Household Bargaining and Excess Fertility: An Experimental Study in Zambia

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December 16, 2012

Abstract

We posit that household decision-making over fertility is characterized by moral hazard due to the fact that most contraception can only be perfectly observed by the woman. Using an experiment in Zambia that varied whether women were given access to contraceptives alone or with their husbands, we find that women given access with their husbands were 19% less likely to seek family planning services, 25% less likely to use concealable contraception, and 27% percent more likely to give birth. However, women given access to contraception alone report a lower subjective well-being, suggesting a psychosocial cost of making contraceptives more concealable.

1 Introduction

The ability to control fertility through modern contraception is one of the most important technological developments of the 20th century, with potentially broad social and economic consequences for women and society. Yet despite the fact that 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] For instance, the overall rate of unmet need in Sub-Saharan Africa was estimated to be 27% in 2006 (Westoff, 2006). Although unwanted births are often treated as evidence of a supply constraint, the fact that high rates of unwanted births occur in settings in which birth control is readily and cheaply available suggests that household demand for children must be a critical factor underlying low levels of contraceptive adoption (Pritchett, 1994).

In truth, the term "unwanted" is potentially misleading, given that household demand for fertility depends on two partners who may disagree about the optimal number of children. Indeed, data from the Demographic and Health Surveys (DHS) indicate that, in many countries, men report larger ideal family sizes than their wives on average (Westoff, 2010). While differences in preferences between husbands and wives have been documented across many domains, leading to a rejection of unitary models of the household (Thomas, 1990; Lundberg et al., 1997; Lusardi, 2009), under standard bargaining models couples can still achieve efficient outcomes (Rangel, 2006; Manser and Brown, 1980; Browning and Chiappori, 1998). However, these models, with a few exceptions, are generally silent on the implications of asymmetric information and hidden action, which can lead to inefficiency (Bloch and Rao, 2002; Anderson and Genicot, 2012; Ashraf, 2009).

The possibility of hidden action is significant in the fertility domain, where many modern contraceptive technologies are used by the wife and unobservable to the husband. Qualitative studies and survey data from Zambia and elsewhere indicate that women frequently hide contraceptive use from their partners (Biddlecom and Fapohunda, 1998; Castle et al., 1999; McCarraher et al., 2005), and concealability is the most cited reason given for the growth in popularity of

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[1] Unmet need is defined by demographers as the difference between the share of women at risk of pregnancy who report wishing to space or discontinue childbearing and the share of women who report currently using a contraceptive method. Unwanted births are defined either, using panel data, as births to women who reported within the past two years that they did not wish to become pregnant within the next two years, or, using cross-section data, as births to women who report ex-post that the birth was undesired.

injectable contraceptives (Kaler, 2000; Gule, 1994).

This paper documents the role of moral hazard in household decision-making over fertility, and presents evidence of inefficiencies in household bargaining around fertility through a field experiment with a large family planning clinic in Lusaka, Zambia. Our experiment provided 749 married women with a voucher guaranteeing free and immediate access to modern contraceptives through a private appointment with a family planning nurse. This included access to the most concealable and highly demanded method, which is often out of stock – injectables. In one condition, the voucher was provided to women alone ("Individual") and required her signature only; in the other condition it was handed to the husband in the presence of his wife and required both of their signatures ("Couple"). The Individual treatment approximates the many family planning programs that target women directly and privately, providing them the opportunity for greater reproductive control (OlaOlorun and Tsu, 2010). The Couple treatment, by essentially giving husbands veto power over contraceptives provided throughout the study, approximates the spousal consent rules governing many family planning services offered through public and private clinics in much of the developing world (Miller et al., 1998).

We use this experiment to investigate the impact on contraceptive use and fertility of spousal consent which reduces the scope for moral hazard – thereby limiting women's ability to meet their own fertility objectives, but also potentially curtailing suspicion and mistrust in the household. We first present a conceptual framework, drawing from a benchmark collective model, to derive predictions for both the long run and the experiment. We subsequently introduce a psychosocial cost to the household of moral hazard in intimate settings, a shading by the husband that arises from aggrievement (Hart and Moore, 2008), and show how the incorporation of this psychosocial cost has distinct long-run implications, which can arise even in the absence of assumptions of commitment and efficiency.

The resulting predictions are supported by the empirical findings from our experiment, which provide evidence of a trade-off between privately improving the woman's set of choices, which may result in contraceptive use outcomes that could improve welfare for herself and her child, and lowering the conjugal value of the marriage. In our experiment, when men were better able to control women's use of family planning services, their wives were 19% less likely to visit a family planning nurse and 25% less likely to use a relatively concealable form of contraception (injectables). Instrumental variables (IV) estimates indicate that use of family planning services

during this period was associated with a 27% reduction in births. These effects were concentrated, as predicted by the theory, among women who wanted to postpone childbearing and also reported having a husband who desired more additional children than they did. Among this subsample, involving husbands in the family planning visit reduced use of injectables by 40%. There was no measurable treatment effect on the remainder of women in the sample.

We also find that responders in the Individual treatment experienced a significant reduction in happiness, health and ease of mind two years after the voucher intervention compared to those in the Couple treatment. While this was not accompanied by more marital dissolution or domestic violence, it suggests a longer-term psychosocial cost to concealable contraceptives that can be mitigated by spousal involvement and is often ignored by programs focused on giving women reproductive control.

On the other hand, we also find evidence suggestive of dynamic inefficiencies in household bargaining over family planning in households even when both spouses wished to postpone child-bearing by at least two years. Such features of the bargaining environment potentially increase the net welfare benefit of placing contraceptives in the hands of women. Giving men more control over contraceptives in settings in which men desire more children than their wives may have the potential to increase not only births that are undesired by the wife, but also births that are undesired by both husband and wife. However, our results also indicate that doing so may lessen the marital tension and strife that the moral hazard problem inherent in contraception creates. Thus, our results provide a cautionary note *both* to male involvement campaigns hoping to change fertility trends and promote family planning and to family planning programs that target women exclusively and promote more concealableforms of contraceptives. The conclusion discusses other first-best options in light of these trade-offs.

2   Context

Our study is set in urban Zambia, where fertility and undesired pregnancy are high. According to the 2007 Zambia Demographic Health Survey (ZDHS), 41% of births in the previous five years were unwanted at the time of conception.[2] However, it is likely that many were unwanted only by the wife. Based on data from a nationally representative 2002 survey of men's family planning

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[2] According to the 2007 ZDHS, the total fertility rate in Lusaka is 4.6 and maternal mortality was estimated to be 1 in 27 nationwide.

attitudes, on average Zambian men want 0.8 more children than their wives (Salem, 2004).

As in many countries in which men have relatively high demand for children, there is significant anecdotal evidence that women hide contraceptive use. Female demand is consequently higher for less visible methods such as injectables, which are superior to the pill in terms of both efficacy and concealability.[3] In a study in Swaziland, for example, injectables and IUDs were reported to be the most popular methods because they do not have to be taken every day and are easy to hide (Gule, 1994). Correspondingly, data from our baseline survey in Zambia indicate that a high fraction of women hide contraceptive use from their husbands. Among the 23% of men who claim they are currently "not doing anything to prevent pregnancy," 59% have wives who separately report using some method of birth control. Furthermore, 77% of women reported preferring "a family planning method that only I know I am using." Likewise, demand for injectables is high: At baseline, 20% of women were relying on injectables, and 37% said they hoped to use them in the future.

In Lusaka, contraceptives – including pills, condoms and injectables – can be obtained through public clinics, private clinics, or pharmacies; however, the price of access fluctuates widely. Injectables have been available in Zambia for many years, but are often either stocked out or pulled out of the market (USAID, 2005).[4] According to a comprehensive assessment of stockouts conducted by USAID, between October and December 2007, 53% of hospitals and health clinics in Zambia were stocked out of injectables for an average of 54 out of 90 days, and 28% were stocked out of contraceptive pills for an average of 35 out of 90 days (Ali et al., 2008). During the time of our study, there were frequent stockouts and very long waiting times at clinics, leading to high variance in supply. According to personnel at the clinic in which we conducted our study,

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[3] Women report hiding their contraceptives through various creative strategies: obtaining them from clinics close to the market while they do their shopping, or hiding them in bags of maize meal, outside under a stone, in their daughter's rooms, in the roofs or with a female friend. In a survey of studies across Africa, documented covert use has ranged from 6 percent to 20 percent (Biddlecom and Fapohunda, 1998). According to Kaler (2000), "The desire for women to gain control over the means of regulating their fertility and the need for this seizure of control to be invisible to the eyes of the husband... led to the dominance of the Depo-Provera injection, the most private of all available methods." Zulu (1998) explains one woman's predicament in Malawi: "She said she could not go for sterilization since the hospital requires the husband's approval. She ruled out pills because it woud be easy for the husband to catch her since pills are taken every day. She thought the injection was the best option for her since it is administered once in three months, and she could lie to her husband that she went to the hospital for a vaccine."

[4] Until the mid-1990s, most women who used modern family planning methods used either oral contraceptives or the condom. Interventions sought to expand contraceptive choice, in particular working to overcome long-standing biases against injectables, which had essentially been banned in the country since 1982. This led to increased take-up of all methods and injectables (registered in 2004) were found to be particularly popular (Depo-Provera, 2011).

the year before our study injectables were out of stock more than half of the time.[5] Although patients could purchase injectables outside of the clinic and bring them in to be administered, nurses reported that average wait times for family planning visits were typically more than 2 hours, and often approached 3-4 hours.

Though spousal consent was required by law until 2005, women are no longer officially required to have their husbands' approval in order to obtain contraceptives through public clinics in Zambia. Anecdotally, however, 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 has been reported in urban areas as well (Osei-Hwedie and Osei-Hwedie, 1992). Similar practices have been documented in other African countries (Miller et al., 1998).

Perhaps because of spousal consent practices, men are generally aware of the existence of injectables. In the 2007 ZDHS, 75.1% of men knew about injectables despite the fact that only 18.8% of women had ever used them (Central Statistical Office, 2009). However, women likely have more precise information than men regarding current availability, since husbands rarely visit the clinic.

There is anecdotal evidence that suspicion over hidden contraception has contributed to increased marital tension in some households (Kaler, 2000). According to Chikovore et al. (2002), couples engage in a process of "hide-and-seek," where "women acquire and use contraceptives secretly while men search for evidence of use." In in-depth interviews we conducted with women drawn from the same population as our study sample, women stressed the challenge of husbands generally being suspicious. As one woman described, "women are ever worried, especially those on pills because it's not easy to hide pills in these small houses of ours. For the injectables, they are less worried because a man can not easily tell unless he pushes/pressures you as to why you are not conceiving."

3   Conceptual Framework

We provide a basic conceptual framework with which to analyze what occurs when women's decision rights over contraception are curtailed by spousal consent rules (which shut down moral

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[5] Interview, Nurse Grace Daka, Chipata Clinic, July 2009.

hazard), both in our experiment and in the long run. This distinction is important because, when women were given more autonomy over contraceptive choice in the context of our experiment, husbands' beliefs about their wives' ability to access contraception were also potentially altered.[6] We think of the long run as the point at which the supply of injectables has become sufficiently widespread and consistently available that the scope for moral hazard is transparent to all parties. Although testing for long-run predictions is outside of the scope of this paper, it is useful to have a framework for thinking about them in order to interpret our results.

We begin by deriving predictions based on a collective bargaining model (Browning and Chiappori, 1998; Chiappori et al., 2002), with the fundamental assumption that spouses can bargain efficiently. To provide a benchmark, we assume that utility is transferable within the household, and remain agnostic as to which bargaining solution is used.[7] We also assume a fixed distribution of bargaining weights, and predict how moral hazard affects outcomes given this fixed distribution.[8] We make predictions for both the experiment and the long run, using this benchmark model. We then introduce a particular cost to the household of moral hazard in intimate settings, a shading by the husband that arises from aggrievement (Hart and Moore, 2008), and show how the incorporation of this psychosocial cost has different long-run implications. In the Online Technical Appendix, we show mathematically how this can arise even in the absence of commitment and transferable utility via a noncooperative bargaining model with moral hazard where efficient bargaining is not assumed.

3.1 Bargaining Efficiently

Although traditionally collective bargaining frameworks have ruled out informational frictions of the kind generated by moral hazard, we can use as a benchmark case what we might expect

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[6] In particular, husbands in the Individual condition knew about the existence of injectables but did not necessarily know that their wife had free and guaranteed access to them, whereas in the Couple condition the husband and wife had the same beliefs about access. Importantly, our setting is one in which both men and women knew of the existence of concealable contraceptives (injectables) prior to our study but the supply of injectables was very limited and erratic.

[7] See for instance Manser and Brown (1980) and McElroy and Horney (1981) for models of cooperative bargaining in which explicit bargaining concepts are analysed.

[8] It is plausible that one effect of increasing moral hazard is to increase the bargaining weight of the wife, although this is not certain. This could lead to a type of dynamic inefficiency, where even if there is agreement on the wife's most preferred option in the first period (here, not having a child), the husband wants to avoid any contraception that introduces moral hazard as it could affect her bargaining power in the second period, and thus the couple may reach an inefficient outcome. We find evidence suggesting this outcome, described in the Results section.

if spouses were able to redistribute surplus amongst themselves efficiently in the face of a moral hazard constraint. Suppose that the choice that needs to be made is whether the wife should use contraception. We are interested in the case in which the wife does not prefer to have another child while the husband does.

Case 1: Contraception is Pareto-efficient   Consider first the couples for which the Pareto-efficient choice *absent moral hazard* involves using contraception. This happens whenever the wife's net increase in payoff from not having another child (including the various costs of acquiring and using contraception) is greater than the husband's net decrease in payoff. The collective paradigm assumes that the couple coordinates on using contraception and the husband receives some form of compensation. Since the couple, absent moral hazard, coordinates on the wife's *most preferred choice* (that is, since there is no tension between the wife's preferences and what the "marital contract" is designed to have her do), there is no reason to anticipate that, when this decision is instead not observable, the couple would coordinate on inducing the wife to not use contraception. As there is nothing to prevent the couples in question from taking the efficient action, they will take contraception whether it is observable or not. Importantly, thus, we expect no differences across the Individual and Couple groups in take-up of contraception for these couples.[9]

Case 2: No use of contraception is Pareto-efficient   Consider now the couples for which the Pareto-efficient choice *absent moral hazard* is not to use contraception; that is, the wife's net increase in payoff from not having another child (including the various costs of acquiring and using contraception) is lower than the husband's net decrease in payoff. While the exact outcome of introducing moral hazard clearly depends on the employed bargaining solution and the spouses' preferences towards risk, we may nevertheless reach several conjectures.[10]

Note first that the non-observability of contraception use tends to make intra-household bargaining less efficient (simply by reducing the number of contractible contingencies) since these couples are coordinating on the wife taking her *least preferred option*. Given these inefficiencies,

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[9] In the Individual treatment, showing her husband the voucher may lead to a renegotiation in favor of the husband and thus she may prefer to remain silent, use the contraception and make the transfer as agreed upon in the status quo. In the Couple treatment, she may need to provide him more transfers. Her payoffs then would be higher in the Individual condition.

[10] We describe below one reduced-form way of introducing moral hazard, with risk neutrality.

it follows that the larger the scope for moral hazard in the long run, the (weakly) lower the surplus created by the couple. Because of this, more of these couples should either start using contraception or revert to their outside options (for example, the payoffs under divorce or the payoffs accruing in a noncooperative outcome (Lundberg and Pollak, 1993). Said differently, contraception take-up should increase in the long run together with moral hazard, if moral hazard is not so severe that couples start separating.[11]

3.2   Costs of moral hazard

One specific way to incorporate moral hazard into a collective model that, although reduced form, yields insight, is through a psychosocial cost that reduces the surplus of the couple. We allow the husband to feel aggrieved and act as a "difficult" husband, depending on his level of suspicion concerning the wife's use of contraception. Although injectables are virtually unde-tectable, his suspicion should increase as time goes by without his wife conceiving. The language of aggrievement is taken from Hart and Moore (2008), where becoming a "difficult" husband in our setting is what Hart and Moore model as ex-post uncontractible shading. In our setting, the informal contract makes clear the expectation of childbearing as part of the marital arrange-ment, a strong cultural norm. The husband can become "aggrieved" when these expectations for children are not met (or not met quickly enough) when there is a possibility for shirking by the wife. Shading thus arises here from the suspicion that the reason for not having a child is shirking, and not bad luck.[12]

The perception that a partner could be keeping something private can create a feeling of distrust and social exclusion, which then translates to worse emotional outcomes for the partner perceived as concealing (see, for a review, Williams (2007)). This is supported by qualitative work we conducted with study subjects several years after the experiment in which we asked a representative sample of 30 men how they would interpret a voucher for family planning services

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[11]In our case, we do not find evidence of treatment effects on separation or violence.

[12]Shading here is thus based on the subjective probability of an unobservable action (that is, contraception), while it comes from an observable price in Hart and Moore (2008). If the husband and wife can transfer utility contingent on the birth of a child, they can write a contract that implements no use of contraception even in the absence of shading. Thus, if the husband's shading decision is based on his rational belief, he will not shade under such a contract and shading will be irrelevant in equilibrium. There are two potential reasons why this might not be the case: 1) The couple cannot write a child-contingent contract, as in the noncooperative model below, or 2) the husband has an "automatic"/hard-wired response of feeling aggrieved to expectations not being met. This hard-wired response is predictable and based, as we describe below, on his subjective probability that the reason for expectations not being met is contraceptive use (and not bad luck, for example).

being handed to them, showing them a replica of the voucher used in the experiment. They talked of a feeling of being "not excluded from something that belongs to me too" and having "control over her visit to the clinic because if I don't get involved she might get birth control for 5 years while I still want to have children." The inclusion of men gives them more control – and hence ability to obstruct women's choices – but at the same time the psychological benefit to the husband can have positive spillovers on the wife.

If the couple had coordinated on not using contraception and having another child, the presence of this effect of moral hazard would lead the husband to become increasingly aggrieved as his wife does not conceive, suspecting that she is using contraception and shirking their contract – and thus impose a loss on the wife.

Of course, the husband has to feel confident enough that the wife's shirking/taking contraception is the reason for a delay in conception. That will be the case only when the scope for moral hazard is high enough (say because the supply of contraceptives is known to be high). She might use contraception as long as he does not (sufficiently) suspect. Thus we would observe couples who would not have used contraception absent moral hazard, but who use contraception once the scope for moral hazard increases. However, if suspicion and aggrievement is high enough – for example, if the supply of injectables becomes guaranteed and widespread while men's expectations of the marital contract (reference point) remains constant – contraceptive use could easily revert back to baseline levels in the long run.

3.3 Aggrievement in a non-cooperative model

Interestingly, the model of aggrievement, and its results, do not require assumptions of commitment, transferable utility, or even efficiency. In the Online Technical Appendix, we analyze a model of how aggrievement arises in a non-cooperative game, in which husband and wife cannot reach binding agreements (i.e., each spouse's action is a best response to the other spouse's action). Aggrievement is in this case precisely ex-post noncontractible shading. The predictions for the experiment itself are similar to those of the cooperative model above. In the long run we assume, as above, that the husband has the right beliefs concerning the scope for moral hazard.[13] We find a possibility that, among couples with misaligned preferences for fertility, increased sup-

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[13]Note that, in all cases, men being aware of the enhanced ability to access injectables actually increases moral hazard, since injectables are practically undetectable.

ply of concealable contraceptives past a certain threshold could generate a mistrust that leads to welfare losses for *both* husband and wife, akin to Akerlof (1970). This ultimately could lead to less use of injectables overall and lower subjective well-being for both parties in the long run.

3.4 Mapping predictions to the experimental setting

In the experiment, the scope for moral hazard was not known to both parties in the Individual treatment: Although husbands knew about the existence of injectables, it was only in the Couple treatment that they knew with certainty that the availability of injectables was guaranteed for their wife. Under both a collective and a noncooperative model, because of a simple revealed preference argument (the wife could choose to turn over the voucher to the husband or use it in the Individual condition), and because the husband has decision rights over the use of the voucher in the Couple group, we would predict that contraceptive use and welfare would be higher for women in the Individual treatment than in the Couple treatment. Although we cannot test for the long-run predictions of the framework without a different experiment, we can use follow-up data from our experiment to shed light on what mechanisms might be at play in the long run by testing for psychosocial costs. Our framework predicts greater aggrievement arising from the enhanced scope for moral hazard that increased supply creates among couples with misaligned preference. In the long run, as injectables become widespread, a potential outcome is that the use of injectables would slow down and fertility would either remain the same or increase, depending on the extent of the aggrievement from husbands and its spillovers on women's well-being.

4 Experimental Design and Data

This section describes the sample for the field experiment, the survey data gathered, and how we implemented the experimental conditions above and measured their impact.[14]

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[14]This experiment is part of the larger Zambian Contraceptive Access Study (ZCAS). Ashraf et al. (2012) explores the implications of lowering the price of contraception in the combined treatment group compared to a control group that did not receive the voucher, while this paper focuses on the difference between the Individual and Couple Treatment arms, which were randomized as a second stage of the study.

4.1 Sample

We recruited subjects from the catchment area of Chipata Clinic, a large government clinic that serves low-income "compound" neighborhoods in Lusaka. Community health workers (CHWs) from the clinic were hired to recruit subjects through home visits. Married women of childbearing age (18-40) were invited to participate in the study if they: (1) currently lived with their husband; (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; (5) were not known to have health conditions for which hormonal contraceptives are contraindicated; and (6) agreed to participate in a survey and information session about family planning together with their husband.[15] Although the voucher intervention only required the husband's presence in the Couple condition, criteria (6) was imposed on all subjects in order to prevent higher rates of attrition among those assigned to the Couple condition relative to those in the Individual condition. Recruitment was conducted in two stages using two different sampling frames during July 2006 to April 2007, described in detail in the Online Appendix.

Figure 1 illustrates the stages of our experiment, with relevant sample sizes. The experiment consisted of a baseline survey in the first visit administered solely to the wife, during which an appointment was made for a second visit with both the wife and husband. Treatment (Individual versus Couple) was then randomly assigned.[16] Among the 1031 women eligible for inclusion in the experiment, 749 participated, including 371 assigned to the Couple treatment condition and 378 assigned to the Individual condition. Figure 1 shows the breakdown of reasons for non-participation. Non-participation overwhelmingly reflected resource constraints on the part of the investigators and a strict timeline for completion of the study, both of which caused us to halt recruitment efforts before all households could be reached for a second visit.

Given that recruitment was double-blind, drop-out happened before assignment was revealed to either subjects or enumerators. Hence, it is safe to assume that factors determining non-participation were orthogonal to treatment assignment.[17] Correspondingly, rates of non-participation were almost identical across treatment arms (28.4% in the Couple arm and 26.2%

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[15]Each of these inclusion criteria was screened by the CHW during recruitment visits. In addition, women were thoroughly screened for health conditions for criteria 3 and 5 if and when they visited the family planning nurse at Chipata clinic. Disqualifying health conditions included diabetes, heart disease and high blood pressure.

[16]Our choice to balance treatment assignment on baseline characteristics prevented us from randomizing earlier.

[17]Importantly, no subjects dropped out of the study mid-way through the second visit, which was when treatment assignment was revealed.

in the Individual arm). Table 1, which reveals that treatment arms in the final sample (excluding non-participants) remained balanced on all observables, provides further evidence that non-participation was independent of treatment assignment.[18]

Approximately two years later, we conducted a follow-up survey using the strategy described in Thomas et al. (2001) to track movers. In total we re-interviewed 94% of individuals, leaving a final sample of 706, and only 1% of study subjects could not be accounted for (an additional 3% had passed away and 2% refused).There were no significant differences in attrition rates at follow-up across treatment arms.

4.2 Baseline Survey

Our baseline survey and voucher intervention for both treatment groups took place between March and June 2007. At the first household visit, a team of one enumerator and one CHW administered the baseline survey to wives only ("First Visit", Figure 1). 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. Eligible women gave consent to participate and were administered a one-hour survey in their homes that collected detailed information about marriage and childbearing, fertility preferences, decision-making in the household, and 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.[19] 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.

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[18]Although this non-participation is not a threat to internal validity, it could still affect external validity: some amount of non-participation may reflect subjects' tacit unwillingness to participate in the study. However, the direction of bias due to this type of sample selection is unclear. See Online Appendix Section on Sampling and Online Appendix Table 2 for discussion.

[19]CHWs all had previous experience working with the clinic to implement information campaigns and homecare programs. The script containing the information covered in this visit is provided in the Online Appendix Section 3.

4.3 Experiment

The key experimental manipulation took place during a second visit in which all households received the voucher described above that guaranteed minimal wait time and access to injectables and implants.[20] Prior to this visit, all women were randomly assigned to either the Couple or Individual condition, which determined whether they were given the voucher alone (Individual) or together with their husband (Couple). Treatment group was assigned dynamically within batches of surveys collected from enumerators approximately daily.[21]

The experimental protocol was as follows: when the field team arrived at the couple's home for the second visit, the couple was told that the team would be conducting short surveys of each spouse. To ensure confidentiality, they were surveyed separately and in private. The husband's survey primarily gathered information on fertility preferences and income. The wife's survey contained only questions about whether she had visited a clinic since the previous visit and whether she had seen or heard about the voucher.[22]

Treatment assignment was revealed to the survey team when they removed the survey instrument from the pre-labeled envelope at the start of the interview. In both cases, first the husband was surveyed alone, then the voucher was given out, then the wife was surveyed alone. The difference is that in the Couple condition, the husband and wife received the voucher together, with the voucher given to the husband, whereas in the Individual condition, the wife was given the voucher in private.[23] Based on responses to debriefing surveys conducted among 48% of women in our study, we estimate a 1.1% rate of non-compliance with treatment assignment. Throughout the paper we consider only treatment assignment rather than treatment received.

Table 1 presents summary statistics on a wide range of variables available in the baseline

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[20]Sufficient condoms, pills, and IUDs were already available at the clinic. To keep waiting lines short we spaced the voucher intervention over 4 months, distributing about 50 vouchers per week. One injection lasted 3-4 months.

[21]Randomization was done using the minmax t statistic method (Bruhn and McKenzie, 2008), with treatment assignment 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.

[22]The main purpose of re-surveying wives in this visit was to have women alone so that those assigned to the Individual condition could be given the information session and voucher privately. Compensation for participation was given to the husband and wife separately.

[23]In the Couple condition, both the husband's and wife's names were written on the voucher and both their national ID numbers were required; in the Individual, only the wife's name and national ID number were required. The protocol is described in depth in the Online Appendix. CHWs and surveyors were responsible for ensuring adherence to the protocol, monitored daily by supervisors.

broken down by treatment assignment. Panel B describes summary statistics for the variables that were used to balance assignment across the treatment arms, hence, means of these variables are predictably very similar across these two groups. Out of 29 variables not used to balance the sample there are no differences in means that are statistically significant or large in magnitude, indicating that treatment assignment was balanced.

4.4 Clinic Take-up Data

To keep track of visits women made to the family planning clinic to redeem their voucher, the nurse hired for the study kept daily visit logs. 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 ID cards to the clinic at the time of the visit for the nurse to verify.[24] For each woman who came to the clinic to redeem a voucher, the nurse verified her identity, discussed family planning alternatives, and prescribed her desired method of contraception after screening for contraindications. Detailed logs of each visit recorded the date and time of visit, the name and National Registration Code (NRC) number of the woman, the ID number of the voucher, and the desired, prescribed and received family planning method. Official expiry date of the last voucher was June 23, 2007.

4.5 Follow-up Surveys

To study the impact on fertility of birth control access provided through our study, we conducted a follow-up survey approximately two years after the baseline. The follow-up survey contained detailed questions on reproductive histories over the past two years, as well as questions about respondents' marital status and current health and well-being.[25] In addition, we collected extensive qualitative data at the time of the follow-up survey, in focus groups with subsets of participants (men and women separately) in July 2010, and in an additional round of individual interviews in June 2012 about factors that influenced a respondent's decision to redeem the voucher and,

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[24]These data were also cross-checked with two additional sources: 1) 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 were reported in the nurse's logs; 2) enumerators conducted a short debriefing survey with each woman in the study as she exited the clinic after her family planning visit. We found no vouchers for women who completed debriefing surveys who were not recorded in the nurse's log.

[25]Continuation after the first voucher redemption for the rest of the year was low, in large part because of an injectable scare which interrupted all supply, detailed in Ashraf et al. (2012). Thus, we focus in this paper only on contraceptive and fertility outcomes directly a result of the redemption of the voucher.

for men, their interpretation of receiving the voucher.

5 Results

In the results that follow, we estimate a linear probability model with the following ordinary least squares (OLS) regression:

$$Y_i = a + \beta I_{MH} + \omega v X_i + e \tag{1}$$

where Y_i is the binary outcome variable of interest; I_{MH} is an indicator for assignment to the Couple condition; and X_i is a vector of controls from the baseline survey, including: husband's and wife's age, husband's and wife's education, husband's and wife's income, husband's and wife's existing and ideal number of children, whether wife was using contraception at baseline, whether wife was over 40, whether wife was aware of her most fertile period of the month, difference between the husband and wife's total number of children, difference between husband and wife's preferences for number of children, months since last birth, and dummy indicators for compound of residence within the catchment area. We show all results with and without a long list of demographic controls detailed in the table notes. Tables 2-5 present experimental results on the impact of assignment to the Couple treatment arm on voucher and injectable take-up, and various indicators of female well-being.

We also refine our empirical predictions to better fit the conceptual framework motivating our analysis by isolating the subsample of couples for whom we should expect the privacy condition to influence contraceptive behavior. In particular, moral hazard only pertains to couples in which incentives to have children are misaligned. That is, based on the conceptual model motivating our research design, we expect to see differences in outcomes only among couples that currently disagree over whether or how quickly to have another child such that the man has a lower demand for birth spacing in the immediate future. We classify such women as potential "responders" to our treatment if they satisfy the following two criteria: (1) she does not want to get pregnant in the near future,[26] and (2) she believes that her husband desires more *additional* children than

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[26]A woman is considered to have unmet need for contraception if she: (1) is married or in a consensual union; (2) is of reproductive age; (3) is capable of becoming pregnant; and (4) 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. We use two questions from the baseline survey data to identify women who meet the fourth

she does at the time of the beginning of the study.[27] While there is no reason to anticipate a response to treatment among women who do not meet the criteria for potential responders, it is important to note that there are many potential sources of measurement error in the variables used to classify women as responders that are likely to lead us to underestimate the number of potential responders in the sample. For instance, women's reported fertility desires may reflect family planning objectives given the availability of contraceptives at baseline rather than under the hypothetical "ideal" circumstances that they were asked about. Also, women may have substantial uncertainty regarding their husband's fertility preferences, and thus, for instance, may conceal contraceptive use even when they guess that their husband does not want more children if they assign some probability to his deciding to have another child.

5.1 Voucher and Contraceptive Use

5.1.1 Voucher Take-up

In total, 48% of women redeemed the voucher for family planning services. While 53% of women in the Individuals treatment redeemed the voucher, the rate was only 43% in the Couple treatment arm, a 19% reduction in use. Table 2 presents corresponding regression estimates of the effect of private information on voucher redemption, which verify that the difference is significant at the 5% level with and without controls (Column 1, Panels A and B).

Among the subset of potential responders, which encompasses a mere 23% of the sample, women are 25% less likely to use the voucher in the Couple treatment (significant at the 5 percent level). Meanwhile, the point estimate is half the size and insignificant among the predicted non-responders, although the difference between responders and non-responders is not statistically significant (Columns 6 and 7, Panels A and B).

To gain confidence in our interpretation that this difference in voucher take-up is indeed due to a difference in opportunity for hiding contraceptive use in the Individual treatment, we use in-depth interviews conducted in conjunction with the follow-up survey to learn what women

criteria at the time of the study: "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 wanting to give birth within two years for either of these questions.

[27]Since we are interested in how the wife responds to gaining asymmetric control over guaranteed access to contraceptives, we use her beliefs about her husband's preferences rather than his stated preferences. To cast as wide a net as possible regarding disagreement, we include couples in which the man states a higher preference for either the ideal or maximum desired number of children.

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 discouraged them from using it.

Using these responses, we identify respondents in the Individual treatment who redeemed the voucher without their husband's knowledge because they believed he would otherwise not have let them use it. That is, according to our analytical framework, the difference in the 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. We hand-coded each observation, making use of all responses to questions in this section, and classify respondents' motives conservatively such that we only report a woman as hiding from her husband when she makes explicit reference to hiding.[28]

Identifying these respondents allows us to directly estimate the fraction of the treatment effect on voucher redemption that can be accounted for by greater reported ability to conceal. In total, among women in the Individual condition who used the voucher, 11% admit that they did so behind their husband's back because he would not have let them redeem it, and another 5% appear to have misrepresented the voucher offer in order to convince their husbands to let them use it. The first category alone implies a 6 percentage point difference in voucher redemption across treatment arms. If we also include cases of misrepresentation, this accounts for an 8.5 percentage point difference in voucher use. These numbers imply that hiding vouchers from disapproving husbands alone explains 60-85% of our estimated treatment effect. Among the responder subsample, women in the Individual treatment who admit in qualitative interviews to redeeming the voucher without their husband's knowledge explain 61% of the estimated treatment effect.

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[28]For example, the following woman who was in the Individual treatment was coded as hiding: "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 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. I did not talk about the voucher with my husband."

5.1.2 Injectable Take-up

We next turn to the effect of male involvement on take-up of injectable contraceptives.[29] Given that injectables are considered more concealable than other methods of contraception, husband involvement should have an especially large negative effect on their use. The estimates in Column 2 (Panels A and B) of Table 2 reveal that take-up of injectable contraceptives is 25% (6.0 percentage points) lower among women in the Couple condition and that the difference is statistically significant at the 5% level.[30]

These numbers imply that the rate of injectable take-up is disproportionately high among voucher users, which we can infer from the fact that 46% of Individual voucher users received injectables compared to only 43% of those in the Couple treatment. Using women in the Couple treatment's rate of take-up of injectables as the counterfactual, this implies that, among the 19.1% of women who were encouraged by the privacy condition to redeem their voucher, the rate of concealables is 59%.[31]

Among the responder subsample the difference is even starker: Women are 47.9% (13.6 percentage points) less likely to take up a concealable form of contraception when it is observable to the husband, indicating that 85.3% of women who are encouraged to use family planning services by the privacy condition demand injectables, compared to only 31.3% of responders in the Couple condition (Table 2, Columns 5 and 6, Panels A and B). That is, virtually all women in the responder subsample that use the voucher only when it is offered in privacy go home with injectables, or 2.7 times as many as would otherwise.[32] With respect to take-up of injectables, there is no difference according to treatment condition among women identified as

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[29]Based on values recorded in the nurse's logs, we construct an indicator variable equal to one if the woman received injectable contraceptives at the time of her family planning visit.

[30]The results are robust to expanding the definition of relatively concealable methods to include contraceptive implants and IUDs, both of which are used very rarely by women in our sample. Only 23 women chose to take up implants through the voucher, compared to the 160 that took up injectables.

[31]In total, 18.3% of women in the Couple treatment received injectables. Since 42.8% of women in the Couple treatment redeemed their vouchers, this is an average injectable take-up among voucher users of 42.8%. The rate of 59% injectable usage among marginal voucher users comes from decomposing the average rate of injectable take-up among the Individual voucher users (45.9%) into a weighted sum of the take-up rate among the 80.9% of "unconditional" voucher users plus the 19.1% of "marginal" voucher users users implied by the difference in rates of voucher use between treatment arms. In particular: $0.809(0.428) + 0.191(0.590) = 0.459$

[32]Among this subsample, 14.8% of women in the Couple treatment received injectables. Since 47.3% of women in the Couple treatment redeemed their vouchers, this is an average injectable take-up among voucher users of 31.3%. The rate of 85.3% injectable usage among marginal voucher users comes from decomposing the average rate of injectable take-up among the Individual voucher users (44.9%) into a weighted sum of the take-up rate among the 74.8% of "unconditional" voucher users plus the 25.2% of "marginal" voucher users implied by the difference in rates of voucher use between treatment arms. In particular: $0.748(0.313) + 0.252(0.853) = 0.449$

non-responders, and the difference in treatment effect estimates between responders and non-responders is statistically significant.

5.1.3 Inefficient Outcomes?

We then restrict the sample to households in our study in which *both* the husband and wife wish to avoid childbearing over the two years between baseline and follow-up, and test whether, among this subset, assignment to the Couple treatment is associated with a reduction in unmet need for contraception and unwanted children. Note that this subset encompasses both potential responders (although the husband and wife agree on not having kids in the next two years, the husband still desires more additional children than his wife) and non-responders (all other couples). This subsample is interesting because it allows us assess whether discordance in spousal preferences discourages men from using the most effective from of contraception even when they would rather postpone child-bearing, and thereby increases the rate of births that are unwanted (at least in terms of timing) by *both* the husband and wife. If so, this suggests dynamic inefficiencies in the underlying bargaining model that could arise for various reasons. These results are presented in Table 3.

Note first that the majority (63%) of couples who disagree about how many additional kids to have agree on waiting at least two years to have their next child. However, subgroup analysis reveals that, even among couples for whom short-term fertility goals are aligned, take-up of family planning services and use of injectables is significantly higher when women are assigned to the Individual condition. That is, even when neither partner wishes to have a child in the near future, men discourage their wives from using injectables. As predicted, among this subset of couples, the effects are driven entirely by households in which the husband desires more children than his wife (although he still prefers to space them, by virtue of the fact that he claims to not want children within next two years).[33] Strikingly, among these couples, women are twice as likely to redeem the voucher and three times as likely to choose long-acting hormonal methods when they are assigned to the Individual treatment, despite the fact that neither spouse wants to become pregnant. As before, when spouses agree on the number of children to bear, there is no effect on take-up of hormonal methods (Table 3, Columns 5 and 6).

Even more surprisingly, the magnitude of the estimate among this subset of responders implies

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[33]Note that this subset corresponds to a subset of our responder sample.

that *most* of the increase in contraceptive use occurs among households in which both spouses wish to avoid pregnancy in the short run. One interpretation of this pattern, which is consistent with our conceptual framework, is that a wife may have less scope for postponing the next birth when her husband is eager to have another child because his suspicion will be greater when she fails to get pregnant. In terms of the model of aggreivement we outlined in the previous section, the level of aggreivement in the household has already reached a critical level so as to tip her preferences in favor of satisfying her husband's fertility desire. Hence, it is only in cases in which she believes he will not mind (or even would prefer) a delay that she feels there is scope for concealment. In this case, both spouses are actually "better off" – at least in terms of avoiding unwanted births – when the wife is given scope to choose birth control without her husband's permission. However, the question of why husbands who wish to avoid pregnancy discourage their wives from using the cheapest and most effective method of birth control remains.[34]

Regardless of the explanation, we take this pattern as strong evidence of an underlying inefficiency in household bargaining over fertility. Even if the household is able to achieve static efficiency, this suggests some type of dynamic inefficiency. In the context of our experiment, in which we unambiguously lowered the cost per unit of protection by hormonal methods relative to traditional methods of birth control, men's reluctance to adopt the cheaper *and* more effective technology suggests that they are willing to pay a significant price in terms of optimal birth timing in order to maintain control over reproductive outcomes and thereby circumvent the moral hazard issues inherent in utilization of methods that they cannot perfectly observe.

5.2 Fertility

We next quantify the effect of reducing the scope for moral hazard on fertility. Since husband involvement lowered take-up of long-term contraceptive methods in the short run, but we do not have reliable data on continuation rates (which were reportedly low), we concentrate on birth rates 9-13 months after a respondent received a voucher. The largest difference in birth control patterns between treatment arms is use of injectables, so this time period reflects the period over which most women were protected by the birth control received from the treatment. As long as there was little substitution towards contraceptives outside of the clinic, the difference in the

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[34]One possible source of dynamic inefficiecny that arose in focus groups with study subjects is that men believe women's ability to conceal contraception increases with experience using a particular method, hence they have an incentive to avoid certain methods as long as they foresee future disagreement over child-bearing.

likelihood of giving birth 9 to 13 months after receiving a voucher measures the increased efficacy of concealable methods relative to birth control methods marginal users would otherwise have relied on.

In total, 29% of women gave birth in the two years following our experiment, and 6.8% of women gave birth 9-13 months after they received a voucher. If we define a birth as unwanted if at baseline a woman stated that she did not want to have another child for at least two years (consistent with the standard definition of unmet need for contraception), a remarkable 65% of births in this interval were unwanted.[35]

Fertility patterns over the entire 24 months following the intervention are presented in Figure 2. Here we see a divergence in birth rates between the two treatment arms beginning 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 Couple treatment arm are significantly lower. This pattern indicates 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). Even this small degree of postponement offers a potentially significant welfare benefit for some women and children in a setting in which the average pregnancy interval is 26 months and an estimated 20% of birth intervals are under 15 months. In terms of child health, a number of studies document that neonatal and infant mortality as well as chronic and general undernutrition are decreasing functions of birth interval until 36 months (Rutstein, 2005, Conde-Agudelo et al., 2006).

We next use treatment assignment as an instrument for voucher redemption, and estimate the causal effect of access to contraception provided through our study on births in the subsequent year (9-13 months after the voucher was initially made available). The IV is valid as long as receiving the Couple as opposed to the Individual treatment had no influence on fertility other than through its effect on use of family planning services provided through our study, which we think is reasonable.[36] Coefficient and standard error estimates from the first and second

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[35]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.

[36]The two relevant proximate determinants of fertility to consider in assessing this are frequency of intercourse and use of contraception. Arguably, the only scope for Individual treatment to increase use of birth control is through changes in access provided through the voucher. Meanwhile, there is no reason to anticipate frequency of intercourse to increase among couples unless failure to get pregnant reduces frequency of intercourse, which is unlikely to be the case.

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equation of this bivariate probit estimation are presented in Columns 3 and 4 of Table 2.[37] The total vector of control variables described above was included in the IV estimation. Using this estimation to generate predicted values of births based on using the voucher, we calculate the Average Treatment Effect (ATE) and the Average Treatment on the Treated (ATT).[38] Family planning services offered through our study have an average treatment effect of -0.268, reducing the likelihood of births in the next year by 27%. The ATE with controls (Table 2, Columns 3 and 4, Panel B) is -0.325. The coefficients for the bivariate probit model are statistically significant at the 5% level in both stages, which indicates that the estimated ATE is statistically significant (Greene, 2010). The ATT estimates are nearly twice as large (between -0.47 and -0.58).

The fact that birth rates are substantially different between treatment groups also confirms that substitution among the Couple group towards other, equally effective sources of birth control offered outside of the clinic was limited. Hence, the short-term fertility results validate our previous findings on take-up of contraception since they measure the effect of contraceptives obtained from all possible sources.

5.3 Well-Being

Using data from the follow-up survey two years after the experiment, we look at the effects of assignment to the Couple treatment on separation, domestic violence, condom use and subjective well-being (Table 4 and Table 5). Recall that the model of aggrievement predicts that such indicators of marital strife could increase, particularly in the long run when husbands become aware of the scope for concealment. We find little evidence that these outcomes are affected by treatment assignment: In the sample of all women, point estimates on an indicator for assignment to the Couple arm are small and statistically insignificant in all specifications (Columns 1, 2 and 3). The same is true for the subsample of potential respondents.

For predicted non-responders, we find that assignment to the Couple arm is associated with a significant decrease in rates of condom use relative to the Individual arm (Column 9), although the estimate loses significance when controls are added. One interpretation is that, when men feel less suspicious that wives are using family planning, they are less concerned about extra-marital

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[37]Because a linear IV model provides a biased, while consistent, estimate of the average effect of treatment and its small sample performance may be inferior to a correctly specified maximum likelihood model, we use the simplest approach of a maximum-likelihood bivariate probit or biprobit (Heckman, 1978).

[38]Using Stata's binormal command to calculate predicted linear indices provides the same estimates.

affairs. However, it is unclear why this result would only show up for couples in which there is no current disagreement over fertility.

We also asked women directly several questions about their subjective well-being.[39] We use three main subjective well-being measures to evaluate life satisfaction, happiness and peace of mind, and health, described in detail in Table 5. Using the same categorization of responders as described above, we find that those women in the Couple treatment report being significantly happier and healthier than those in the Individual treatment group. Specifically, 50% of potential responders in the Individual treatment report their overall health as being "good" or "excellent" compared to women in their community of the same age, while 73% of potential responders in the Couple treatment group report this high level of health, a difference that is significant at the 1% level. 69% of women who are predicted responders in the Couple treatment group report feeling "Happy and Content" or "Very Happy and Content" compared to women in their community of the same age, compared to 54% of potential responders in the Individual treatment group, a difference that is marginally significant with a p-value of 0.057. We see no significant differences in these outcomes associated with assignment to the Couple or Individual treatment, however, in the full sample of women in our study.

6   Discussion

Our findings that in the Couple treatment there was significantly less take-up of the voucher, less take-up of injectables, and subsequently more births (less spacing) than in the Individual treatment, are consistent with the predictions for the experiment in both the collective and noncooperative models we describe. Although these results demonstrate that women in couples with misaligned preferences are willing to hide when given the opportunity, this is not necessarily evidence of inefficiency, given that husbands were not aware of the change in scope for moral hazard. However, even when *both* spouses do not want to have children in the next two years but do have misaligned preferences over number of children, the fact that the privacy condition increases take-up of the cheaper contraceptive option suggests that couples may have difficulty

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[39]Subjective well-being measures of self-reported happiness and satisfaction in life have been shown to be significantly correlated with physical measures of happiness in the body and brain (Diener, 1984), as well as evaluations by friends, sleep quality and changes in life circumstances (Diener et al., 2006; Kahneman and Krueger, 2006).

coming to an efficient bargaining outcome.[40]

An important limit to extrapolating from our results is that injectables were freely available to women in our study, which is not the case in much of Sub-Saharan Africa, particularly in rural areas. Furthermore, our asymmetry of decision rights over contraceptive access was accompanied by informational asymmetries within couples regarding the ease of accessing concealable contraceptives. Although our experiment does not allow us to evaluate what would happen when both parties are fully aware of the scope of moral hazard, our follow-up survey results provide some evidence that rising tension and strife within the marriage is likely to undo at least some of the short-run effects we find. That is, while we do not find evidence of increased separation, divorce or violence, as described in the Conceptual Framework, breakdown of cooperative bargaining may well take the form of staying together but with less happiness. Our results on subjective well-being point in that direction. Extensive qualitative work we conducted with subjects after the study reaffirm that the channel could well be one of more (or less, in the case of the Couple treatment) mistrust and sense of exclusion. Of course, as we point out above, this is only one possible way of incorporating this implication of moral hazard in intimate settings into a framework of decision-making over fertility, and depends critically on maintaining the difference in fertility demand between husbands and wives.

7   Conclusions

This paper uses a novel experimental design to understand the nature of household bargaining over fertility in a world of hormonal contraceptive technology that is only perfectly observable to the wife. Our experimental manipulation changed the degree of concealability of contraceptive use by varying whether a woman received access to injectable contraception alone or in the presence of her spouse. The opportunity to conceal lead to a dramatic increase in use of injectables and reduction in births. Furthermore, the pattern of results indicate that giving women greater opportunity to conceal birth control brought not only women but also a non-trivial fraction of men closer to their short-term fertility goals by increasing the rate of effective contraception among couples who both wished to avoid pregnancy in the near future but who differed in terms of long-run fertility goals.

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[40]As we mention in the Conceptual Framework, this is suggestive of dynamic inefficiency, even if there is static efficiency.

In this manner, the paper documents the role of moral hazard in household decision-making over fertility, and presents evidence of inefficiencies in household bargaining around fertility that have not been considered in the existing literature. Our findings also provide suggestive evidence of a trade-off between privately improving a woman's set of choices, which may result in contraceptive use outcomes that could improve welfare for herself and her child, and lowering the conjugal value of the marriage. In particular, survey data on subjective well-being collected more than two years after the experiment indicate lower health and happiness among woman given the opportunity to conceal relative to those whose husbands were given some degree of veto power over injectables. This result points in the direction of longer-run implications of the conceptual framework we present, whereby husbands feel aggrieved as the scope for moral hazard increases in the home and the subsequent shading and mistrust can lead, under certain conditions, to lower welfare for all.

The finding of a potential negative effect of male involvement among couples with conflicting fertility preferences helps explain why results from previous studies on male involvement in family planning have been mixed, and why concealable contraceptives such as injectables have proven to be so popular in cultural contexts in which men dominate family planning decisions.[41] In reality, the path of giving women access to injectables privately, while improving her set of choices, also may have detrimental consequences for the conjugal value of her marriage. Hence, it is important for practitioners to ask whether policies that reduce further relationship-specific versus general investments are the right path to take.

Given that household frictions may result from the interaction of misaligned preferences with unobservable contraceptive choice, changing either of these features could improve the bargaining environment. Understanding why male and female preferences are so misaligned and involving men in a way that influences their preferences on number of children or helps them to better internalize the costs to women of childbearing and child-raising may be promising areas for future research and policy development.

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[41]Over the past 40 years, only three randomized studies – Fisek and Sumbuloglu (1978), Terefe and Larson (1983), and Wang et al. (1998) – have found any evidence that providing education about family planning to husbands raised adoption of contraception, and one very large study Freedman and Takeshira (1969) found no effect.

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Figure 1: Timeline of Randomization

Figure 1: Experimental Design

Randomization into Control and Treatment Occurs

Sample of Control Women
Baseline Survey
February – April 2007

Follow-up Wife Survey
February – June 2009

Sample of Treatment Women
Baseline survey and STD/Condom/Injectables Information
February – April 2007
N=1,031

Randomization of Treatment Group into Individual and Couples Treatment Occurs

N=503
Couples Voucher Treatment
March – June 2007
Reasons for non-participation:
Disqualified 3
Husband refused 9
Could not locate 6
Respondent refused 13
Not enough budget 101
Final N=371

N=528
Individual Voucher Treatment
March – June 2007
Reasons for non-participation:
Disqualified 5
Could not locate 8
Husband refused 7
Respondent refused 18
Not enough budget 112
Final N=378

Follow-up Wife Survey
February – June 2009
Reasons for attrition from original sample:
Can't find 4
Died 10
Refused 4
N=468

Follow-up Wife Survey
February – June 2009
Reasons for attrition from original sample:
Can't find 5
Died 16
Refused 4
N=489

Reasons for non-participation: Disqualified includes: baby out of range, pregnant, and separated; Could not locate includes: shifted and not home; Husband refused includes: husband work schedule and husband refusal; Not enough budget includes: not enough budget and second visit not done.

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

Notes:
[1] Sample includes all women who received a voucher ("Final sample") and completed the follow-up survey and said that they did not want a child in the next 24 months at baseline. Month and year of birth are reported by women in the follow-up survey.
[2] Women were defined as not wanting children in next two years if they wanted children after 24 months or not at all, or did not know when they next wanted children. All values are normalized for number of women who were in the sample in a given month.

Table 1: Summary Statistics for Final Sample

	Individual Treatment			Couple Treatment			
	Mean	SE	N	Mean	SE	N	P-Value
Panel A							
Highest schooling attained	6.673	0.225	339	6.487	0.159	339	0.409
Husband's highest schooling attained (reported by wife)	9.536	0.205	343	9.377	0.145	337	0.436
Ideal number of children	3.915	0.115	378	3.997	0.0817	371	0.476
Age	27.58	0.456	378	27.65	0.324	368	0.873
Husband's age (reported by wife)	34.50	0.547	339	34.46	0.390	327	0.938
Husband's ideal number of children (reported by wife)	4.184	0.142	359	4.286	0.101	346	0.471
Has ever used a modern contraceptive method	0.889	0.0237	378	0.873	0.0168	371	0.511
Wife has monthly income	0.347	0.0353	378	0.396	0.0251	371	0.160
Wife knows when she is most fertile	0.142	0.0251	346	0.103	0.0178	339	0.126
Wife wants to become pregnant in following 2 years	0.262	0.0324	378	0.275	0.0230	371	0.688
Age wife married	19.39	0.304	373	19.03	0.216	366	0.238
Catholic	0.217	0.0304	378	0.226	0.0216	371	0.755
Comparison of happiness with other women in region							
(1=very unhappy, 5=very happy)	3.579	0.0654	378	3.563	0.0464	371	0.806
Comparison of health with other women in region							
(1=very poor, 5=excellent)	3.619	0.0562	378	3.657	0.0400	370	0.502
Number of years respondent lived in Lusaka	18.33	0.788	378	17.88	0.561	369	0.562
Couple has electricity	0.410	0.0359	378	0.391	0.0255	371	0.592
Formally married	0.886	0.0236	378	0.879	0.0167	371	0.749
Number of days in past 7 days couple has sex	2.067	0.121	373	2.068	0.0858	369	0.995
Number of days in past month couple has sex	7.920	0.395	374	8.180	0.280	367	0.510
Number of children husband has with other women	0.289	0.0335	367	0.283	0.0237	364	0.861
Frequency at which couple has talked about contraception in last							
year	1.775	0.0768	378	1.701	0.0546	371	0.334
Couple has ever disagreed on number of children	0.138	0.0248	378	0.127	0.0176	371	0.661
Couple has ever disagreed on contraception use	0.106	0.0230	378	0.116	0.0163	371	0.661
Have used contraceptive method without husband's knowledge	0.138	0.0253	377	0.138	0.0179	370	0.997
Husband drinks at least 2 to 3 times a week	0.410	0.0360	378	0.418	0.0256	371	0.830
Husband has ever threatened physical violence	0.516	0.0364	378	0.566	0.0259	371	0.169
Wife ever pressured to have sex	0.500	0.0366	378	0.518	0.0260	371	0.632
Husband does budgeting	0.143	0.0261	378	0.157	0.0186	370	0.595
Husband decides major purchases	0.655	0.0349	377	0.647	0.0248	371	0.813
Joint F Statistic							12.86
P-value							0.996
Panel B							
Using any method at baseline	0.841	0.0259	377	0.869	0.0184	366	0.280
Number of living children	2.950	0.132	377	2.986	0.0941	366	0.781
Using injectable at baseline	0.202	0.0300	377	0.221	0.0214	366	0.511
Using pill at baseline	0.297	0.0337	377	0.306	0.0240	366	0.791
Using a hormonal contraceptive at baseline	0.501	0.0367	377	0.536	0.0261	366	0.352
Has ever used an injectable contraceptive method	0.405	0.0359	378	0.407	0.0255	371	0.950
Months sine last birth (at recruitment)	15.57	0.445	377	15.30	0.317	366	0.536
Husband's age (reported by husband)	33.80	0.563	376	34.24	0.400	371	0.438
Husband's highest schooling attained (reported by husband)	8.831	0.213	378	8.682	0.151	371	0.485
Husband's ideal number of children (reported by husband)	4.168	0.148	374	4.435	0.105	368	0.0721
Husband's average monthly income (1,000 USD) (reported by husband)	0.131	0.0160	378	0.153	0.0114	371	0.162
Wife earned money in previous month	0.403	0.0363	375	0.450	0.0257	369	0.194
Husband works 40+ hours	0.575	0.0374	360	0.546	0.0267	346	0.442
Wife ever pressured violently to have sex	0.128	0.0253	375	0.149	0.0180	370	0.415
Husband decides savings	0.614	0.0356	378	0.622	0.0254	368	0.811
Husband holds the money	0.164	0.0275	372	0.171	0.0195	368	0.793

Table 2: Effect of Private Information Treatment on Households

Panel A: Without Controls

	All Women				Responders		Non-Responder	
	Voucher Redeemed	Received Injectable	Birth in Next Year IV - 2nd Stage	Used Voucher IV - 1st Stage	Voucher Redeemed	Received Injectable	Voucher Redeemed	Received Injectable
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Assigned to								
Couple Treatment	-0.101***	-0.060**		-0.269***	-0.159**	-0.136**	-0.070	-0.029
	(0.036)	(0.030)		(0.096)	(0.076)	(0.064)	(0.043)	(0.035)
Used Voucher			-1.369**					
			(0.614)					
Ave. Treatment Effect (ATE)			-.268					
Ave. Treatment on the Treated (ATT)			-.468					

Panel B: With Controls

	All Women				Responders		Non-Responder	
Assigned to								
Couple Treatment	-0.098***	-0.058*		-0.244**	-0.182**	-0.108	-0.072	-0.046
	(0.037)	(0.030)		(0.106)	(0.083)	(0.068)	(0.044)	(0.035)
Used Voucher			-1.656**					
			(0.681)					
Ave. Treatment Effect (ATE)			-.325					
Ave. Treatment on the Treated (ATT)			-.583					
N	749	749	706	706	169	169	536	536
Mean of Outcome Variable among Individual Treatment	0.529	0.243	0.054	0.541	0.632	0.284	0.496	0.223
Estimator	OLS	OLS	Probit	Probit	OLS	OLS	OLS	OLS

* p<.1, ** p<.05, *** p<.01

[1] A responder is defined as a women who doesn't want a child in the next two years who believes her husband wants to have more children than they currently have and who also believes her husband wants more children than she does. Non-responders didn't satisfy these requirements and didn't have missing information on the relevant variables.

[2] Controls include: age, husband's age, education, number of children, wife's ideal # of children, husband's ideal # of children, using injectables at baseline, using pill at baseline, using any hormonal contraceptive at baseline, wife's monthly income, husband's monthly income, difference in desired fertility of couple, wife knows when she is most fertile, woman's age > 40, time since last birth, difference between husband's and wife's total number of children, and compound indicators.

[3] Missing values for controls were replaced with a zero and dummy variables for missing values were included in the regression.

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

[5] Bootstrapped biprobit estimation was used to determine Birth in Next Year, with assignment to treatment as an IV for take-up of family planning services. The ATE and ATT were determined using Stata's binormal command to calculate predicted linear indices.

Table 3: Effect of Private Information Treatment on Households in Which Both Husband and Wife Do Not Want a Child in Next 2 Years

	All Women		Responders		Non-Responder	
	Voucher Redeemed	Received Injectable	Voucher Redeemed	Received Injectable	Voucher Redeemed	Received Injectable
	[1]	[2]	[3]	[4]	[5]	[6]
Panel A: Without Controls						
Assigned to Couple Treatment	-0.103**	-0.065	-0.259***	-0.213***	-0.041	-0.014
	(0.049)	(0.040)	(0.095)	(0.077)	(0.059)	(0.048)
Panel B: With Controls						
Assigned to Couple Treatment	-0.097*	-0.061	-0.274**	-0.253***	-0.051	-0.020
	(0.051)	(0.041)	(0.120)	(0.094)	(0.063)	(0.049)
N	419	419	106	106	290	290
Mean of Outcome Variable among Individual Treatment	0.531	0.244	0.650	0.300	0.483	0.214

* p<.1, ** p<.05, *** p<.01

[1] A responder is defined as a women who doesn't want a child in the next two years who believes her husband wants to have more children than they currently have and who also believes her husband wants more children than she does. Non-responders didn't satisfy these requirements and didn't have missing information on the relevant variables.

[2] Controls include: age, husband's age, education, husband's education, number of children, wife's ideal # of children, husband's ideal # of children, using injectables at baseline, using pill at baseline, using any hormonal contraceptive at baseline, wife's monthly income, husband's monthly income, difference in desired fertility of couple, wife knows when she is most fertile, woman's age > 40, time since last birth, difference between husband's and wife's total number of children, and compound indicators.

[3] Missing values for controls were replaced with a zero and dummy variables for missing values were included in the regression.

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

Table 4: Effect of Private Information Treatment on Households - Potential Adverse Effects of Intervention

Panel A: Without Controls

	All Women			Responders			Non-Responder		
	Separated	Domestic Violence	Using Condom	Separated	Domestic Violence	Using Condom	Separated	Domestic Violence	Using Condom
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Assigned to Couple Treatment	-0.028	0.001	-0.034	-0.050	0.012	0.067	-0.016	-0.010	-0.054**
	(0.018)	(0.033)	(0.023)	(0.038)	(0.073)	(0.051)	(0.021)	(0.039)	(0.027)
Panel B: With Controls									
Assigned to Couple Treatment	-0.028	0.016	-0.024	-0.048	0.018	0.074	-0.021	-0.006	-0.039
	(0.019)	(0.034)	(0.024)	(0.042)	(0.075)	(0.055)	(0.022)	(0.040)	(0.028)
N	706	704	705	156	154	155	509	509	509
Mean of Outcome Variable among Individual Treatment	0.076	0.268	0.122	0.080	0.267	0.080	0.069	0.268	0.134

* p<.1, ** p<.05, *** p<.01

[1] A responder is defined as a women who doesn't want a child in the next two years who believes her husband wants to have more children than they currently have and who also believes her husband wants more children than she does. Non-responders didn't satisfy these requirements and didn't have missing information on the relevant variables.

[2] Controls are same as Table 3.

[3] Domestic violence at follow-up is measured using the following question: Has your husband ever been physically violent toward you?

Table 5: Effect of Private Information Treatment on Households - Measures of Well Being

Panel A: Without Controls

	All Women			Responders			Non-Responder		
	Satisfaction	Health	Happiness	Satisfaction	Health	Happiness	Satisfaction	Health	Happiness
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Assigned to Couple Treatment	0.041	0.038	0.049	0.053	0.230**	0.151	0.070	0.008	0.050
	(0.037)	(0.037)	(0.037)	(0.078)	(0.077)	(0.079)	(0.044)	(0.044)	(0.043)
Panel B: With Controls									
Assigned to Couple Treatment	0.030	0.028	0.048	0.065	0.273***	0.142*	0.059	-0.028	0.053
	(0.036)	(0.038)	(0.037)	(0.078)	(0.085)	(0.083)	(0.044)	(0.045)	(0.044)
N	705	705	705	155	155	155	509	509	509
Mean of Outcome Variable among Individual Treatment	0.588	0.568	0.574	0.609	0.506	0.540	0.557	0.589	0.573

* p<.1, ** p<.05, *** p<.01

[1] A responder is defined as a women who doesn't want a child in the next two years who believes her husband wants to have more children than they currently have and who also believes her husband wants more children than she does. Non-responders didn't satisfy these requirements and didn't have missing information on the relevant variables.

[2] Controls are same as Table 3.

[3] Satisfaction is measured using the following question: All things considered, how satisfied are you with your life as a whole these days? Please tell me which number on this scale more adequately represents your level of satisfaction with your life as a whole: 1 means you are ? "Completely Dissatisfied" and 5 means you are "Completely Satisfied".

[4] Health is measured using the following question: Compared to women in your community of the same age, how would you describe your overall health?

[5] Happiness is measured using the following question: Compared to women in your community of the same age, how would you describe your overall level of happiness and peace of mind? "Very Unhappy or Discontent" is coded as 1 and "Very Happy and Content" is coded as 5.

[6] An individual was considered satisfied, healthy or happy if they responded with a value great than or equal to 4 for the above questions.

Online Appendix: Household Bargaining and Excess Fertility: An Experimental Study in Zambia

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December 9, 2012

1 Technical Appendix of Noncooperative Model

We present a simple non-cooperative framework to model the intra-household bargaining over fertility decisions presented in the Conceptual Framework section. To save on space, we consider only the long run version of this game, that is, we consider the situation in which H *has the right beliefs concerning the scope for moral hazard*. We nevertheless also briefly comment on the implications for the experiment below.

The set-up is identical to that developed in the Conceptual Framework, except that now (i) H and W cannot reach binding agreements (i.e., each spouse's action is a best reply to the other spouse's action) and (ii) we let H feel aggrieved and act as a difficult husband/shade ($a_H = b$) or not ($a_H = g$) depending on his level of suspicion concerning W's use of contraception (see below). In what follows, let w be the probability of W choosing $a_W = c$, conditional on the availability of a contraceptive technology, and let h be the probability of H choosing $a_H = b$.

When $\theta = 0$, H may feel aggrieved suspecting the wife uses contraception, and can have an incentive to shade (to be a difficult husband).[1] Specifically, when he decides to shade, H gets extra payoff of

$$S(w^e, \alpha) := k \cdot (\text{Prob}[a_W = c | w^e, \alpha, \theta = 0] - \text{Prob}[a_W = n | w^e, \alpha, \theta = 0]), \tag{1}$$

where w^e is H's subjective belief over w. This roughly means that being a bad husband yields a psychological gain (cost) of k proportional to his subjective probability of W choosing $a_W = c$ ($a_W = n$). Let h be the probability of H being a difficult husband *conditional on* $\theta = 0$. On the other hand, W directly

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[1] For this assumption, we draw both from the anthropological literature cited in the Context section, regarding the mistrust and suspicion that husbands feel in this environment, and from Hart and Moore (2008). Becoming a "difficult" husband in our setting is what Hart and Moore (2008) model as ex-post, uncontractible shading. In our setting, the informal contract offered makes clear the expectation of childbearing as part of the marital arrangement, a strong cultural norm. Fehr, Hart and Zehnder (2011) provide experimental evidence for aggrievement from contract expectations not being met.

incurs a cost of l whenever H becomes a difficult husband. We assume $\bar{u}_W - l < 0$, which means that W prefers having a child and a good husband to having no child and a bad husband.

The timing of the game is as follows. Nature (randomly) chooses whether contraception is available or not. If it is available, W chooses $a_w \in c, n$. Otherwise, she has no choice and takes $a_W = n$. Conditional on a_W, Nature draws θ. H observes θ. If $\theta = 1$, he confirms $a_W = n$ and thus takes $a_H = g$. Otherwise, H chooses $a_H \in g, b$.

The expected payoff functions are

$$U_W(w, h) = \text{Prob}[\theta = 0] \cdot (\bar{u}_W - hl) + \text{Prob}[\theta = 1] \cdot 0 - wK \tag{2}$$
$$= w\alpha[\bar{u}_W - hl] + (1 - w\alpha)[v \cdot 0 + (1 - v)(\bar{u}_W - hl)] - wK,$$

and

$$U_H(w, h; w^e, \alpha) = \text{Prob}[\theta = 1] \cdot \bar{u}_H + \text{Prob}[\theta = 0] \cdot hS(w^e, \alpha) \tag{3}$$
$$= (1 - w\alpha)v\bar{u}_H + [1 - (1 - w\alpha)v]hk \left(\text{Prob}[a_W = c | w^e, \alpha, \theta = 0] - \text{Prob}[a_W = n | w^e, \alpha, \theta = 0]\right).$$

An equilibrium of this game is a pair (w^*, h^*) such that (i) w^* maximizes $U_W(\cdot, h^*)$ and (ii) h^* maximizes $U_H(w^*, \cdot; w^*, \alpha)$.

Equilibrium Characterization. H's (subjective) conditional probability of $a_w = c$ when $\theta = 0$ is given by $\rho = \frac{w^e \alpha}{w^e \alpha + (1 - w^e \alpha)(1 - v)}$. When $\theta = 0$, hence, H's (subjective) payoff is $(2\rho - 1)k$ if $a_H = b$ and 0 if $a_H = g$. That is, $a_H = b$ $(h = 1)$ is a best reply if and only if

$$\rho \geq 1/2 \iff w^e \alpha \geq (1 - w^e \alpha)(1 - v). \tag{4}$$

Notice that when α is sufficiently low (i.e., $\alpha < \frac{1-v}{2-v}$), being a bad husband can never be a best reply (i.e., even if $w = 1$).

Next, let's consider W's best reply. As a_W is relevant only when injectables are available, she (weakly) prefers $a_W = c$ if and only if $\alpha(\bar{u}_W - hl) + (1 - \alpha)(1 - v)(\bar{u}_W - hl) - K \geq (1 - v)(\bar{u}_W - hl)$, which simplifies to

$$\bar{u}_W - hl \geq \frac{K}{\alpha}. \tag{5}$$

Thus, there are two possible cases depending on α.

- Case 1: $\alpha < \frac{1-v}{2-v}$. In this case, $h = 0$ is a dominant strategy for H, and $w = 1$ is the unique best reply of W. That is, $(w^*, h^*) = (1, 0)$ is the unique equilibrium.

- Case 2: $\alpha \geq \frac{1-v}{2-v}$. In this case, it is easy to see that there exists no pure strategy equilibrium. The unique mixed strategy equilibrium is given by (4) and (5) with equalities, which reduce to $(w, h) = \left(\frac{1-v}{\alpha(2-v)}, \frac{\bar{u}_W - \frac{K}{\alpha}}{l} \right)$.

Prediction. As the scope for moral hazard increases—that is, as α goes up—the use of contraception decreases and shading increases. When moral hazard is limited in scope ($\alpha < \frac{1-v}{2-v}$), increases in α lead to an increase in W's payoff and a decrease in H's payoff. If the scope for moral hazard is large enough ($\alpha > \frac{1-v}{2-v}$), further increases in α lower both H and W's payoffs.

Proof. The fact that as α goes up the use of contraception goes down and the quantity of shading goes up immediately follows when (i) comparing h^* and w^* between case 1 ($\alpha < \frac{1-v}{2-v}$) and case 2 ($\alpha > \frac{1-v}{2-v}$) and (ii) looking at how α enters h^* and w^* in case 2. The statements regarding the changes in payoffs can immediately be seen by substituting the pair (h^*, w^*) into (2) and (3). ∎

Intuition. To gain intuition for the predictions stated above it is useful to bear in mind that H will shade—and thus impose a loss on W—only if confident enough (suspicious enough) that W used injectables. When α is low ($\alpha < \frac{1-v}{2-v}$)—injectables are likely stocked out—H rationally infers when $\theta = 0$ that the most likely reason for the lack of birth is simply bad luck (even if he understands that W did attempt to gain access to injectables). In these instances, H finds it optimal not to shade, even when no child is born. This, however, in turn implies that W will attempt to obtain these injectables with probability one since she faces no prospect of retaliation. If we focus on this range of parameter values, we find that W's payoff is increasing in α while H's is decreasing. This is simply due to the fact that as α increases injectables are likely more available, thereby paving the way to lower fertily, which is beneficial to W but detrimental to H.

Things differ, however, when $\alpha > \frac{1-v}{2-v}$. In these instances, the threat of W actually accessing injectables is high enough that there is scope for shading. In particular, H finds it optimal to shade often enough (when $\theta = 0$) to make W indifferent between attempting to obtain injectables or not. This likelihood of shading, not surprisingly, is increasing in α, i.e., is increasing in the availability of injectables. W, on the other hand, reacts to this increased likelihood of shading when $\theta = 0$ (due to a higher α), by decreasing the probability with which she attempts to obtain injectables. The overall impact of changes in the availability of injectables is to (i) maintain fertility constant (any increase in α is offset by a proportionate decrease in w, see the formula for w^* above) and (ii) decrease both payoffs as W is facing more shading and H is unfairly punishing his wife (which he dislikes).

To conclude, let us briefly comment on the predictions regarding the experiment itself. Similar to the cooperative model presented in the paper, secretly handing a voucher guaranteeing access to injectables at no cost can only make W better-off and lead to a lower level of fertility. This is once again due to

a revealed preference argument. H having the wrong beliefs concerning W's access to injectables (he underestimates it) in the Individual group, W can always guarantee herself the payoff accruing to the wifes in the Couple group simply by mimicking their behavior. If W decides not to mimick their behavior, then it must follow that her payoff increases. As we describe in the Results and Discussion section, she did indeed increase her Injectable usage and decrease her fertility in the Individual condition compared to the Couple condition. However, 2 years after the experimental intervention, although there is no difference in violence or separation, women in couples with misaligned incentives do report a lower level of subjective well-being. Although we don't have any evidence that men found out about injectable use (and hence we cannot compare this to the long run case in the framework above), it does point to the general costs associated with increasing concealability. In the long run, the increase in the scope for hidden action comes simply from increasing access to a contraceptive that is almost perfectly concealable, in terms of being hard for the man to monitor. The mistrust resulting from this increased access, which is common knowledge in the long run, leads to lower welfare for both in the long.

2   Sample Recruitment and External Validity

As described in the paper, married women of childbearing age (18-40) were invited to participate in the study if they: (1) currently lived with their husband; (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; (5) were not known to have health conditions for which hormonal contraceptives are contraindicated; and (6) agreed to participate in a survey and information session about family planning together with their husband.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 (5), and who resided at the address listed in the records. Only around 50% of those women could be located, largely because of false or missing addresses and high rates of mobility within the city.[2] Therefore, women were also invited to participate in the study if they resided at the house number listed for the intended respondent and met all six inclusion criteria.[3] If more than one eligible woman resided at a sampled address, the one whose first name came first in alphabetical order was invited to participate.

To expand the sample, 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.[4] Women residing at

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[2] Clinic staff reported that false addresses were often given by women who resided outside the catchment area in order to obtain services at Chipata clinic, which is larger and much better equipped than other clinics in Lusaka. To the extent this is true, women who were found are a representative sample from the catchment area.

[3] Of the women recruited in the first stage, 74% were taken from obstetrics records and 26% were alternates residing at the addresses listed in the records.

[4] The catchment area is approximately 8 square kilometers and densely populated, encompassing an estimated 107,107 people. Women who had already been included in the sample from the process above were excluded from this random sampling expansion process.

sampled house numbers were invited to participate if they met all six inclusion criteria.

In order to provide wait-free appointments with guaranteed access, we hired a dedicated nurse for the study and purchased sucient stocks of injectable contraceptives (Depo-Provera) and contraceptive implants (Jadelle) to treat all women in the sample for at least one year.[5] These stocks and the nurse were reserved exclusively for women in our study. Hence, the voucher signicantly reduced barriers to accessing all forms of contraception, but in particular long-acting methods. The voucher, a copy of which appears in Section 4, was valid for one month from the day it was issued.[6] 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 ID cards to the clinic at the time of the visit for the nurse to verify. Responses to the debrieng survey were also used to verify the identities of women using the voucher.

As described in the paper, the experiment consisted of a baseline survey in the first visit administered solely to the wife, during which an appointment was made for a second visit with both the wife and husband. Treatment (Individual versus Couple) was then randomly assigned.[7] Among the 1031 women eligible for inclusion in the experiment, 749 participated, including 371 assigned to the Couple treatment condition and 378 assigned to the Individual condition. Figure 1 shows the breakdown of reasons for non-participation. Non-participation overwhelmingly reflected resource constraints on the part of the investigators and a strict timeline for completion of the study, both of which caused us to halt recruitment efforts before all households could be reached for a second visit.

In terms of external validity, it is worth keeping in mind that some amount of the non-participation discussed above may reflect subjects' tacit unwillingness to participate in the study. However, the direction of bias due to this type of sample selection is unclear. Wives with husbands who are most unwilling to participate in a family planning survey may be the most likely to hide contraception when given the opportunity, in which case our experimental results underestimate the average effect of the intervention on the population of eligible women. Alternatively, attrition may be driven by women with no interest in family planning who would be little influenced by treatment assignment, in which case our estimates overstate the average population effect.

Comparing observables in our sample with those of married women in Lusaka from the 2007 ZDHS sheds some light on the representativeness of our sample (Table A.2). In many respects, such as education and desired fertility, our sample is very similar to the random sample from the ZDHS. However, the means indicate that our sample is composed of a disproportionate number of couples with discordant fertility preferences and relatively frequent intercourse. These differences suggest that our experimental sample is

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[5] Sufficient stocks of condoms, pills, and IUDs were already available at the clinic. To keep waiting lines short we spaced the intervention over 4 months, distributing approximately 50 vouchers per week.

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

[7] Our choice to balance treatment assignment on baseline characteristics prevented us from randomizing earlier.

at greater risk of an unwanted birth than the average woman in urban Zambia. Furthermore, women in our sample also have significantly more experience using modern contraceptives than the average woman in urban Zambia, likely due to their proximity to the clinic. Both differences are consistent with the case in which the most important source of selection into our study is interest in modern family planning methods. Although this suggests that our expected treatment effect may be larger than what we would anticipate were the experiment conducted on a random sample of women from the same population (although not definitively), we are arguably still capturing the estimate of interest for policy purposes by implicitly restricting the sample to women with a demand for family planning services and relatively good access to public services since this is the group that would be influenced by policy measure such as increasing access to injectable contraceptives.

3   Script 1: Condom and Family Planning Information

Information on STDs and Condoms

- Did you know that 1 out of 5 Zambians over the age of 15 is HIV positive?

  - If used correctly and consistently, condoms will protect you from getting sexually transmitted diseases and HIV, the virus that causes AIDS. There is no known cure for AIDS.
  - Condoms will keep you among the 4 out of 5 who can still avoid HIV

- Facts about Sexually Transmitted Diseases

  - Anyone can become infected through sexual intercourse with an infected person.
  - Changing sexual partners adds to the risk of becoming infected.
  - Sometimes, early in the infection, there may be no symptoms, or symptoms may be easily confused with other illnesses.
  - Sexually transmitted diseases can cause:

    * Tubal pregnancies, sometimes fatal to the mother and always fatal to the unborn child
    * Death or severe damage to a baby born to an infected woman
    * Sterility (loss of ability to get pregnant)
    * Cancer of the cervix in women
    * Damage to other parts of the body, including the heart, kidneys, and brain
    * Death to infected individuals
    * See a doctor if you have any of these symptoms of STDs:
    * Discharge from the vagina, penis, and/or rectum

∗ Pain or burning during urination and/or intercourse

　　　　∗ Pain in the abdomen (women), testicles (men), and buttocks and legs (both)

　　　　∗ Blisters, open sores, warts, rash, and/or swelling in the genital area, sex organs, and/or mouth

　　　　∗ Flu-like symptoms, including fever, headache, aching muscles, and/or swollen glands

- The surest way to avoid sexually transmitted diseases is to not have sex altogether (abstinence). Another way is to limit sex to one partner who also limits his or her sex in the same way (monogamy). Condoms are not 100% safe, but if used properly, will reduce the risk of sexually transmitted diseases, including AIDS. Protecting yourself against the AIDS virus is of special concern because this disease is fatal and has no cure.

- Condoms will help protect you from having an un-planned pregnancy which could ruin your plans and overburden you with responsibilities you are not ready for. Condoms are used for both birth control and reducing the risk of disease. That is why some people think that other forms of birth control – such as the IUD, injectable, or pill – will protect them against diseases, too. But that is not true. So if you use any other form of birth control, you still need a condom in addition to reduce the risk of getting sexually transmitted diseases. This is called dual protection, and it is very important to practice it.

- A condom is especially important when an uninfected pregnant woman has sex, because it can also help protect her and her unborn child from a sexually transmitted disease.

- A condom prevents the transmission of disease. It acts as a barrier or wall to keep blood, or semen, or vaginal fluids from passing from one person to the other during intercourse.

- These fluids can harbor germs such as HIV (the AIDS virus). If no condom is used, the germs can pass from the infected partner to the uninfected partner.

- What is the correct way of using condoms?

　　– First ensure that you have them available so that you are ready when you need one.

　　– Always check the expiry date of the condoms

　　– Keep your condoms away from heat and direct sunlight.

　　– Use a new condom for each act of sex.

- Deciding to use condoms is an important choice you make to protect yourself, your partner and your loved ones.

- Do not be embarrassed about protecting yourself and your loved ones. Is it not more embarrassing to end up with an unplanned pregnancy, or an STD which could be HIV when you can avoid all that? Think about the future plans you have made for yourself and for them. Make the right choice of condoms and continue with your plans.

- Remember you are in-charge of your life and the decisions you make. Be responsible to yourself and use condoms!

General Information on Family Planning

A. Definition of family planning

1. Family planning is a decision about:

- How many children to have, when to start having them, how long to wait in between each one (spacing), and when they will stop

B. Benefits of family planning

1. Benefits to children:

- Better health, more food and other resources available, greater opportunity for emotional support from parents, better opportunity for education

2. Benefits to women:

- Better health and possibly protection from certain diseases, freedom to decide when to have children, less physical and emotional strain, no need for unsafe abortions, improved quality of life

3. Benefits to men:

- Protection from STDs/HIV with some methods (barrier methods), less emotional and financial strain, greater care for each child, improved quality of life

C. Methods of family planning

1. Many different methods out there; some require nurse and some do not:

- Barrier methods such as male and female condoms
- IUDs (implants)
- Surgical sterilization
- Hormonal methods such as pills, injectables and implants
- Natural methods such as withdrawal, the rhythm method and abstinence

D. Importance of condoms

    1. ONLY CONDOMS PROVIDE PROTECTION AGAINST STDs and HIV/AIDS.

    2. [Offer woman pack of 3 condoms]. Even if you are married, and even if you are using another method of birth control, it may still be appropriate to use condoms as dual protection against both pregnancy and HIV/AIDS.

    3. Please keep these condoms provided by the clinic

E. Chipata clinic services

    1. Nurse at Chipata Clinic can help you to choose and properly use the method that is best for you

    2. For more information, visit the family planning nurse, Grace Daka

    3. Clinic is open for family planning services from 13 hours to 17 hours, Mon - Saturday

    4. Do you know how to get there?

Additional Information About Family Planning

    1. Now I'll tell you about two family planning options that many people don't know about

    2. But there are other options, so take time to explore all of the choices to figure out what is best for you

A. Description of injectables (Depo-Provera)

    1. Depo Provera is an injection given in arm or rear that prevents pregnancy for 3 months

    2. Injection contains same type of medicine as EC and some pills - synthetic progesterone hormone

    3. It prevents pregnancy by stopping release of eggs. It also causes cervical mucus to thicken, making it harder for sperm to enter or survive in uterus. These changes prevent fertilization and thus pregnancy

B. Benefits of using

    1. Injectables are very reliable:

- Of 1,000 women who use it correctly, only 3 become pregnant during first year of use
- After first injection, protection from pregnancy is immediate if you take shot during first 5 days of your period. Otherwise, it begins to work after 1 week (so use backup method of contraception)

- Protection lasts for 12 weeks

2. Injectables are reversible:

    - Women who want to become pregnant at any time can stop using injectables
    - For many women, fertility returns immediately, but for some it may take over 1 year

3. Injectables very private form of birth control

    - It cannot be seen on body and requires no home supplies
    - You do not have to keep any pills at home, which your husband may find
    - There is nothing for you or your husband to put in place before intercourse

4. Injectables very convenient - only requires 1 clinic appointment every 3 months.

    - However, very important to follow the date given to return to the clinic
    - If you are late returning to get your shot you will risk getting pregnant!

5. Injectables can also cause changes to menstrual cycle, including:

    - Less menstrual cramping and pain, fewer periods, and less chance of anemia
    - Irregular or no bleeding at all. Many women stop having periods after one year.
    - DON'T WORRY: THIS IS NOT UNHEALTHY!!! This in no way prevents future pregnancy or harms a woman's reproductive capacity. In fact, many women find this to be a welcome convenience!

6. For most women Depo Provera is safe and reliable method of postponing pregnancy

C. I would also like to inform you that Jadelle implants have recently become available at Chipata Clinic.

   - Jadelle is for women who are looking for a reliable, reversible long-term method of birth control
   - Consist of two small silicone rods containing synthetic hormones
   - Rods are inserted under the skin in the arm

- Once inserted, implants very effectively prevent pregnancies for up to five years – you don't have to do anything after the initial insertion for them to work

- The rods are usually barely visible – because the incision from insertion is very small, most women do not have a visible scar.

- The rods can be removed.

- Once removed, contraceptive effects disappear within a few days.

- Need to be inserted and removed by trained health care personnel

- Because the hormone in Jadelle is the same as the hormone in injectables, the contraindications and side effects are similar

- Discuss carefully with the nurse in order to determine whether Jadelle is the right option for you

Before you consider either IC or Jadelle, there are three important things to remember:
    D. Neither Jadelle nor injectable contraceptives protect against STDs including HIV/AIDS

    1. To protect yourself, you should also use a condom - this is called dual protection

E. Injectables and Jadelle are not safe for women with:

- Past heart attack or stroke, blood clots in the legs or lungs

- Cancer or epilepsy

- High blood pressure

- Heart, kidney, or liver disease, such as hepatitis

- Are or might be pregnant, want to become pregnant immediately

- Unexplained bleeding from the vagina

- History of severe depression

F. If you had bad experiences with hormonal contraceptives (pills, injectables, or implants) in the past, consult the family planning nurse before trying a hormonal method again as you may have a similar experience if you try them again.
    G. Mild side effects are likely with both methods

    1. Most common are temporary and not dangerous, but can be uncomfortable, including:

        - Nausea and/or vomiting
        - Breast tenderness, irregular bleeding
        - Headache or dizziness

2. Other side effects of injectables only can include:

- Nervousness, mood changes
- Bloating, hot flashes, a decreased interest in sex, acne, hair loss, and back ache
- After last injection, it can take over 6 months for side effects to completely go away

3. More serious problems with injectables are very rare but can include:

- Allergic reactions
- Decrease in bone density, which can lead to osteoporosis (weak bones) when you are older

4. If you use either method, you should go to the clinic immediately if you have:

- A new lump in your breast
- Major depression
- Severe pain in the stomach or abdomen
- Unusually heavy or prolonged vaginal bleeding
- Yellowing of skin or eyes

H. Any questions about when and how to use either method, or how these methods work? If you have more questions, you can ask them of the nurse at the family planning clinic and she will help you to choose the method that is best for you.

4 Voucher

Individuals   Couples

English Translation of Voucher: If you bring this voucher with your NRC card to the Nurse Grace Daka at Chipata Clinic between 14h and 17h on Monday and Saturday, we guarantee that you will receive:

- First class, personalized service, by Grace Daka, your own dedicated family planning nurse.

- You will not wait for more than an hour, and receive a free gift if you wait more than an hour.

- A family planning method Jadelle or an injectable Depo-Provera for one year will be given to you for a year if Nurse Grace Daka finds it suitable for you.

5 Husband Survey and Voucher Script and Protocol

STEP 1 (CHW) Hello, my name is _____ and I am representing Chipata Clinic. We are going today to randomly selected households in your area, in order to conduct a survey about families and family planning.

STEP 2 (CHW) Are both you and your husband here?

_____ Yes/ Yes let me go get him. (Go to STEP 4)

_____ No he is not here. (Go to STEP 3)

STEP 3 (CHW) If no, do you know when you both will next be at home? [Schedule directly with husband if possible.]

	Month	Day	Time
	＿＿＿＿＿＿＿＿＿＿＿	＿＿＿＿＿＿＿＿＿＿＿	＿＿＿＿＿＿＿＿＿＿＿

STEP 4 (Enumerator)

[Once you have found the correct respondent]

I am a representative of Chipata Clinic. We would like you to participate in our study about family planning. We are administering a survey about women and men's attitudes towards having children, raising children and family planning.

The entire session will take approximately fifteen minutes. Since we really value how you can help us to learn about women and their decisions about children, you will receive a gift of for spending your time with us.

If you choose to participate, all of the session is voluntary, and you may choose not to answer any of the questions I ask if you prefer not to. Also, every piece of information you give will be kept strictly confidential. Your name will be removed from any of the information that you give as soon as it is entered into the computer, and only staff members at the clinic and members of the research team will have access to the information.

STEP 5 (Enumerator and CHW)

First we would like to talk to the husband in private. Is there a quiet place where we can conduct the survey in private? Can we go inside your house to conduct the survey? [If there is no private setting, arrange to return at a later time, preferably later on the same day.]

If there is no place to conduct a private interview, write the date and time of the appointment below:

	Month	Day	Time
	＿＿＿＿＿＿＿＿＿＿＿	＿＿＿＿＿＿＿＿＿＿＿	＿＿＿＿＿＿＿＿＿＿＿

STEP 6a (Enumerator)

[Go to private setting and administer husband survey. Both CHW and enumerator should be present

during survey. Note whether there is a voucher attached to the survey. If there is a voucher, go to step 6b. If there is no voucher, go to step 7a. Give husband gift of either 10,000 talk time or kwacha when survey is completed.]

STEP 6b [VOUCHER ATTACHED TO HUSBAND SURVEY] (Enumerator)
[If there is a voucher attached to the survey, then invite woman into the house]

Your household has also been selected by lottery to be eligible to receive special services from Chipata Clinic's family planning clinic. This voucher entitles you to first-rate care from your own dedicated family planning nurse. It also will enable you to access methods of family planning that are extremely effective, private and easy to use. These methods do not require you to do something every day, or to do something every time you have sex in order to be effective. These methods are not available to all people who come into Chipata Clinic because there are more people who want to use these methods than the clinic is able to serve.

This voucher is especially for you and only you, and it cannot be used by anyone else. In order to ensure that this is only for you, we will write both of your names and NRC numbers on the card.

STEP 7a [NO VOUCHER ATTACHED TO WIFE SURVEY] (Enumerator)
[Go to private setting and administer wife survey. Both CHW and enumerator should be present during survey. Go to step 8.]

STEP 7b [VOUCHER ATTACHED TO WIFE SURVEY] (Enumerator)
[If there is a voucher attached to the survey, then give to woman in private, before completing survey. Make sure no one else is around when she receives the voucher so that her privacy is completely ensured]

You have also been selected by lottery to be eligible to receive special services from Chipata Clinic's family planning clinic. This voucher entitles you to first-rate care from your own dedicated family planning nurse. It also will enable you to access methods of family planning that are extremely effective, private and easy to use. These methods do not require you to do something every day, or to do something every time you have sex in order to be effective. These methods are not available to all people who come into Chipata Clinic because there are more people who want to use these methods than the clinic is able to serve. This gift is for you, the woman, and it is your choice to share this with your husband or to keep it for yourself. If you like, we can keep this card at the clinic for you.

This voucher is especially for you and only you, and it cannot be used by anyone else. In order to ensure

that this is only for you, we will write your name and NRC number on the card.

[Administer wife survey part II.]

STEP 8 (Enumerator)

Thank woman for her time, give her chitenge or 10,000 kwacha and say goodbye.

Voucher Talking Points, as Emphasized in Field Worker Training

(These points must be emphasized to women or the couple, depending on the treatment.)

For Couples Women:

1. They are one of the lucky couples chosen to receive a special, limited-time offer of guaranteed quick, easy access to family planning methods like Jadelle and Depo-Provera.

2. The voucher guarantees immediate access to Depo Provera and Jadelle provided these methods are medically appropriate for them. This voucher will also give them access to other family planning methods available at Chipata Clinic.

3. They should ask for our study's dedicated family planning nurse Grace Daka. She is available at Chipata Clinic Monday through Saturday from 13-17 hours until the expiration date written on the voucher.

4. This voucher guarantees a wait time of less than an hour.

5. They will be given a free surprise gift if they are one of the first 50 women.

6. They will not be seen without a voucher.

7. The voucher is only for them, not for anyone else. No one else can use this voucher.

For Individual Women:

1. This voucher guarantees quick, easy, private access to Depo-Provera and Jadelle. The husband does not know about this voucher, and no one will require any husband involvement. It is completely up to the woman whether or not to tell her husband about this voucher.

2. They are one of the lucky women chosen to receive a special, limited-time offer of guaranteed quick, easy access to family planning methods like Jadelle and Depo-Provera provided these methods are medically appropriate for them.

3. This voucher will also give them access to other family planning methods available at Chipata Clinic.

4. They should ask for our dedicated family planning nurse Grace Daka. She is available at Chipata Clinic Monday through Saturday from 13-17 hours until the expiration date written on the voucher.

5. This voucher guarantees a wait time of less than an hour.

6. They will be given a free surprise gift if they visit the clinic if they are one of the first fifty women.

7. They will not be seen without a voucher.

8. The voucher is only for them, not for anyone else. No one else can use this voucher.

Ashraf, Field and Buessing (2012)

References

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Fehr, Ernst, Oliver Hart, and Christian Zehnder. 2011. "Contracts as Reference Points - Experimental Evidence." *American Economic Review*, 101(2): 493–525.

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Figure A.1: Gender gap in mean ideal number of children
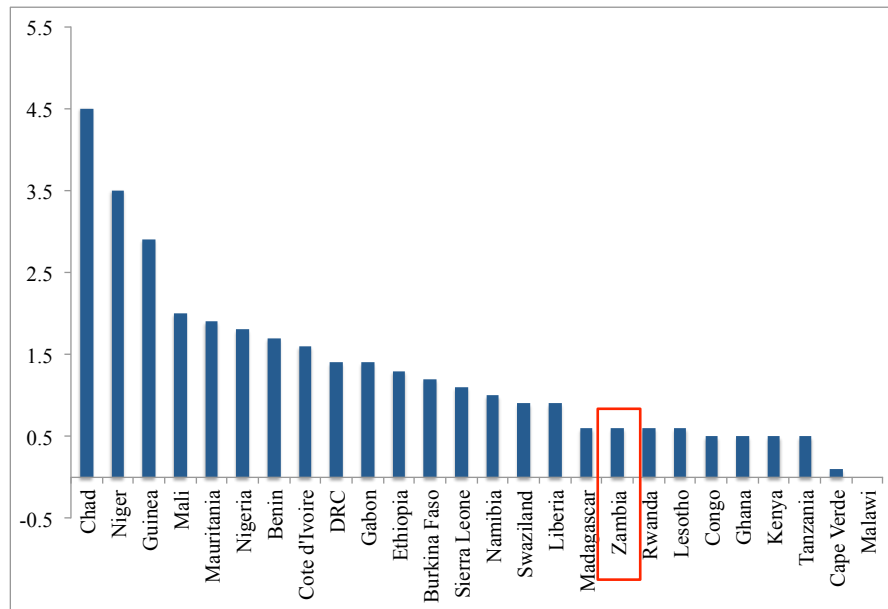
Source: Westoff (2010).

Table A.1: Summary Statistics for Recruited Sample

	Individual Treatment			Couples Treatment			
	Mean	SE	N	Mean	SE	N	P-Value
Panel A							
Highest schooling attained	6.672	0.190	472	6.524	0.135	460	0.437
Husband's highest schooling attained (reported by wife)	9.623	0.176	475	9.411	0.125	455	0.227
Ideal number of children	3.939	0.0979	528	3.964	0.0700	503	0.800
Age	27.47	0.380	528	27.51	0.272	499	0.918
Husband's age (reported by wife)	34.31	0.456	461	34.26	0.326	442	0.909
Husband's ideal number of children (reported by wife)	4.233	0.123	490	4.244	0.0879	464	0.929
Has ever used a modern contraceptive method	0.886	0.0206	528	0.865	0.0147	503	0.295
Wife has monthly income	0.347	0.0301	528	0.394	0.0215	503	0.118
Wife knows when she is most fertile	0.158	0.0227	482	0.124	0.0162	460	0.137
Wife wants to become pregnant in following 2 years	0.252	0.0273	528	0.264	0.0195	503	0.646
Age wife married	19.42	0.262	521	19.15	0.188	497	0.301
Catholic	0.231	0.0263	528	0.231	0.0188	503	0.987
Comparison of happiness with other women in region							
(1=very unhappy, 5=very happy)	3.576	0.0551	528	3.559	0.0394	503	0.756
Comparison of health with other women in region							
(1=very poor, 5=excellent)	3.619	0.0477	528	3.651	0.0342	502	0.502
Number of years respondent lived in Lusaka	18.24	0.674	528	18.06	0.483	501	0.790
Couple has electricity	0.384	0.0304	528	0.388	0.0217	503	0.916
Formally married	0.865	0.0209	527	0.877	0.0150	503	0.584
Number of days in past 7 days couple has sex	2.019	0.102	523	2.002	0.0731	501	0.867
Number of days in past month couple has sex	7.929	0.337	523	7.891	0.242	496	0.910
Number of children husband has with other women	0.308	0.0291	510	0.300	0.0207	494	0.777
Frequency at which couple has talked about contraception in last							
year	1.723	0.0671	528	1.684	0.0480	503	0.555
Couple has ever disagreed on number of children	0.136	0.0214	528	0.137	0.0153	503	0.970
Couple has ever disagreed on contraception use	0.120	0.0204	527	0.125	0.0146	503	0.780
Have used contraceptive method without husband's knowledge	0.160	0.0227	526	0.152	0.0162	501	0.724
Husband drinks at least 2 to 3 times a week	0.432	0.0309	528	0.423	0.0221	503	0.787
Husband has ever threatened physical violence	0.540	0.0310	528	0.559	0.0222	503	0.543
Wife ever pressured to have sex	0.546	0.0311	527	0.543	0.0222	503	0.904
Husband does budgeting	0.140	0.0218	527	0.143	0.0156	502	0.890
Husband decides major purchases	0.650	0.0298	525	0.648	0.0213	503	0.962
Joint F Statistic							11.90
P-value							0.998
Panel B							
Using any method at baseline	0.844	0.0223	527	0.855	0.0160	498	0.622
Number of living children	2.922	0.112	527	2.903	0.0803	497	0.867
Using injectable at baseline	0.194	0.0253	527	0.219	0.0181	498	0.317
Using pill at baseline	0.292	0.0283	527	0.279	0.0203	498	0.643
Using a hormonal contraceptive at baseline	0.488	0.0313	527	0.506	0.0224	498	0.557
Has ever used an injectable contraceptive method	0.405	0.0307	528	0.416	0.0220	503	0.739
Months sine last birth (at recruitment)	15.46	0.377	527	15.30	0.271	498	0.653
Husband's age (reported by husband)	33.89	0.561	380	34.21	0.398	375	0.561
Husband's highest schooling attained (reported by husband)	8.814	0.211	382	8.699	0.150	375	0.585
Husband's ideal number of children (reported by husband)	4.204	0.148	378	4.433	0.105	372	0.122
Husband's average monthly income (1,000 USD) (reported by husband)	0.130	0.0158	382	0.153	0.0113	375	0.159
Wife earned money in previous month	0.398	0.0309	525	0.446	0.0221	498	0.123
Husband works 40+ hours	0.588	0.0317	505	0.554	0.0228	473	0.280
Wife ever pressured violently to have sex	0.135	0.0218	524	0.148	0.0156	501	0.575
Husband decides savings	0.617	0.0303	528	0.628	0.0217	500	0.727
Husband holds the money	0.159	0.0231	521	0.166	0.0165	499	0.762

Table A.2: Final Experimental Sample vs. DHS Summary Statistics

	Final Experimental Sample			DHS 2007 All Women Ages 15-49 Urban Locations			DHS 2007 All Women Ages 15-49 All Locations		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Variables Used to Balance Sample									
Age	27.61	6.22	746	31.20	0.40	787	30.91	0.13	5,420
Highest schooling attained	6.58	2.93	678	7.50	0.36	787	5.95	0.13	5,420
Number of living children	2.97	1.80	743	2.96	0.09	787	3.40	0.04	5,420
Ideal number of children	3.96	1.57	749	4.28	0.09	771	4.98	0.05	5,068
Difference in husband's ideal and wife's ideal number of children (reported by wife)	0.29	1.32	705						
Using injectable at baseline	0.24	0.43	749	0.11	0.02	787	0.08	0.01	5,420
Using pill at baseline	0.31	0.46	749	0.13	0.02	787	0.10	0.00	5,420
Other Observable Characteristics									
Husband's age (reported by wife)	34.48	7.05	666	37.25	0.66	569	37.44	0.19	4,142
Husband's age (reported by husband)	34.02	7.70	747						
Husband's highest schooling attained (reported by wife)	9.46	2.67	680	12.58	0.85	726	10.39	0.29	4,985
Husband's highest schooling attained (reported by husband)	8.76	2.91	749						
Husband's ideal number of children (reported by wife)	4.23	1.88	705						
Husband's ideal number of children (reported by husband)	4.30	2.02	742						
Using any modern contraceptive method at baseline	0.55	0.50	749	0.36	0.02	787	0.31	0.01	5,420
Have ever used a modern contraceptive method	0.83	0.37	749	0.81	0.02	787	0.69	0.01	5,420
Average wealth quintile (1=poorest)				4.43	0.09	787	3.04	0.07	5,420
Average monthly household income (1,000 USD)	0.03	0.07	749						
Husband's average monthly income (1,000 USD) (reported by husband)	0.14	0.22	749						
Wife knows when she is most fertile	0.12	0.33	685						
Wife would like to have a child in following 2 years	0.27	0.44	749	0.15		502	0.13		3751
Formally married	0.88	0.32	749						
Intimacy and Violence Measures									
Difference in husband's and wife's income	0.30	0.67	743						
Difference in husband's and wife's age	6.47	3.95	666	6.12	0.26	569	6.35	0.08	4,142
Difference in husband's and wife's education	2.81	2.94	613	5.19	0.70	726	4.59	0.27	4,985
Difference in wife's perception of husband's ideal and husband's actual ideal number of children	-0.04	1.89	700						
Husband wants more children	0.28	0.45	705	0.16		558	0.23		4,077
Husband wants same number of children	0.59	0.49	705	0.48		558	0.36		4,077
Husband wants less children	0.13	0.34	705	0.09		558	0.06		4,077
Number of days in past 7 days couple had sex	2.07	1.65	742	0.47	0.02	787	0.47	0.01	5,412
Number of children husband has with other women	0.57	1.16	731						
Frequency at which couple has talked about contraception in last year	1.74	1.05	749						
Couple has ever disagreed on number of children	0.13	0.34	749						
Couple has ever disagreed on contraception use	0.11	0.31	749						
Have used contraceptive method without husband's knowledge	0.14	0.35	747						
Husband has ever threatened physical violence	0.54	0.50	749						
Husband has ever been physically violent conditional on having threatened violence	0.67	0.47	402						
Wife ever pressured to have sex	0.51	0.50	749						
Wife ever pressured violently to have sex	0.14	0.35	745						
Financial Decision Making Measures									
Husband decides savings	0.62	0.49	746						
Husband holds the money	0.17	0.37	740						
Husband does budgeting	0.15	0.36	748						
Husband decides major purchases	0.65	0.48	748	0.34	0.03	571	0.44	0.01	4,160

Notes:

[1] Final experimental sample includes all households that received a voucher ("Final sample").

[2] See Notes to Table 1a.

[3] Variables 26 through 28 were asked differently across the two surveys. The DHS asked directly "Does your husband want more, fewer, or the same number of kids as you do", whereas in our data these variables were constructed from separate survey questions regarding the wife's ideal number of children and her perception of her husband's ideal number of children. The higher reporting of husbands who want the same number of children in the latter study could also be a result of the ordering of the questions, since the wife was asked what she thinks her husband's ideal number of children is soon after she was asked about her ideal number.

[4] Variable 20, "Wife would like to have a child in 2 years", was also defined differently across the two surveys. In our survey data, a respondent was said to want a child in the next two years if she either answered "within two years" to the question "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?" or if she answered 0 to 24 months when asked "If it were completely up to you, how long would you like to wait until the birth of another child?", whereas the DHS survey only contains the former question.

Table A.3: Summary Statistics for Responder Sample

	Individual Treatment			Couples Treatment			
	Mean	SE	N	Mean	SE	N	P-Value
Panel A							
Highest schooling attained	7.048	0.434	84	6.957	0.322	69	0.834
Husband's highest schooling attained (reported by wife)	9.683	0.430	82	9.250	0.318	68	0.316
Ideal number of children	3.400	0.229	95	3.405	0.172	74	0.981
Age	27.11	0.911	95	27.43	0.683	74	0.720
Husband's age (reported by wife)	34.16	1.173	88	33.78	0.878	69	0.749
Husband's ideal number of children (reported by wife)	4.642	0.331	95	5.068	0.248	74	0.200
Has ever used a modern contraceptive method	0.884	0.0514	95	0.865	0.0386	74	0.707
Wife has monthly income	0.263	0.0720	95	0.392	0.0540	74	0.0758
Wife knows when she is most fertile	0.131	0.0538	84	0.106	0.0402	66	0.644
Wife wants to become pregnant in following 2 years	0	0	95	0	0	74	.
Age wife married	19.96	0.705	93	18.89	0.528	73	0.132
Catholic	0.253	0.0684	95	0.270	0.0513	74	0.797
Comparison of happiness with other women in region							
(1=very unhappy, 5=very happy)	3.579	0.139	95	3.608	0.104	74	0.834
Comparison of health with other women in region							
(1=very poor, 5=excellent)	3.621	0.117	95	3.703	0.0881	74	0.488
Number of years respondent lived in Lusaka	18.86	1.645	95	16.08	1.233	74	0.0926
Couple has electricity	0.316	0.0739	95	0.378	0.0554	74	0.398
Formally married	0.874	0.0480	95	0.919	0.0360	74	0.347
Number of days in past 7 days couple has sex	2.011	0.249	92	1.865	0.185	74	0.558
Number of days in past month couple has sex	8.170	0.863	94	8.865	0.646	74	0.422
Number of children husband has with other women	0.301	0.0718	93	0.297	0.0536	74	0.958
Frequency at which couple has talked about contraception in last							
year	1.663	0.159	95	1.851	0.120	74	0.240
Couple has ever disagreed on number of children	0.253	0.0679	95	0.257	0.0509	74	0.952
Couple has ever disagreed on contraception use	0.126	0.0535	95	0.149	0.0401	74	0.677
Have used contraceptive method without husband's knowledge	0.189	0.0569	95	0.122	0.0427	74	0.235
Husband drinks at least 2 to 3 times a week	0.432	0.0754	95	0.324	0.0566	74	0.157
Husband has ever threatened physical violence	0.537	0.0778	95	0.541	0.0583	74	0.962
Wife ever pressured to have sex	0.484	0.0775	95	0.581	0.0581	74	0.213
Husband does budgeting	0.158	0.0563	95	0.149	0.0422	74	0.870
Husband decides major purchases	0.674	0.0745	95	0.608	0.0558	74	0.380
Joint F Statistic							28.07
P-value							0.461
Panel B							
Using any method at baseline	0.884	0.0518	95	0.863	0.0389	73	0.683
Number of living children	2.674	0.243	95	2.973	0.183	73	0.221
Using injectable at baseline	0.274	0.0625	95	0.123	0.0470	73	0.0172
Using pill at baseline	0.326	0.0744	95	0.370	0.0559	73	0.559
Using a hormonal contraceptive at baseline	0.600	0.0774	95	0.507	0.0582	73	0.230
Has ever used an injectable contraceptive method	0.516	0.0772	95	0.392	0.0579	74	0.110
Months sine last birth (at recruitment)	15.20	1.012	95	15.63	0.761	73	0.671
Husband's age (reported by husband)	33.35	1.252	95	34.04	0.938	74	0.580
Husband's highest schooling attained (reported by husband)	8.968	0.440	95	8.743	0.330	74	0.609
Husband's ideal number of children (reported by husband)	4.053	0.320	94	4.392	0.239	74	0.291
Husband's average monthly income (1,000 USD) (reported by husband)	0.119	0.0382	95	0.163	0.0286	74	0.250
Wife earned money in previous month	0.298	0.0747	94	0.466	0.0560	73	0.0259
Husband works 40+ hours	0.600	0.0784	90	0.592	0.0586	71	0.914
Wife ever pressured violently to have sex	0.118	0.0501	93	0.110	0.0375	73	0.862
Husband decides savings	0.653	0.0753	95	0.595	0.0564	74	0.442
Husband holds the money	0.147	0.0578	95	0.181	0.0436	72	0.567