid estimate of the treatment effect for women in this sample only if the factors determining attrition were uncorrelated with treatment assignment. It is first worth noting that rates of attrition were almost identical across treatment arms: attrition was 26.8% in the Couples treatment arm and 27.6% in the Individual treatment arm. Table 1b provides further evidence that attrition was independent of treatment assignment. Here we compare means across treatment arms of the summary statistics shown in Table 1a among the subsample of final participants. There are no differences in means that are statistically significant at a level below 5%, and only one difference in means that is statistically significant at a level below 10% (whether using contraceptive implants or IUD at baseline). Once again, a chi-square test confirms that the set of mean differences in the last column of the table are not jointly significant. Overall, the sample balance appears to be completely unaffected by sample attrition, indicating that sources of attrition were exogenous to treatment assignment. It is also worth noting that there are no reasons to anticipate non-random attrition given that study participants were not told about their treatment assignment until they had been located for the intervention, so assignment could not have affected their decision to drop out of the study before the intervention.[22] Although enumerators were aware of treatment assignment, there is also no reason to anticipate non-random attrition driven by enumerator behavior since recruiting procedures were equally difficult for both study arms. In particular, enumerators were required to locate and interview both the husband and wife in all cases, a protocol feature added intentionally to minimize this concern.

one or two attempts had been made. For the latter group, their nonparticipation potentially reflects some degree of tacit unwillingness to participate in the study.

[22]Importantly, no couples dropped out of the study mid-way through the intervention, which was when treatment assignment was revealed

An alternative way to explore the plausibility of this assumption is to estimate a regression with attrition as the outcome variable and verify that treatment assignment does not predict dropout. These estimates are presented in Appendix A. As expected from Table 1b, treatment assignment does not predict drop-out. Here we also see that timing of baseline survey was a major factor determining dropout, as we would expect since there was more limited opportunity to make two visits to respondents recruited towards the end of the study. Date of baseline is clearly exogenous to treatment assignment since assignments were stratified by survey date.

4 Empirical Analysis

4.1 Experimental Outcomes

In order to study intra-household decision-making about fertility, this paper focuses on the difference between the two treatment arms on four main outcomes of interest: use of the voucher, choice of contraception, use of contraception, and pregnancy. We use outcome data from four sources: administrative data from clinic records on family planning visits and contraceptive use ('nurse's logs'), a database of all redeemed vouchers collected by the investigators, a debriefing survey conducted by enumerators with each woman who redeemed her voucher following her family planning visit, and a follow-up survey of women two years after the intervention.

To keep track of visits women made to the family planning clinic to redeem their voucher, we used logs kept by the nurse hired for the study. The nurse oversaw the daily management of the experiment with the assistance of medical interns. She met with participating women redeeming their vouchers, checked that their identity corresponded to the information written on the voucher, discussed family planning alternatives with the women and prescribed the desired method after thoroughly screening for contraindications (inclusion criteria number 6). This nurse kept detailed logs of the visit of all study women in which she recorded, among other things, the date and time of visit, the name and NRC number of the women, the ID number of the voucher, and the desired,

prescribed and received family planning method (result of the visit). In cases in which women could not be prescribed a certain family planning method on account of a temporary condition such as menstruation, currently on a contraceptive method, or illness, their prescribed method was recorded along with their reason for not receiving it, and a follow-up appointment was set. Subsequent visits by women in treatment arms were also recorded in the nurse's log for approximately one month after the last voucher expired in order to capture changes in contraceptive choices as well as the length they remained on their initial contraceptive choice. Official expiry date of the last voucher was June 23, 2007. A few women with expired vouchers continued to come into the clinic until August 2007 but did not redeem their voucher with the study nurse.

4.1.1 Voucher Redemption

From these data, we first construct a variable indicating whether a woman redeemed her voucher according to whether her name appears in the nurse's logs. The data are then cross-checked and augmented with two additional sources: First, all of the vouchers that were redeemed were physically collected from the clinic by the investigators to verify that all women who redeemed a voucher are reported in the nurse's logs. We found vouchers for six women who were not recorded in the nurses' logs. In addition, enumerators conducted a short debriefing survey with each woman in the study as she exited the clinic after her family planning visit. These data were used to verify that we collected vouchers from all women who went to the clinic.

As an alternative measure, we augment the subsample of vouchers redeemed according to the nurse's logs, debriefing surveys and redeemed vouchers with 38 follow-up survey respondents who claimed to have used the voucher but did not appear in our records. While the majority of these cases are likely to reflect misreporting given the two-year lag, it is possible that some are women who tried to redeem the voucher at the wrong clinic, or after the expiration period.

4.1.2 Take-up of Concealable Contraceptives

Based on values recorded in the nurses' logs, we also construct two variables for the analysis related to an individual's take-up of concealable contraceptives at the time of the clinic visit. The first is the contraceptive method the woman requested from the study nurse at the start of the family planning appointment. We construct an indicator variable equal to one if the woman asked for either injectable contraceptives, a contraceptive implant, or an IUD at the time of her family planning visit. To record this consistently, the study nurse was instructed to, after describing the range of available contraceptives at the clinic, ask each woman her preferred method of contraception based on the available choices. She then screened the woman for contraindications and either prescribed her chosen method or offered a list of alternative methods if she was not eligible. Hence, our second variable is whether the woman received a concealable method of contraception. Any missing data from nurse's logs was supplemented with data on the same outcomes asked of women in the debriefing surveys.

4.1.3 Long-run outcomes

To study the long-run impact of voucher use - including effects on fertility - , we conducted a follow-up survey approximately two years after the baseline. Women who moved were tracked to other parts of the country. In total we reached 94% of individuals in the final study phase, leaving a final sample of 789.[23]. The follow-up survey contained questions analogous to the baseline, in addition to specific questions that about what influenced respondents' decision to redeem the voucher and choose a particular contraceptive method. These questions, and extensive qualitative data on respondents' experiences, were intended to shed light on mechanisms underlying differences in use of the voucher.

From these data we construct one measure of short-term and two measures of long-term family planning behavior: whether the respondent gave birth 9-13 months after she received a

[23]Of those that could not be interviewed, 3% had passed away, 2% refused, and 1% could not be found)

voucher, whether she gave birth 14-24 months after the intervention and whether she was using a concealable contraceptive method at the time of the follow-up survey (on average, 24 months after the intervention).[24]

4.2 Regression Estimates

We test the following null hypotheses:

1. Voucher redemption is no different for women who receive the voucher alone than for those who receive it with their husband. If this is not true, it implies that couples have discordant preferences over number of children and are unable to bargain efficiently over fertility outcomes.

2. Women who receive the voucher alone are no more likely to prefer "concealable" contraceptives- such as injectables and implants- nor more likely to use them, than women who receive the voucher with their husbands.

with the following simple regression model, using ordinary least squares to allow for the most non-parametric analysis on dummy variables:

$$Y_i = a + \beta I_{individual} + vX_{_i} + e \tag{1}$$

where Y_i is the outcome variable of interest- dummies for whether a woman redeemed her voucher, whether she chose a concealable contraceptive, and whether she was given a concealable

[24]We choose to look at births 9-13 months in order to capture all possible births prevented by one shot of injectable contraception taken by women in our study. Injectables prevent births for three months and reduce fertility for four months. Furthermore, women could have redeemed the voucher, and hence received a shot, up to one month after receiving the voucher.

contraceptive in her family planning visit; $I_{individual}$ is an indicator for assignment to the Individual treatment, and X_i is a vector of controls from both husband's and wife's baseline surveys. As described above, there should be no differential effect of being given the voucher alone or with one's husband for women who have the same preferences over children as their husbands. To check this, we split our sample according to whether the husband wants more children than his wife, whether the husband and wife want the same number of children, and whether the wife wants more children than her husband, allowing for heterogenous responses to treatment.

To estimate the magnitude of the causal impact of modern contraceptive use on birth outcomes for those whose behavior is impacted by the treatment, we then use assignment to receiving the voucher alone as an instrument for contraceptive use and estimate the following standard instrumental variables model:

$$Z_i = a + \beta I_{couples} + vX_i + e \tag{2}$$

$$Y_i = a + \beta Zi + vX_i + e \tag{3}$$

where Z_i is takeup of modern contraception, and Y_i is pregnancy. Because assignment to treatment is random, this will produce an unbiased estimate of the improvement in fertility control from using modern methods. Note, however, that this is a local average treatment effect – it reflects the average treatment effect for those whose contraceptive use choices are shifted by the treatment, and not for the population as a whole. We argue that for policy purposes, the population of people whose choices can be shifted by reductions in cost and information provision is the relevant population, and so this estimation procedure generates exactly the estimand of interest.

5 Results

5.1 Voucher Redemption

In total, 48 percent of women who were given a voucher for family planning services redeemed the voucher and had an appointment with a family planning nurse and opportunity to receive a prescription for contraceptives. The first two columns of Figure 2 show differences in the take-up rate by treatment arm. While only 43% of women in the Couples treatment redeemed the voucher, the rate was 53% in the Individual treatment arm. To gauge the significance of this difference, Table 2 presents regression estimates of the effect of private information on voucher redemption. The basic experimental estimate in Column 1 indicates that sharing information with husbands about the reduced price of contraceptive services lowered the rate of voucher redemption by ten percentage points, or by 19 percent, and the estimate is significant at the 5% level. The estimate changes little when control variables are added. When we use the alternative definition of voucher redemption (columns 3-4), which also considers reported use from the follow-up survey, the point estimate falls slightly but remains significant.

In Table 3 we explore heterogeneity in the treatment effect according to the husband's and wife's demand for children. We first divide the sample according to whether the husband desires more or fewer children than his wife (according to the wife).[25] Private information should have a larger effect on the take-up of family planning services when couples have discordant fertility preferences - and in particular, when the husband has a greater demand for children - because women have greater incentive to conceal contraceptive use. Indeed, the estimates in Table 3 indicate that voucher redemption is only significantly higher for women who are given private information

[25]Since we are interested in how the wife responds to private information, we use her beliefs about her husband's preferences rather than his stated preferences (from the husband's survey) since the former would dictate her behavior. Interestingly, more than half (54%) of women incorrectly predict their husband's fertility desires, although only 25% are off by more than one. The discrepancy is relatively symmetric with a slightly higher fraction of women overestimating (28% versus 23%) their husband's desired number of children.

when the husband desires more children than his wife (columns 1-2). In this subsample, which encompasses a mere 26% of the sample, women are 46% more likely to use the voucher when they are not required to share information about the opportunity with their husbands. Meanwhile, there is no significant effect of private information when the couple has concordant fertility preferences or when the wife desires more children than her husband. [26]

In Table 4 we divide the sample according to the wife's fertility desires as a means of isolating the effect of our intervention on unmet need for contraception. According to the standard definition used by demographers, a woman is only considered to have an unmet need for contraception if she is married or in a consensual union, is of reproductive age, is capable of becoming pregnant, and wants to have no more children or to postpone childbearing by at least two years. Based on the sampling frame, all women in our study meet the first three criteria. To identify women who meet the fourth criteria, we use baseline survey data to categorize women as desiring to space or limit fertility at the time of the intervention if they do not claim to want to give birth within the next two years. [27] Clearly, we should expect to see little impact of reducing costs of contraceptives among women who desire to conceive, and therefore little difference between women in the two treatment arms. Indeed, as the results in Table 4 reveal, there is no measurable effect of the intervention among the 27% of the sample who desire to have another child in the immediate future. Reassuringly, the effect is concentrated among women with a demand for contraceptives.

[26] While one might expect voucher redemption to be *lower* in the private information treatment when women demand *more* children than their husbands, given that family planning appointments are always held in private with a woman, a man has little to gain by pushing his wife to go to the clinic.

[27] We use two questions to identify this subsample: "If it were completely up to you, would you like to have another child within the next two years, after two years or not at all?" and "If it were completely up to you, how long would you like to wait until the birth of another child?" A respondent is reported as desiring to conceive if she reports within two years to either of these questions.

5.2 Take-up of Concealable Contraceptives

We next turn to the effect of private information on take-up of concealable contraceptives. As described earlier, since women were not always able to receive their desired method due to contraindications, as outcome variables we look at both the method of contraception that a woman initially requested during her visit and the method that was ultimately prescribed by the nurse.

While our voucher results indicate that husbands' discouragement is a significant barrier to the utilization of family planning services, there are two important reasons for examining the direct effect of the intervention on take-up of concealable contraceptives. First, it provides a consistency check on our interpretation of the difference across treatment arms. According to our theoretical framework, the higher rate of voucher redemption among women in the private information treatment derives from greater ability to conceal use of contraceptives. Hence, we should expect to see disproportionate take-up of relatively concealable methods among women in the Individual treatment accompanying their higher rate of voucher redemption. Second, the effect on contraceptive use is important for drawing policy conclusions from our intervention. In particular, while the results on voucher redemption indicate that husbands discourage women from taking up family planning services, it is possible that differences in family planning visits do not translate into differences in the prevention of unwanted births. For instance, it could be the case that, when given the chance to hide the opportunity, women are willing to meet with a family planning nurse but are hesitant to carry through with a new method of contraception without their husband's approval. In this case, private information would increase the rate of voucher redemption but not be a sufficient condition to reduce excess fertility.

Results from these regressions are presented in Table 5. Here we see that the difference in take-up rates of concealable contraceptives between women in the Couples and Individual treatment arms almost perfectly matches the difference in rates of voucher redemption, indicating that women on the margin of influence for redeeming the voucher were indeed those who sought relatively concealable methods. There is little difference in the estimated effect of the intervention on method

requested and method received.

The magnitude of the effect rules out a number of competing stories for why voucher use might have been higher when information was given to couples. For instance, it is possible that women were more likely to redeem the voucher when it was given to them alone because they would not have to share the free gift with their husbands. However, in this case, women on the margin of influence would not be disproportionately those seeking concealable methods of birth control.

5.3 Fertility

What do these results imply for fertility, and more importantly, the prevention of unwanted births? Since we know that our intervention increased take-up of long-term contraceptive methods, but do not have reliable data on continuation rates (which were reportedly low), we first look at birth rates 9-13 months after an individual woman's received a voucher. Since the majority of concealable methods chosen were injectables, if there was little substitution towards contraceptives outside of the clinic among women in the Individual treatment who did not redeem their vouchers, we should see a drop in the likelihood of giving birth between 9 and 13 months after receiving a voucher.

Table 6 presents these results. We first look at the total sample of women in our data. In total, 36% of women gave birth in the two years following our intervention, and 6.5% of women gave birth 9-13 months afterwards. Although the point estimate indicates that this rate was slightly lower among women who were offered family planning services in private, the difference is not statistically significant. However, we do observe a significant effect of our intervention on the rate of unwanted births. That is, since we anticipate a treatment effect only among women who desire to limit fertility, we limit our sample to this set of women and estimate the effect of our intervention on unwanted births. Consistent with Table 4 and the standard definition of unmet need for contraception, we define a birth as unwanted if, at the time of the baseline survey, a woman stated that she did not want to have another child for at least two years. According to this definition, a remarkable 75%

of births in this interval were unwanted.[28]

Results from these regressions are presented in columns 3 and 4 of Table 6. Here we see a significant decrease in unwanted births among women assigned to the private information treatment. The point estimates indicate that excess fertility falls by 59% when women are told about family planning services in private. In Columns 5 and 6 we present instrumental variables estimates of the effect of receiving a modern method of birth control through our study, instrumented with assignment to the Couples treatment, on birth rates 9-13 months later. Consistent with the reduced form estimates, these results imply that the marginal effect of using modern birth control methods is an immediate 54% reduction in the rate of conception.

These results imply that concealability of contraception has a major impact on women's ability to meet their own fertility desires. The results also validate our previous findings since they serve as a proxy for total contraceptive use. In particular, one shortcoming of our measure of contraceptive use from administrative data is that we do not observe use of contraceptive methods that were obtained outside of the clinic during the study period. Hence, while we know that take-up of family planning methods at the clinic was lower among women assigned to the Couples treatment, it could be the case that overall use of concealable contraception was not significantly different across the two treatment arms if there was sufficient substitution towards family planning services outside of the clinic among women who were prevented from using the voucher by their husbands.

Unfortunately, follow-up survey data do not help us address this problem since recall of contraceptive use two years prior is unlikely to be reliable. In general, the rate of access to concealable methods outside of public clinics is low: According to data in the baseline survey, approximately 10% of women who had ever used injectables had *ever* obtained them outside of the clinic. The majority (68%) report that their reason for going somewhere else was related to stock-outs or waiting times at the clinic. Hence, this rate is unlikely to reflect the rate at which women in our study

[28]While this is higher than the DHS estimate (52%) of excess fertility in Zambia, the discrepancy is consistent with the fact that, due to ex-post rationalization, ex-post measures of birth "wantedness" are generally much higher than ex-ante measures.

obtained injectables outside of the clinic when the clinic was fully stocked and there was a guarantee of no waiting time, but is a reasonable upper bound on the rate at which women who could not use the voucher sought injectables in other locations.[29] Given that, substitution is unlikely to explain away all of our estimated treatment effect.

Nonetheless, we cannot completely rule out substitution among women who did not use the clinic services with available data on contraceptive use. However, based on the fact that birth rates are substantially different between treatment groups, we can conclude that substitution among the control group towards other, equally effective sources of birth control was limited.

5.4 Long-term Effects

Our intervention increased overall use of injectable contraception in the month following the intervention by 12 percentage points, the rate of use rising from 23% at baseline to 35% after vouchers were redeemed.[30] However, it appears that our intervention did not have a lasting impact on use of birth control: at follow-up only 13% of women reported that they were still using injectables, well below initial levels. We first test for effects of treatment assignment on long-term use of concealable contraceptives in a regression analysis in which the outcome variable is an indicator of whether the woman is still using a method at follow-up. These results are presented in Table 7. Not surprisingly given the overall trend away from these methods, the differential use of concealable contraceptives across treatment arms has disappeared by Year 2.

While these discontinuation rates are striking, the primary reason for the sharp decline in use of injectables to levels below baseline was not a generalizable phenomenon but rather the result of a large unanticipated shock to contraceptive availability that occurred several months after our intervention. In particular, for several weeks between December 2007 and March 2008, people in Zambia were led to believe that injectable contraceptives contained HIV. This situation was triggered when

[29] If study women came to the clinic without their voucher, they would receive the standard clinic treatment by the regular family planning nurse.

[30] This is assuming that those who were using at baseline and did not redeem vouchers continued to use.

a box of Depo-Provera tested positive for HIV at Lusaka international airport. Although the test conducted was invalid, the news was quickly and broadly broadcasted in the media, and on January 27, 2008, the Ministry of Health imposed a national ban on the distribution of injectable contraceptives until further tests could be conducted. After careful local and international investigations, Depo-Provera was proven to be perfectly safe for use and, as expected, no evidence of it being contaminated with HIV, human blood products, or HIV antibodies was found.[31] Although on March 16, the Zambian government officially instructed its healthcare providers to resume distribution of injectable contraceptives, as of mid-April, the message had yet to reach most health district facilities, the product was still unavailable in several areas, and confidence of both health providers and community members remained low. However, by mid-July, injectables had returned to clinics and demand seemed to come back slowly.

Given the eight-month ban on injectables and general contraceptive scare that interrupted our study, it is unsurprising that the influence of the intervention was short-lived. These unfortunate events led to an immediate convergence in use of contraceptives among women in the two treatments arms as soon as four months into our study as usage rates in both groups first fell to zero while stocks were withheld from clinics and then appear to have rebounded in limited proportions in response to the subsequent local and national awareness campaigns and increase in stocks available to all women at Chipata clinic.

Likewise, we see no long-term effect of the intervention on childbearing 14-24 months after the intervention (Table 7). This result holds when the sample is restricted to discordant couples and when we focus on unmet need and excess fertility among the sample of women who do not want children. Fertility patterns over the entire 24 months following the intervention are presented in Figure 3. Here we see the divergence in birth rates between the two treatment arms beginning

[31]HIV DNA PCR tests, which look for the presence of HIV, were performed in Zambia at the MoH's request on samples from the suspicious lot and were negative. The manufacturer, Family Health International, also proved that Depo-Provera was not contaminated with HIV virus and that the false positive reaction was caused by a substance used to make chemicals soluble called Polysobed.

at month 8 (the first possible month that births could be influenced by the treatment), that lasts for about 5 months. Between months 14 and 18, the pattern switches, and births in the Couples treatment are significantly lower. This pattern suggests that our intervention essentially postponed births in the Individual arm by 3-5 months (or on average slightly more than the duration of one shot of injectable contraceptives).

6 Channels of Influence

Thus far we have interpreted higher take-up of family planning services when women are given private information about reductions in the cost of contraception as resulting from the fact that it is easier for the subset of women who desire fewer children than their husbands to conceal birth control. Here we consider a number of alternative explanations for our findings and present direct and indirect evidence in support of this interpretation.

6.1 Effect of the Intervention on Spousal Communication

It is possible that the intervention had a direct effect on the degree of communication about family planning between spouses. While, in the baseline survey, 86% of women in our sample report that they have discussed family planning with their partner in the past year (33% more than five times) and 77% have discussed desired family size (30% more than five times), as noted earlier, there is a great deal of misinformation among women as to their husband's fertility preferences. Hence, it is possible that our intervention encouraged couples to discuss family planning issues, and - by bringing husbands and wives together to receive the voucher - that the Couples treatment had a greater effect on communication than the Individual treatment.

In this case, one reason that women in the Couples treatment may have been less likely to use the voucher is because they learned that their husbands wanted more children than they had previously believed. To gauge whether this mechanism may be at work, we divide the sample

according to whether the wife overestimates or underestimates her husband's desired number of children to test whether the effect of the Couples treatment is concentrated among the latter group of women. These results are presented in Appendix B. Here we see no evidence that the effect of Couples treatment is higher in the subgroup of women who underestimated their husbands' demand for children.

To study more directly the possible effect of the treatment on spousal communication, we next look at a number of outcome variables related to spousal dialogue available in both the baseline and the follow-up survey, including: Whether the couple disagrees about number of children or contraception, whether they discuss contraception, and the accuracy of the wife's perception of her husband's desired fertility. These estimates, presented in Table 8, show no evidence of a disproportionate change in the degree of communication or information-sharing about family planning among couples assigned to the Couples treatment.

6.2 Direct Evidence of Concealment

We next look for *direct* evidence that our results operated through changing women's ability to hide contraceptive use from their husbands. A major objective of the follow-up survey was to obtain detailed information from women about what they did with the voucher after receiving it, including whether and why or why not they spoke to their husbands about the voucher, why they did or did not use the voucher, and whether their husbands encouraged or discouraged them from using it. To collect this information, at the end of the follow-up survey we asked a series of qualitative questions about their experiences two years ago.[32] We use these responses to identify individually-treated

[32]Specific questions included: "What did you do with the voucher just after you received it?", "At any point in time, did you talk about the voucher with your husband?", "What did you tell him (relating to the voucher, FP, contraceptives, ...)?", "How did he react to what you said? What did he say or do?", "Did you show the voucher to your husband?", "How did your husband react when you showed him the voucher? What did he say or do?", "What did you and/or your husband do with the voucher just after you received it?", and "Did you tell your husband beforehand that you were going for a family planning visit at Chipata clinic?".

respondents who used the voucher without their husband's knowledge because they believed he would otherwise not have let them use it.

Identifying these respondents allows us to directly estimate the fraction of the treatment effect of private information on voucher redemption that can be accounted for by greater ability to conceal. That is, according to our analytical framework, the difference in rate of voucher redemption between the two treatment arms is equal to the number of individually-treated women who used the voucher but whose husbands would not have let them go had they been made aware of the opportunity (or, alternatively, the number of Couples-treated women who did not use the voucher because their husband did not permit them to - but who would have hidden the voucher from their husbands and used it had they received it alone, which is harder to identify). We classify respondents' motives conservatively, making use of all responses to questions in this section and only reporting a woman as hiding from her husband when she makes explicit reference to hiding.

To give an example, the following woman who was in the Individual treatment and used the voucher described her experience as follows: "I put [the voucher] in the bag for my children's clothes to hide it from my husband. I did not show him the voucher because he does not know that I am using contraceptives." In addition, the enumerator made the following comments on this respondent: "The respondent did not tell the husband about the survey or the voucher because the husband does not allow her to use any contraceptives. He does not want his wife to use any contraceptives without giving any reason. It seems the husband wants the wife to get pregnant that is why he's not allowing the wife to use contraceptives." In another instance, the respondent gave the following description: "I kept it in the house and hid it because I didn't want my husband to see it. He didn't know I had gone to the clinic for family planning." In this case, the enumerator commented that, "Her partner doesn't allow her to use family planning so she does it without his consent." Both of these women were classified as an Individually-treated woman who would not have been able to use the voucher had she been assigned to the Couples treatment.[33].

[33]In contrast, although ambiguous, the following Individually-treated woman who used the voucher but did not tell her husband was not considered to be hiding. According to this woman, "I kept the voucher in my handbag.

Since it is also possible that, in addition to these unambiguous cases of hiding, giving the woman private information allowed her to more easily persuade her husband to let her use the voucher by either presenting partial information about the services available or framing the opportunity in a misleading way, we also look through the descriptions for this type of scenario. In particular, we identify women in the Individual treatment who used the voucher but appear to have partially hidden or misrepresented information about the voucher when discussing it with their husbands.

For example there is a case in which a woman initially tells her husband about the voucher and seeks his permission to switch from the pill to injectables, but does not mention the opportunity to get contraceptive implants: "When I went home [from the clinic], my husband asked me how it went and if they gave me injections and I told him it went well but I didn't get injections, I got implants instead, they last longer, they last for 5 years. My husband became angry, asking me how I could do something so long term without talking to him." In this case, it is possible that, had the husband known that implants were being offered for free at the clinic, he would not have allowed his wife to use the voucher. In another instance, the respondent reports that her husband "asked what would happen during my visit to the clinic. I told him I did not know but would tell him more afterwards". The enumerator notes of this respondent that, "The only secret she has ever kept from her husband is the injectables contraceptives she is using," suggesting that the husband would not have approved had he known that the clinic was offering free injectables. Being in the Individual treatment appears to have allowed the woman to keep this information secret from her husband.

In total, among individually-treated women who used the voucher, 11% admit that they did so behind their husband's back because he would not have let them redeem it (N=24), and another 5% appear to have misrepresented the voucher offer in order to convince their husbands to let them use

I did not talk about the voucher with my husband." Meanwhile, the enumerator noted that, "Respondent went to the clinic after the voucher had expired. Respondent could not recall most information because it has been long, although we probed."

it. Cases in the first category alone imply a 6 percentage point difference in voucher redemption. If we also include cases of misrepresentation, this implies a 7.5 percentage point difference in voucher use between treatment arms. Given our estimated treatment effect of 10 percentage points, these numbers imply that confessions of husbands' perceived or actual unwillingness to let wives use the voucher can alone explain 60-75% of our estimated treatment effect. It is important to note that not only have we likely underestimated such cases by classifying responses conservatively (e.g. not counting cases in which the women hides the voucher from her husband but gives no reason, or gives a different reason), but we are also underestimating if women were reluctant to admit concealing the voucher, which our survey data indicate is the case.[34] Most importantly, only 85% of women were administered this section of the survey so it is also likely that we do not observe several relevant cases.[35]

7 Conclusions

This paper uses a novel experimental design to understand the nature of household bargaining over fertility, and the role it plays in accounting for excess fertility. Our experimental manipulation changed the concealability of contraceptive use by varying whether a woman received information about new family planning opportunities alone or in the presence of her spouse. In the simplest household bargaining models, couples with discordant preferences should be able to bargain to efficiency and therefore have no incentive to hide contraceptive use. In contrast, we find that when women are given the opportunity to conceal birth control use, they are 19% more likely to visit a family planning nurse and 27% more likely to ask for a relatively concealable form of contraception, suggesting that in a significant fraction of households, women do have incentives to hide contraception. Our interpretation of concealment is further evident in the fact that the

[34]That is, while at least 8% of women are using modern contraceptives without telling their husbands, only 2% admit to doing so when asked directly.

[35]6% did not participate in the follow-up survey, and 9% of responses to this section are still being translated.

treatment effect is concentrated among households in which women want fewer children than their husbands, and from in-depth interviews with women after the intervention. Furthermore, our study shows that strategic behavior has major consequences for female economic wellbeing: the opportunity to conceal leads to a 59% reduction in unwanted births in our sample.

Our findings suggest significant inefficiencies in intra-household bargaining over fertility, which has the potential to contribute to excess fertility. Our findings also suggest that some fraction of women can be made better off by increasing their opportunities to make private choices over birth control, such as by promoting access to relatively concealable methods of long-term birth control (implants, IUDs and injectables), conducting family planning outreach efforts among women in private, or by eliminating requirements at many clinics in the developing world that husbands approve contraception. Given that men may be made worse off by such efforts, before drawing more general welfare conclusions, more needs to be understood about the channels through which bargaining inefficiencies arise, for instance credit constraints may prevent fully transferable utilities, or a weak contracting environment may limit households' ability to bargain over long-range fertility plans.

Our results also help explain why previous work on male involvement may have found mixed results, and why concealable contraceptives- such as injectables- have proven to be so popular in cultural contexts where men dominate family planning decisions. In addition, in a policy environment with increasing emphasis on male involvement in family planning, our results suggest caution: male involvement that is simply making men aware of family planning opportunities may actually decrease opportunities for women, depending on the distribution of discordant households in the population. More promising might be a involving males in a way that influences men's preferences over number of children, or helps them to better internalize the costs to women of childbearing and child-raising.

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Figure 1: Timeline of Study

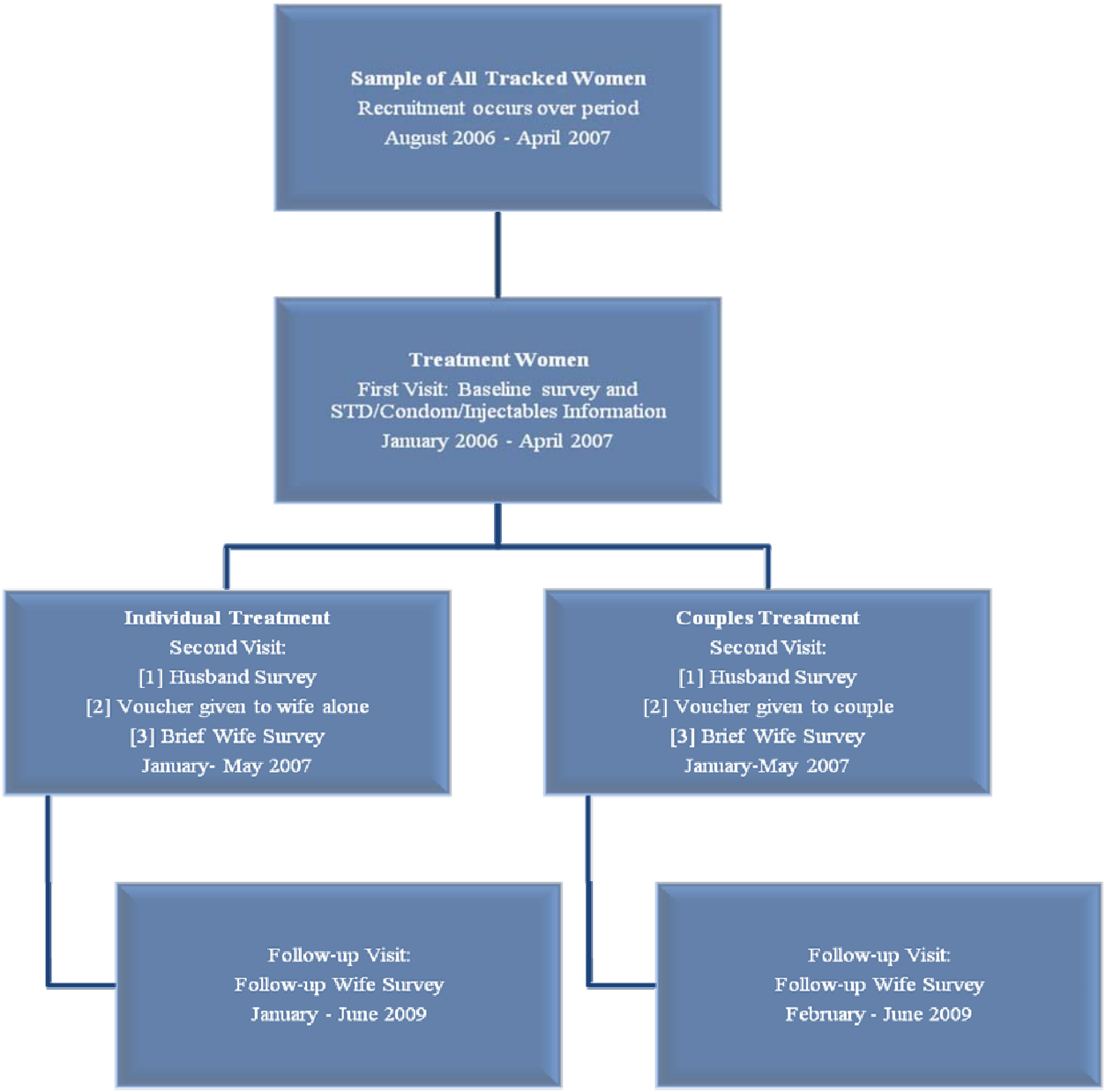


Figure 2: Voucher Redemption and Use

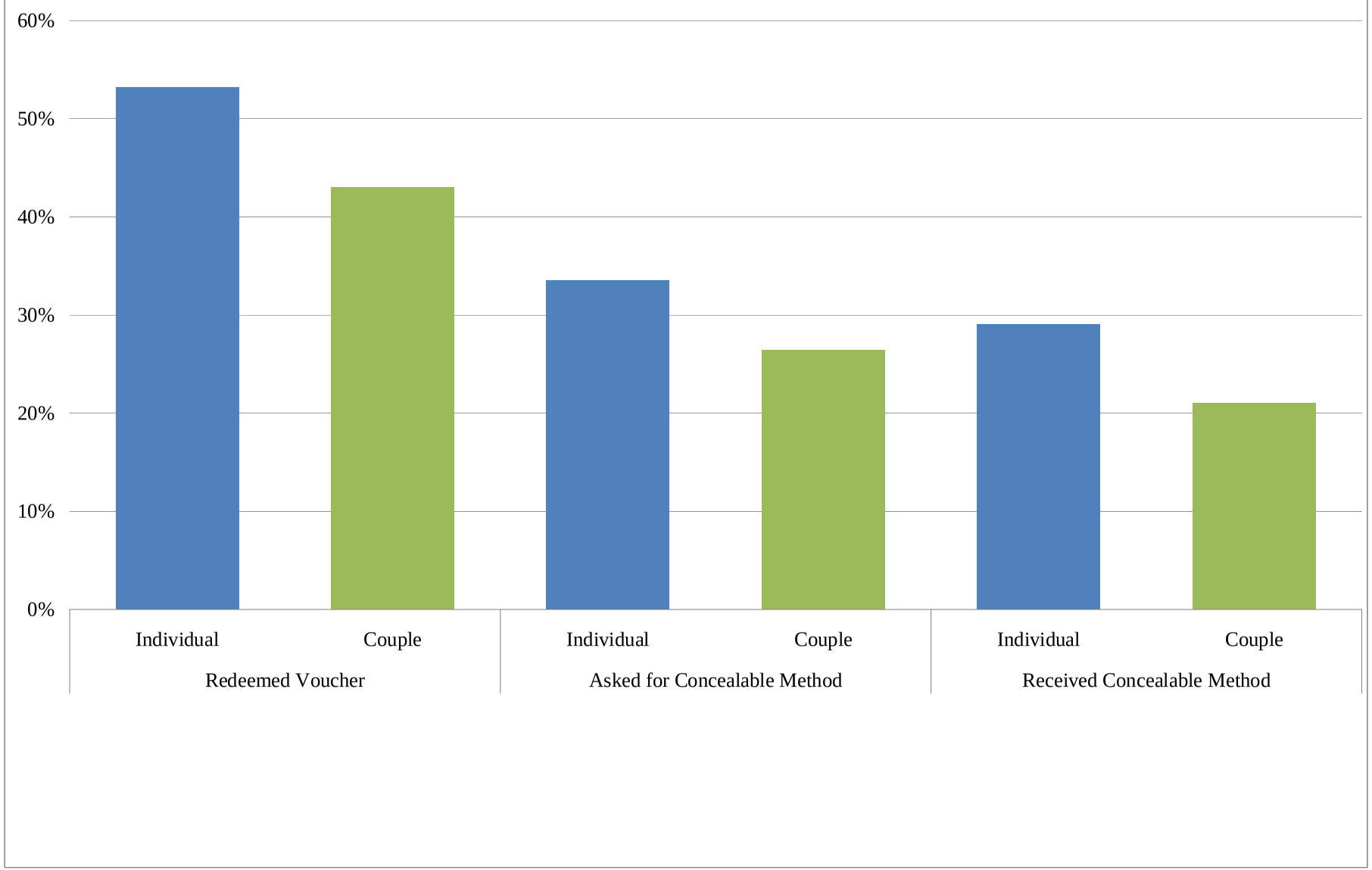


Figure 3: Frequency of Births by Month and Treatment Arm Following Voucher Distribution
Women Who Did Not Want a Child in 2 Years Following Baseline

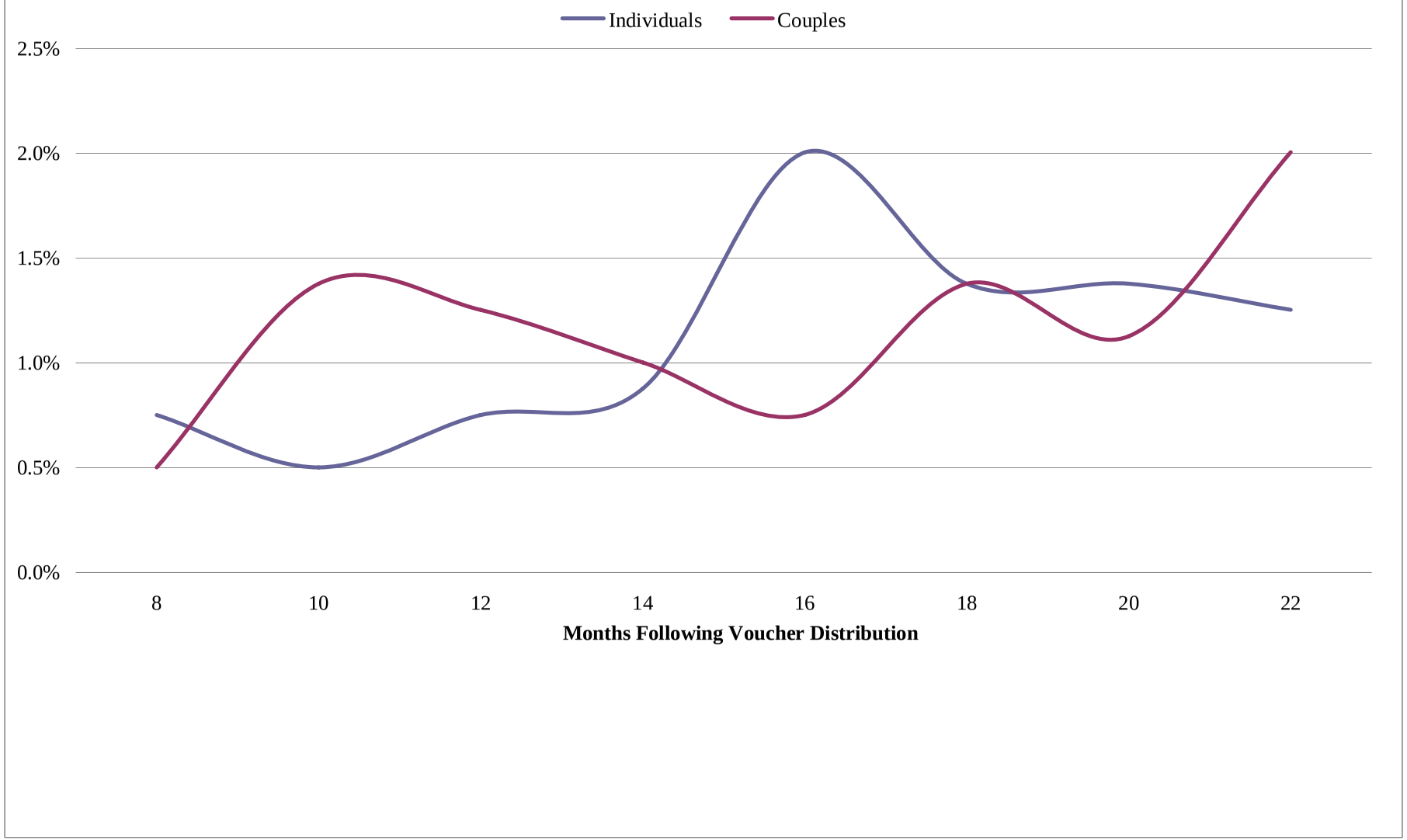


TABLE Ia
Summary Statistics for Recruited Sample

		Couples			Individuals			P-value for
	Variable	Mean	Standard Deviation	N	Mean	Standard Deviation	N	Difference of Means
	Variables Used to Balance Sample							
1	Age	27.44	6.23	552	27.45	5.88	588	0.977
2	Highest schooling attained	6.36	2.96	557	6.38	3.05	588	0.949
3	Number of living children	2.96	1.81	557	2.99	1.68	588	0.750
4	Ideal number of children	3.99	1.58	557	3.97	1.56	588	0.905
5	Difference in husband's ideal and wife's ideal number of children (reported by wife)	0.32	1.41	511	0.32	1.36	545	0.926
6	Using injectable at baseline	0.22	0.42	555	0.23	0.42	588	0.853
7	Using pill at baseline	0.30	0.46	555	0.31	0.46	588	0.483
	Other Observable Characteristics							
8	Husband's age (reported by wife)	33.96	7.16	488	33.87	6.80	514	0.840
9	Husband's age (reported by husband)	34.12	8.07	412	33.82	7.27	429	0.562
10	Husband's highest schooling attained (reported by wife)	9.40	2.73	499	9.57	2.51	530	0.292
11	Husband's highest schooling attained (reported by husband)	8.67	2.85	413	8.78	2.93	431	0.584
12	Husband's ideal number of children (reported by wife)	4.27	1.99	511	4.30	1.88	545	0.785
13	Husband's ideal number of children (reported by husband)	4.37	2.06	410	4.25	1.93	425	0.399
14	Using any modern contraceptive method at baseline	0.53	0.50	557	0.54	0.50	588	0.794
15	Using IUD or implant at baseline	0.03	0.16	558	0.01	0.09	589	0.019
16	Have ever used a modern contraceptive method	0.98	0.14	558	0.97	0.16	589	0.512
17	Wife's average monthly income (1,000 USD)	0.06	0.85	557	0.03	0.08	588	0.308
18	Husband's monthly income (1,000 USD) (reported by husband)	0.15	0.26	414	0.13	0.16	431	0.218
19	Wife knows when she is most fertile	0.11	0.32	513	0.15	0.35	536	0.098
20	Date of baseline survey	3/3/2007	25.15	558	3/3/2007	25.16	589	0.989
	Intimacy and Violence Measures							
21	Difference in husband's and wife's income	0.23	1.11	556	0.32	0.77	581	0.127
22	Difference in husband's and wife's age	6.57	3.90	487	6.26	3.94	514	0.220
23	Difference in husband's and wife's education	2.87	3.15	499	3.10	2.97	530	0.221
24	Difference in wife's perception of husband's ideal and actual husband's ideal number of children	-0.02	1.88	381	0.02	1.93	402	0.793
25	Number of days in past 7 days couple has sex	1.98	1.62	554	2.00	1.62	582	0.879
26	Number of children husband has with other women	0.65	1.31	545	0.61	1.23	564	0.654
27	Frequency couple has talked about contraception past year	1.69	1.08	556	1.73	1.08	587	0.528
28	Couple has ever disagreed on number of children	0.15	0.36	557	0.14	0.34	586	0.492
29	Couple has ever disagreed on contraception use	0.12	0.33	553	0.12	0.32	586	0.856
30	Have used contraceptive method without husband's knowledge	0.16	0.37	555	0.16	0.36	585	0.761
31	Husband has ever threatened physical violence	0.56	0.50	557	0.53	0.50	588	0.444
32	Husband has ever been physically violent conditional on having threatened violence	0.66	0.47	312	0.66	0.47	320	0.953
33	Wife ever pressured to have sex	0.55	0.50	557	0.55	0.50	587	0.971
34	Wife ever pressured violently to have sex	0.15	0.36	555	0.14	0.34	584	0.604
	Financial Decision Making Measures							
35	Husband decides savings	0.62	0.49	554	0.61	0.49	588	0.857
36	Husband holds the money	0.17	0.37	551	0.16	0.36	581	0.637
37	Husband does budgeting	0.15	0.35	555	0.14	0.35	587	0.891
38	Husband decides major purchases	0.65	0.48	556	0.65	0.48	585	0.848
							Chi2	34.24
							Probability < Chi2	0.727

Notes:
[1] The sample used in this table is the goup of households selected for treatment.
[2] The variable "Couple has talked about contraception in the last year" takes on the following values: 0=never, 1=once or twice, 2=three or four times, 3=five or more times.
[3] Variables 28-38 are all dummy variables. For variables 35- 38, the variable took on 0 if the respondent said the wife or both were in charge of the respective task.
[4] Modern contraception includes use of the pill, IUD, implant, injectable, diaphragm, female and male sterilization.
[5] A concealable method is comprised of the following contraceptives: IUD, implant and injectable.
[6] All data comes from husband and wife baseline surveys. If not specified, data comes from wife's baseline survey.

TABLE Ib
Summary Statistics for Final Sample

		Couples			Individuals			P-value for
	Variable	Mean	Standard Deviation	N	Mean	Standard Deviation	N	Difference of Means
	Variables Used to Balance Sample							
1	Age	27.60	6.32	405	27.54	6.04	427	0.895
2	Highest schooling attained	6.38	2.91	409	6.44	3.11	427	0.768
3	Number of living children	3.05	1.83	409	3.02	1.68	427	0.774
4	Ideal number of children	4.02	1.59	409	3.97	1.56	427	0.647
5	Difference in husband's ideal and wife's ideal number of children (reported by wife)	0.30	1.37	380	0.30	1.34	404	0.996
6	Using injectable at baseline	0.22	0.42	408	0.24	0.43	427	0.588
7	Using pill at baseline	0.31	0.46	408	0.33	0.47	427	0.608
	Other Observable Characteristics							
8	Husband's age (reported by wife)	34.19	7.46	361	34.03	6.93	384	0.763
9	Husband's age (reported by husband)	34.14	8.09	408	33.74	7.23	425	0.446
10	Husband's highest schooling attained (reported by wife)	9.36	2.69	368	9.53	2.53	388	0.380
11	Husband's highest schooling attained (reported by husband)	8.66	2.85	409	8.79	2.93	427	0.489
12	Husband's ideal number of children (reported by wife)	4.29	1.97	380	4.27	1.86	404	0.930
13	Husband's ideal number of children (reported by husband)	4.37	2.06	406	4.22	1.90	421	0.282
14	Using any modern contraceptive method at baseline	0.55	0.50	409	0.56	0.50	427	0.578
15	Using IUD or implant at baseline	0.03	0.16	409	0.01	0.10	427	0.059
16	Have ever used a modern contraceptive method	0.99	0.12	409	0.98	0.14	427	0.484
17	Wife's average monthly income (1,000 USD)	0.03	0.06	409	0.03	0.08	427	0.952
18	Husband's monthly income (1,000 USD) (reported by husband)	0.15	0.26	409	0.13	0.16	427	0.212
19	Wife knows when she is most fertile	0.10	0.29	376	0.13	0.34	390	0.102
20	Date of baseline survey	3/4/2007	25.20	409	3/3/2007	24.22	427	0.487
	Intimacy and Violence Measures							
21	Difference in husband's and wife's income	0.26	0.38	408	0.33	0.82	421	0.131
22	Difference in husband's and wife's age	6.65	4.14	360	6.28	3.77	384	0.199
23	Difference in husband's and wife's education	2.85	3.07	368	3.03	2.94	388	0.416
24	Difference in wife's perception of husband's ideal and actual husband's ideal number of children	-0.02	1.88	378	0.02	1.94	400	0.807
25	Number of days in past 7 days couple has sex	2.07	1.63	406	2.03	1.62	421	0.720
26	Number of children husband has with other women	0.60	1.23	400	0.56	1.15	411	0.609
27	Frequency couple has talked about contraception past year	1.70	1.06	408	1.77	1.05	426	0.314
28	Couple has ever disagreed on number of children	0.14	0.34	409	0.14	0.35	425	0.859
29	Couple has ever disagreed on contraception use	0.11	0.32	406	0.11	0.31	426	0.807
30	Have used contraceptive method without husband's knowledge	0.14	0.35	408	0.14	0.34	425	0.813
31	Husband has ever threatened physical violence	0.56	0.50	409	0.51	0.50	427	0.116
32	Husband has ever been physically violent conditional on having threatened violence	0.66	0.48	231	0.67	0.47	223	0.819
33	Wife ever pressured to have sex	0.53	0.50	409	0.51	0.50	427	0.614
34	Wife ever pressured violently to have sex	0.14	0.35	408	0.13	0.34	424	0.533
	Financial Decision Making Measures							
35	Husband decides savings	0.62	0.49	406	0.61	0.49	427	0.891
36	Husband holds the money	0.17	0.38	406	0.16	0.37	421	0.745
37	Husband does budgeting	0.16	0.36	408	0.15	0.36	427	0.780
38	Husband decides major purchases	0.65	0.48	409	0.66	0.47	426	0.723
							Chi2	41.65
							Probability < Chi2	0.399

Notes:
[1] Sample final participants are the households that received a voucher and went through the complete survey process.
[2] The variable "Couple has talked about contraception in the last year" takes on the following values: 0 = never, 1 = once or twice, 2 = three or four times, 3 = five or more times.
[3] Variables 28-38 are all dummy variables. For variables 35- 38, the variable took on 0 if the respondent said the wife or both were in charge of the respective task.
[4] Modern contraception includes use of the pill, IUD, implant, injectable, diaphragm, female and male sterilization.
[5] A concealable method is comprised of the following contraceptives: IUD, implant and injectable.
[6] All data comes from husband and wife baseline surveys. If not specified, data comes from wife's baseline survey.

TABLE II
Effect of Private Information Treatment on Voucher Use

Variable	Voucher Redeemed Nurses Logs		Voucher Redeemed Supplemented with Follow-up Survey Information	
Assigned to Individual Treatment	0.101***	0.094**	0.089**	0.084**
	(0.036)	(0.037)	(0.039)	(0.040)
Age		0.007		0.006
		(0.006)		(0.006)
Husband's age		0.002		0.000
		(0.004)		(0.004)
Highest schooling completed		0.000		-0.006
		(0.006)		(0.006)
Husband's highest schooling		-0.006		0.001
		(0.007)		(0.006)
Number of living children		0.010		0.027
		(0.020)		(0.020)
Difference between husband's and wife's total number of children		0.018		0.024
		(0.020)		(0.020)
Ideal number of children		0.001		-0.014
		(0.013)		(0.014)
Husband's ideal number of children		-0.013		-0.016*
		(0.009)		(0.010)
Currently using IUD, injectable or implant		0.057		0.034
		(0.041)		(0.040)
Average monthly income		-0.521***		-0.643***
		(0.196)		(0.190)
Husband's monthly income		-0.053		0.030
		(0.068)		(0.076)
Husband larger ideal family size than wife		0.012		0.011
		(0.013)		(0.013)
Wife understands when she is most fertile		-0.051		-0.034
		(0.062)		(0.063)
Wife 40 or older		-0.124		-0.187**
		(0.092)		(0.085)
Constant	0.430***	0.278*	0.504***	0.418***
	(0.023)	(0.159)	(0.025)	(0.147)
Observations	836	836	836	836

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:
[1] Missing values were replaced with a zero and a dummy variable flagging zeroes was included.
[2] Income has been divided by 1000 to get visible coefficients in the regression analysis.
[3] The sample discussed in this table is the final sample that received a voucher.
[4] Husband demographic and fertility preference information is gathered from the husband's survery.
[5] Wife demographic and fertility preference information is gathered from the baseline survey.
[6] A wife understands when she is most fertile if she says she is most fertile half way between periods.
[7] A husband has a larger ideal family size than the wife, if she believes he wants more children then she does.
[8] Difference between total number of children captures number of children from other marriages.
[9] In addition, the regression controls for differences in survey questions .

TABLE IV
Effect of Private Information Treatment on Voucher Use

Variable	Redeemed Voucher Wife Wants Child in Next 2 Years		Redeemed Voucher Wife Doesn't Want Child in Next 2 Years	
Assigned to Individual Treatment	0.056	0.044	0.117***	0.104**
	(0.070)	(0.076)	(0.040)	(0.041)
Age		0.012		0.004
		(0.013)		(0.007)
Husband's age		0.005		0.001
		(0.009)		(0.005)
Highest schooling completed		0.011		-0.006
		(0.013)		(0.008)
Husband's highest schooling		-0.005		-0.006
		(0.016)		(0.008)
Number of living children		0.012		0.009
		(0.050)		(0.029)
Difference between husband's and wife's total number of children		0.038		0.017
		(0.051)		(0.022)
Ideal number of children		0.020		-0.001
		(0.032)		(0.016)
Husband's ideal number of children		-0.001		-0.016
		(0.022)		(0.010)
Currently using IUD, injectable or implant		0.109		0.036
		(0.092)		(0.045)
Average monthly income		-0.258		-0.656***
		(0.590)		(0.205)
Husband's monthly income		0.100		-0.114
		(0.127)		(0.071)
Husband larger ideal family size than wife		0.016		0.010
		(0.022)		(0.018)
Wife understands when she is most fertile		-0.023		-0.056
		(0.117)		(0.070)
Wife 40 or older		0.094		-0.107
		(0.258)		(0.090)
Constant	0.409***	-0.210	0.439***	0.464**
	(0.043)	(0.290)	(0.026)	(0.183)
Observations	227	227	609	609

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The final sample is split into two groups for this analysis based on heterogeneity in wife's preference for timing of the next child. If a wife said she wanted to have in 24 months or less at the time of baseline, she is included in the group that wants a child in the next two years. All other study participants who either answered they didn't know, didn't want any more children, or said they wanted children after 24 months were included in the category "Wife Doesn't Want Child in Next 2 Years."

[2] A voucher was "redeemed" if there is a record of a voucher use by a woman in the study at the Chiapata Clinic.

[3] Missing values were replaced with a zero and a dummy variable flagging zeroes was included in the regression.

[4] Income has been divided by 1000 to get visible coefficients in the regression analysis.

[5] The sample discussed in this table is the final sample that received a voucher.

[6] Husband demographic and fertility preference information is gathered from the husband's survery.

[7] Wife demographic and fertility preference information is gathered from the baseline survery.

[8] A wife understands when she is most fertile if she says she is most fertile half way between periods.

[9] Difference between total number of children captures number of children from other marriages.

[10] In addition, the regression controls for differences in survey questions .

TABLE V
Effect of Private Information Treatment on Use of Concealable Method

	Full Sample				Husband Desires Larger Family than Wife				Wife Doesn't Want Child in Next 2 Years			
Variable	Asked for Concealable		Received Concealable		Asked for Concealable		Received Concealable		Asked for Concealable		Received Concealable	
Assigned to Individual Treatment	0.071**	0.062*	0.080***	0.078**	0.139**	0.149**	0.137**	0.143**	0.093**	0.069*	0.100***	0.090**
	(0.034)	(0.036)	(0.030)	(0.032)	(0.060)	(0.066)	(0.054)	(0.058)	(0.040)	(0.041)	(0.034)	(0.035)
Age		0.001		-0.005		-0.014		-0.015		0.002		-0.003
		(0.005)		(0.004)		(0.012)		(0.010)		(0.006)		(0.005)
Husband's age		0.000		0.002		-0.000		0.002		-0.002		-0.001
		(0.004)		(0.003)		(0.006)		(0.005)		(0.004)		(0.003)
Highest schooling completed		-0.003		-0.001		0.001		-0.000		-0.006		-0.003
		(0.005)		(0.005)		(0.012)		(0.010)		(0.007)		(0.006)
Husband's highest schooling		0.001		0.001		0.001		-0.003		-0.002		-0.002
		(0.006)		(0.006)		(0.012)		(0.011)		(0.008)		(0.008)
Number of living children		0.033*		0.033**		0.087**		0.049*		0.034		0.036**
		(0.017)		(0.016)		(0.036)		(0.028)		(0.021)		(0.018)
Difference between husband's and wife's total number of children		0.001		0.012		0.033		0.006		-0.001		0.009
		(0.015)		(0.015)		(0.038)		(0.031)		(0.016)		(0.017)
Ideal number of children		-0.015		-0.011		-0.018		0.001		-0.014		-0.007
		(0.012)		(0.010)		(0.025)		(0.023)		(0.015)		(0.013)
Husband's ideal number of children		-0.003		-0.001		-0.019		-0.010		-0.008		-0.008
		(0.009)		(0.009)		(0.012)		(0.011)		(0.011)		(0.009)
Currently using IUD, injectable or implan		0.216***		0.247***		0.203***		0.198**		0.207***		0.228***
		(0.042)		(0.042)		(0.075)		(0.075)		(0.046)		(0.047)
Average monthly income		-0.296*		-0.200		0.131		0.231		-0.482***		-0.396**
		(0.177)		(0.172)		(0.618)		(0.589)		(0.175)		(0.162)
Husband's monthly income		-0.055		-0.037		-0.099		-0.052		-0.084		-0.052
		(0.051)		(0.053)		(0.098)		(0.098)		(0.062)		(0.065)
Husband larger ideal family size than wif		-0.007		-0.007						-0.017		-0.017
		(0.012)		(0.010)						(0.014)		(0.012)
Wife understands when she is most fertile		0.009		-0.001		-0.074		-0.053		0.018		0.002
		(0.056)		(0.050)		(0.096)		(0.093)		(0.059)		(0.057)
Wife 40 or older		-0.155**		-0.066		-0.032		0.006		-0.163**		-0.078
		(0.075)		(0.071)		(0.173)		(0.156)		(0.081)		(0.078)
Constant	0.264***	0.178	0.210***	0.191	0.235***	0.542**	0.176***	0.448*	0.272***	0.267	0.214***	0.261
	(0.021)	(0.151)	(0.020)	(0.147)	(0.038)	(0.252)	(0.035)	(0.232)	(0.025)	(0.170)	(0.023)	(0.166)
Observations	836	836	836	836	217	217	217	217	609	609	609	609

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] A woman either chooses are receives a concealable method if they asked for or received one of the following forms of contraception: IUD, implant or injectable.

[2] The analysis looks at the total sample of individuals that received a voucher, as well as women who didn't want a child in the next 2 years following baseline. All study participants who either answered they didn't know, didn't want any more children, or said they wanted children after 24 months were included in the category "Wife Doesn't Want Child in Next 2 Years."

[3] A method was "asked for" if it was the first contraception mentioned by the study participant on the first visit recorded in the nurses logs. For women with risks such as high blood pressure, some requested options were not feasible for them which is why the second parameter of "received" is included. The received method is the method the woman took away with her when she left the clinic.

[4] Missing values were replaced with a zero and a dummy variable flagging zeroes was included in the regression.

[5] Income has been divided by 1000 to get visible coefficients in the regression analysis.

[6] The sample discussed in this table is the final sample that received a voucher.

[7] Husband demographic and fertility preference information is gathered from the husband's survey.

[8] Wife demographic and fertility preference information is gathered from the baseline survey.

[9] A wife understands when she is most fertile if she says she is most fertile half way between periods.

[10] The difference between the husband's and wife's total number of children captures the number of children from other marriages.

[11] In addition, the regression controls for differences in survey questions .

TABLE VI
Effect of Private Information Treatment on Fertility

Variable	Birth 9-13 Months After Voucher Given [Sample Final Participants]		Unwanted Birth 9-13 Months After Voucher Given [Women Who Want to Wait Longer than 2 Years to Have Another Child]		Unwanted Birth 9-13 Months After Voucher Given IV Specification [Women Who Want to Wait Longer than 2 Years to Have Another Child]	
Assigned to Individual Treatment	-0.022	-0.024	-0.051**	-0.051**		
	(0.019)	(0.021)	(0.022)	(0.025)		
Received a modern contraceptive method (Instrument=Individual Treatment)					-0.538**	-0.594*
					(0.269)	(0.325)
Age		-0.005**		-0.005		-0.004
		(0.002)		(0.003)		(0.005)
Husband's age		0.001		0.002		0.002
		(0.002)		(0.002)		(0.004)
Highest schooling completed		0.001		-0.001		-0.006
		(0.003)		(0.003)		(0.006)
Husband's highest schooling		-0.002		-0.001		-0.002
		(0.003)		(0.003)		(0.005)
Difference between husband's and wife's total number of children		0.011		0.009		0.015
		(0.012)		(0.014)		(0.017)
Ideal number of children		-0.015*		-0.013		-0.007
		(0.009)		(0.011)		(0.014)
Husband's ideal number of children		-0.001		0.000		-0.013
		(0.006)		(0.008)		(0.011)
Currently using IUD, injectable or im		-0.045**		-0.042**		0.034
		(0.018)		(0.020)		(0.050)
Average monthly income		-0.027		0.073		-0.192
		(0.088)		(0.117)		(0.206)
Husband's monthly income		0.039		0.003		-0.045
		(0.058)		(0.050)		(0.080)
Husband larger ideal family size than		0.011		0.009		0.011
		(0.008)		(0.008)		(0.014)
Wife understands when she is most f		0.040		0.016		0.015
		(0.038)		(0.044)		(0.055)
Wife wants a child in first 2 years		0.017				
		(0.023)				
Wife 40 or older		-0.019		-0.037		-0.089
		(0.025)		(0.030)		(0.079)
Constant	0.080***	0.105	0.089***	0.252	0.267***	0.353
	(0.012)	(0.072)	(0.016)	(0.206)	(0.103)	(0.312)
Observations	789	789	574	574	574	574

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:
[1] The wife is asked if she has had a child in the 2 years since she was last surveyed. If that date is 9 to 13 months after the date she was given a value of 1, otherwise she wa given a value of 0.
[2] The analysis looks at the total sample of individuals that received a voucher, as well as women who didn't want a child in the next 2 years following baseline. All study participants who either answered they didn't know, didn't want any more children, or said they wanted children after 24 months were included in the category "Wife Doesn't Want Child in Next 2 Years."
[3] Modern contraception includes use of the pill, IUD, implant, injectable, diaphragm, female and male sterilization.
[4] Missing values were replaced with a zero and a dummy variable flagging zeroes was included in the regression.
[5] Income has been divided by 1000 to get visible coefficients in the regression analysis.
[6] The sample discussed in this table is the final sample that received a voucher.
[7] Husband demographic and fertility preference information is gathered from the husband's survey.
[8] Wife demographic and fertility preference information is gathered from the baseline survey.
[9] A wife understands when she is most fertile if she says she is most fertile half way between periods.
[10] The difference between the husband's and wife's total number of children captures the number of children from other marriages.
[11] In addition, the regression controls for differences in survey questions .
[12] Birth parity is controlled for using a fixed effect on number of children.

TABLE VII
Effect of Private Information Treatment on Long-Term Use of Concealable Method and Fertility

	Full Sample				Husband Desires Larger Family than Wife				Wife Doesn't Want Child in Next 2 Years			
Variable	Using Concealable Method at Time of Follow-up		Had a Child in 14-24 Months Following Baseline		Currently Using Concealable Method at Time of Follow-up		Had a Child in Second Year Following Baseline		Using Concealable Method at Time of Follow-up		Had a Child in 14-24 Months Following Baseline	
Assigned to Individual Treatment	0.009	0.013	0.006	0.007	-0.011	-0.012	0.015	-0.028	0.046	0.049	0.033	0.030
	(0.030)	(0.029)	(0.031)	(0.031)	(0.056)	(0.062)	(0.062)	(0.067)	(0.039)	(0.038)	(0.032)	(0.033)
Age		-0.003		-0.005		-0.007		0.011		-0.001		-0.005
		(0.005)		(0.005)		(0.008)		(0.008)		(0.006)		(0.006)
Husband's age		-0.002		0.002		-0.002		-0.013**		-0.003		-0.001
		(0.003)		(0.004)		(0.005)		(0.005)		(0.004)		(0.004)
Highest schooling completed		0.005		0.001		0.009		0.017		0.004		-0.002
		(0.005)		(0.006)		(0.011)		(0.013)		(0.007)		(0.007)
Husband's highest schooling		0.003		-0.002		0.001		-0.016		0.002		-0.005
		(0.005)		(0.005)		(0.010)		(0.012)		(0.006)		(0.006)
Number of living children		0.034*		-0.030*		0.029		-0.022		0.028		-0.016
		(0.018)		(0.017)		(0.040)		(0.037)		(0.022)		(0.022)
total number of children		0.007		-0.026		-0.016		-0.035		0.007		-0.017
		(0.014)		(0.018)		(0.037)		(0.037)		(0.018)		(0.018)
Ideal number of children		-0.001		0.031**		0.034		0.034		0.003		0.024
		(0.013)		(0.014)		(0.031)		(0.024)		(0.018)		(0.016)
Husband's ideal number of children		-0.012		-0.001		0.011		-0.015		-0.021**		-0.006
		(0.009)		(0.009)		(0.018)		(0.011)		(0.008)		(0.012)
Currently using IUD, injectable or implan		0.161***		-0.019		0.149*		-0.051		0.186***		-0.016
		(0.043)		(0.039)		(0.084)		(0.064)		(0.054)		(0.046)
Average monthly income		-0.255*		-0.047		-1.109***		-0.000		-0.131		0.089
		(0.147)		(0.201)		(0.329)		(0.569)		(0.205)		(0.220)
Husband's monthly income		0.143**		-0.116***		0.295***		-0.154**		0.082		-0.083*
		(0.069)		(0.035)		(0.059)		(0.063)		(0.086)		(0.049)
Husband larger ideal family size than wif		0.002		0.005						-0.009		0.001
		(0.010)		(0.011)						(0.013)		(0.011)
Wife understands when she is most fertile		0.067		-0.061		0.022		-0.083		0.107		-0.053
		(0.054)		(0.044)		(0.103)		(0.099)		(0.070)		(0.055)
Wife 40 or older		-0.035		-0.066		-0.231**		-0.164		-0.022		-0.020
Constant	0.206***	0.168	0.224***	0.281**	0.229***	0.062	0.240***	0.433*	0.221***	0.185	0.192***	0.378***
	(0.024)	(0.122)	(0.018)	(0.116)	(0.042)	(0.223)	(0.041)	(0.218)	(0.028)	(0.154)	(0.023)	(0.138)
Observations	789	789	789	789	206	206	206	206	574	574	574	574

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The wife is asked if she has had a child in the 2 years since she was last surveyed. If that date is 9 to 13 months after the date she was given a value of 1, otherwise she was given a value of 0.

[2] The analysis looks at the total sample of individuals that received a voucher, as well as women who didn't want a child in the next 2 years following baseline. All study participants who either answered they didn't know, didn't want any mo children, or said they wanted children after 24 months were included in the category "Wife Doesn't Want Child in Next 2 Years."

[3] A concealable method was used at the time of follow-up if the woman said she was currently using a concealable method in the follow-up survey

[4] Missing values were replaced with a zero and a dummy variable flagging zeroes was included in the regression.

[5] Income has been divided by 1000 to get visible coefficients in the regression analysis.

[6] The sample discussed in this table is the final sample that received a voucher.

[7] Husband demographic and fertility preference information is gathered from the husband's survey.

[8] Wife demographic and fertility preference information is gathered from the baseline survey.

[9] A wife understands when she is most fertile if she says she is most fertile half way between periods.

[10] The difference between the husband's and wife's total number of children captures the number of children from other marriages.

[11] In addition, the regression controls for differences in survey questions .

[12] Birth parity is controlled for using a fixed effect on number of children.

TABLE VIII
Effect of Private Information Treatment on Follow-Up Measures

Variable	Disagreed on Number of Children with Husband in Follow-up Conditional on Having Disagreed on Number of Children at Baseline	Disagreed on Contraception with Husband in Follow-up Conditional on Having Disagreed on Number of Children at Baseline	Disagreed on Number of Children with Husband in Follow-up Conditional on Having Agreed on Number of Children at Baseline	Disagreed on Contraception with Husband in Follow-up Conditional on Having Agreed on Number of Children at Baseline	Change in Difference of Wife's Perception and Husband's Actual Ideal Number of Children from Baseline to Follow-up Conditional on Wife not Knowing Husband's Actual Ideal Number at Baseline	Discuss Contraception at Follow-up Conditional on Never Discussing Contraception at Baseline	Discuss Contraception at Follow-up Conditional on Discussing Contraception at Baseline
Assigned to Individual Treatment	0.067	-0.007	0.019	0.010	-0.277	0.007	-0.025
	(0.073)	(0.041)	(0.031)	(0.020)	(0.208)	(0.056)	(0.027)
Constant	0.226***	0.075**	0.262***	0.080***	0.026	0.869***	0.895***
	(0.053)	(0.033)	(0.022)	(0.016)	(0.143)	(0.039)	(0.018)
Observations	111	111	678	678	399	181	604

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The sample discussed in this table is the final sample that received a voucher.

Appendix A
Effect of Assignment to Couples Treatment on Attrition
Sample Selected for Participation

Variable	Attrition of Household	
Assigned to Couples Treatment	0.008	0.001
	(0.029)	(0.005)
Age		-0.001
		(0.001)
Husband's age		0.001
		(0.000)
Highest schooling completed		0.000
		(0.001)
Husband's highest schooling		0.001
		(0.000)
Number of living children		-0.000
		(0.002)
Difference between husband's and wife's total number of children		0.002
		(0.003)
Ideal number of children		0.003**
		(0.001)
Husband's ideal number of children		0.002
		(0.002)
Currently using IUD, injectable or implant		0.005
		(0.007)
Average monthly income		0.001
		(0.001)
Husband's monthly income		-0.005
		(0.006)
Husband larger ideal family size than wife		-0.000
		(0.000)
Wife understands when she is most fertile		-0.008**
		(0.003)
Wife 40 or older		0.011
		(0.017)
Date of baseline		0.000
		(0.000)
Constant	0.267***	-2.067
	(0.021)	(1.833)
Observations	1147	1147
R-squared	0.000	0.966

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:
[1] A husband was considered concerned if he gave either of the following responses to the questior "Are there any reasons why you would not want to use family planning, or would not want your wif
[2] Income has been divided by 1000 to get visible coefficients in the regression analysis.

Kutenga Depo Provera na Jadelle mahala pameneapo

Name .....
NRC# .....
Husband's Name .....
Husband's NRC # .....
Date .....
Respondent ID .....
Expires on .....

sponsored by Ministry of Health

**LIMITED TIME OFFER! SEE INSIDE FOR DETAILS*

Ngati mwaleta ka pepala aka ndi NRC card kuli ba Nurse ba Grace Daka ku Chipata Clinic pakati pa 13 ndi 17 hours pa Monday ndi Saturday kufikila pa chi-belu, ti kulonjezani kuti muzalandila:

- Kulandilidwa mofulumila ndipo kuthandiziwa mwamusanga naba sista Grace Daka bamene buyanganila munkani yachilezi kumbali ya azimai mu program yatu iyi.
- kulindilila kosapitilila pa 1 hour tizakupasani mpaso yaulele ngati mwayembekeza kupitilila pa 1 hour
- Njila ya chilezi yoshanga kukwanja (Jadelle) olo nyeleti ya Depo-Provera yokumani-la chaka chimozi yazapasidwa kwaimwe chabe ngati ba Nurse ba Grace Daka baona kuti yakuyenelani kusebenzesa
- mpaso yaulele yosayembekezela yaimwe, muzimai wa pa nyumba, ngati ndimwe woyamba pa azimai ali 50 kuwonana ndi a Grace Daka ndi ka pepala aka.

Kutenga Depo Provera na Jadelle mahala pameneapo

Name .....
NRC# .....
Date .....
Respondent ID .....
Expires on .....

sponsored by Ministry of Health

**LIMITED TIME OFFER! SEE INSIDE FOR DETAILS*

Ngati mwaleta ka pepala aka ndi NRC card kuli ba Nurse ba Grace Daka ku Chipata Clinic pakati pa 13 ndi 17 hours pa Monday ndi Saturday kufikila pa chi-belu, ti kulonjezani kuti muzalandila:

- Kulandilidwa mofulumila ndipo kuthandiziwa mwamusanga naba sista Grace Daka bamene buyanganila munkani yachilezi kumbali ya azimai mu program yatu iyi.
- kulindilila kosapitilila pa 1 hour tizakupasani mpaso yaulele ngati mwayembekeza kupitilila pa 1 hour
- Njila ya chilezi yoshanga kukwanja (Jadelle) olo nyeleti ya Depo-Provera yokumani-la chaka chimozi yazapasidwa kwaimwe chabe ngati ba Nurse ba Grace Daka baona kuti yakuyenelani kusebenzesa
- mpaso yaulele yosayembekezela yaimwe, muzimai wa pa nyumba, ngati ndimwe woyamba pa azimai ali 50 kuwonana ndi a Grace Daka ndi ka pepala aka.

APPENDIX C: Effect of Private Information Treatment on Lost Pregnancies

Variable	Abortions and Miscarriages in 2 Years After Voucher Given [Sample Final Participants]		Abortions and Miscarriages in 2 Years After Voucher Given [Women Who Want to Wait Longer than 2 Years to Have Another Child]		Abortions and Miscarriages in 2 Years After Voucher Given Instrumental Variables Specification [Women Who Want to Wait Longer than 2 Years to Have Another Child]	
Assigned to Individual Treatment	-0.011	-0.008	-0.005	-0.005		
	(0.014)	(0.014)	(0.015)	(0.016)		
(Instrument=Assigned Individual Treatment)					-0.059	-0.059
					(0.166)	(0.187)
Age		0.002		0.002		0.002
		(0.003)		(0.004)		(0.004)
Husband's age		-0.001		-0.001		-0.001
		(0.002)		(0.002)		(0.002)
Highest schooling completed		-0.000		-0.000		-0.001
		(0.002)		(0.002)		(0.003)
Husband's highest schooling		-0.004*		-0.000		-0.000
		(0.002)		(0.002)		(0.002)
Difference between husband's and wife's total number of children		0.008*		0.000		0.001
		(0.005)		(0.005)		(0.006)
Ideal number of children		-0.001		0.004		0.004
		(0.006)		(0.007)		(0.007)
Husband's ideal number of children		-0.008**		-0.005		-0.006
		(0.003)		(0.004)		(0.004)
Currently using IUD, injectable or implant		-0.007		-0.015		-0.008
		(0.017)		(0.016)		(0.030)
Average monthly income		-0.070		-0.052		-0.078
		(0.054)		(0.052)		(0.105)
Husband's monthly income		0.014		0.003		-0.001
		(0.018)		(0.017)		(0.024)
Husband larger ideal family size than wife		-0.002		-0.001		-0.001
		(0.005)		(0.004)		(0.004)
Wife understands when she is most fertile		0.018		0.019		0.019
		(0.027)		(0.028)		(0.028)
Wife wants a child in first 2 years		0.033*				
		(0.017)				
Wife 40 or older		0.014		0.021		0.015
		(0.051)		(0.057)		(0.060)
Constant	0.046***	1.001***	0.034***	0.007	0.053	0.030
	(0.010)	(0.058)	(0.010)	(0.053)	(0.063)	(0.091)
Observations	836	836	609	609	609	609

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The dependent variable is the total count of a woman's miscarriages and abortions since the baseline survey. If a woman did not have any miscarriages or abortions the variable takes the value 0.

[2] The analysis looks at the total sample of individuals that received a voucher, as well as women who didn't want a child in the next 2 years following baseline. All study participants who either answered they didn't know, didn't want any more children, or said they wanted children after 24 months were included in the category "Wife Doesn't Want Child in Next 2 Years."

[3] Modern contraception includes use of the pill, IUD, implant, injectable, diaphragm, female and male sterilization.

[4] Missing values were replaced with a zero and a dummy variable flagging zeroes was included in the regression.

[5] Income has been divided by 1000 to get visible coefficients in the regression analysis.

[6] The sample discussed in this table is the final sample that received a voucher.

[7] Husband demographic and fertility preference information is gathered from the husband's survey.

[8] Wife demographic and fertility preference information is gathered from the baseline survey.

[9] A wife understands when she is most fertile if she says she is most fertile half way between periods.

[10] The difference between the husband's and wife's total number of children captures the number of children from other marriages.

[11] In addition, the regression controls for differences in survey questions .

[12] Birth parity is controlled for using a fixed effect on number of children.

APPENDIX D
Effect of Private Information Treatment on Voucher Use

Variable	Voucher Redeemed [Wife Accurately Predicts Husband's Ideal Number of Children]		Voucher Redeemed [Wife Under Predicts Husband's Ideal Number of Children]		Voucher Redeemed [Wife Over Predicts Husband's Ideal Number of Children]	
Assigned to Individual Treatment	0.116**	0.106**	0.094	0.087	0.083	0.090
	(0.051)	(0.053)	(0.073)	(0.070)	(0.069)	(0.072)
Age		0.010		0.015		-0.004
		(0.009)		(0.010)		(0.014)
Husband's age		0.006		0.001		-0.006
		(0.007)		(0.007)		(0.010)
Highest schooling completed		0.000		0.011		-0.009
		(0.008)		(0.013)		(0.013)
Husband's highest schooling		-0.018*		-0.011		0.004
		(0.010)		(0.014)		(0.014)
Number of living children		-0.010		0.016		0.054
		(0.034)		(0.032)		(0.045)
Difference between husband's and wife's total number of children		0.015		-0.086**		0.115**
		(0.041)		(0.035)		(0.047)
Ideal number of children		-0.007		0.031		-0.033
		(0.033)		(0.031)		(0.024)
Husband's ideal number of children		-0.017		-0.008		0.003
		(0.037)		(0.015)		(0.035)
Currently using IUD, injectable or implant		0.005		0.155*		0.003
		(0.060)		(0.078)		(0.085)
Average monthly income		-0.606*		-0.401*		-0.782
		(0.333)		(0.226)		(0.806)
Husband's monthly income		-0.159*		-0.225		0.104
		(0.084)		(0.320)		(0.140)
Wife understands when she is most fertile		-0.029		-0.118		0.001
		(0.083)		(0.102)		(0.125)
Wife 40 or older		-0.040		-0.309		-0.065
		(0.135)		(0.191)		(0.259)
Constant	0.439***	0.309	0.416***	-0.036	0.442***	0.742**
	(0.030)	(0.202)	(0.047)	(0.297)	(0.055)	(0.319)
Observations	355	355	201	201	222	222

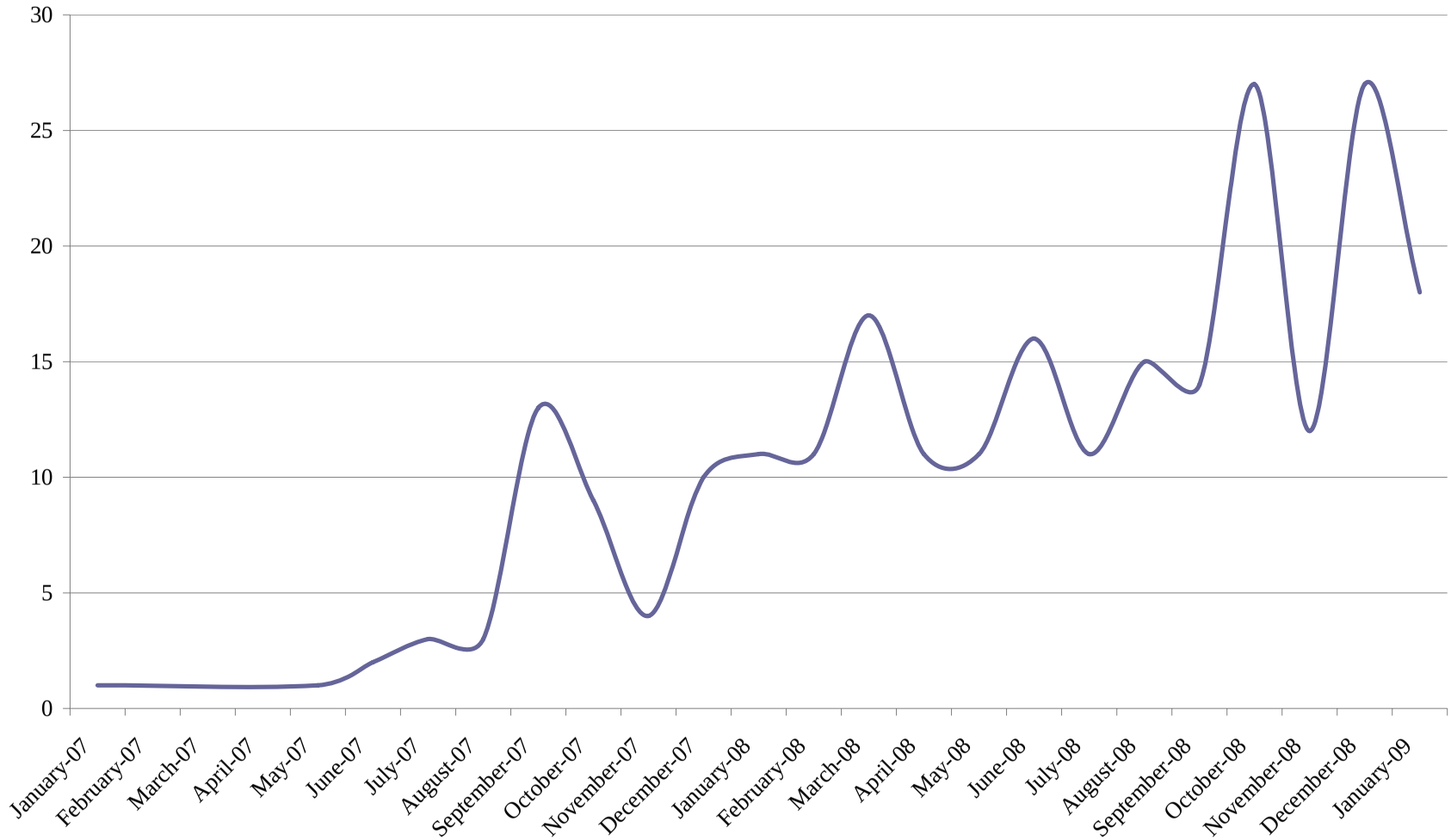
* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The difference measured is the wife's perception of the husband's ideal and her own ideal number of children.

[2] Income has been divided by 1000 to get visible coefficients in the regression analysis.

Appendix F: Frequency of Births by Calendar Month



APPENDIX G
Effect of Private Information Treatment on Voucher Use

Variable	Voucher Redeemed [Wife Accurately Predicts Husband's Ideal Number of Children]		Voucher Redeemed [Wife Under Predicts Husband's Ideal Number of Children]		Voucher Redeemed [Wife Over Predicts Husband's Ideal Number of Children]	
Assigned to Individual Treatment	).116**	).106**	0.094	0.087	0.083	0.090
	(0.051)	(0.053)	(0.073)	(0.070)	(0.069)	(0.072)
Age		0.010		0.015		-0.004
		(0.009)		(0.010)		(0.014)
Husband's age		0.006		0.001		-0.006
		(0.007)		(0.007)		(0.010)
Highest schooling completed		0.000		0.011		-0.009
		(0.008)		(0.013)		(0.013)
Husband's highest schooling		-0.018*		-0.011		0.004
		(0.010)		(0.014)		(0.014)
Number of living children		-0.010		0.016		0.054
		(0.034)		(0.032)		(0.045)
Difference between husband's and wife's total number of children		0.015		).086**		).115**
		(0.041)		(0.035)		(0.047)
Ideal number of children		-0.007		0.031		-0.033
		(0.033)		(0.031)		(0.024)
Husband's ideal number of children		-0.017		-0.008		0.003
		(0.037)		(0.015)		(0.035)
Currently using IUD, injectable or implant		0.005		0.155*		0.003
		(0.060)		(0.078)		(0.085)
Average monthly income		-0.606*		-0.401*		-0.782
		(0.333)		(0.226)		(0.806)
Husband's monthly income		-0.159*		-0.225		0.104
		(0.084)		(0.320)		(0.140)
Wife understands when she is most fertile		-0.029		-0.118		0.001
		(0.083)		(0.102)		(0.125)
Wife 40 or older		-0.040		-0.309		-0.065
		(0.135)		(0.191)		(0.259)
Constant	439***	0.309	416***	-0.036	442***	).742**
	(0.030)	(0.202)	(0.047)	(0.297)	(0.055)	(0.319)
Observations	355	355	201	201	222	222

* significant at 10%; ** significant at 5%; *** significant at 1%.

Notes:

[1] The difference measured is the wife's perception of the husband's ideal and her own ideal number of children.

[2] Income has been divided by 1000 to get visible coefficients in the regression analysis.