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SUBJECTIVE EXPECTATIONS AND DEMAND FOR CONTRACEPTION

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ABSTRACT

One-quarter of married, fertile-age women in Sub-Saharan Africa report not wanting a pregnancy and yet do not practice contraception. We collect detailed data on the subjective beliefs of married, adult women not wanting a pregnancy and estimate a structural model of contraceptive choices. Both our structural model and a validation exercise using an exogenous shock to beliefs show that correcting women's beliefs about pregnancy risk absent contraception can increase use considerably. Our structural estimates further indicate that costly interventions like eliminating supply constraints would only modestly increase contraceptive use, while confirming the importance of partners' preferences highlighted in related literature.

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1 Introduction

Total fertility rates in low-income countries remain high, averaging 4.6 children per woman (World Development Indicators, 2019). Importantly, these appear markedly higher than desired by women: in nationally representative surveys, about one quarter of married, fertile-age women in these countries state that they do not wish to become pregnant, but are also not using contraceptives — a phenomenon commonly referred to as "unmet need for family planning." This results in over 52 million unwanted pregnancies and about 70,000 maternal deaths due to unsafe abortions each year (Singh et al., 2014). However, there is surprisingly little systematic evidence about why this so-called unmet need persists.

On the supply-side, fewer than 10% of married women with unmet need across 52 low-income countries cite high cost or inadequate supply as the primary reason for not using contraceptives (Sedgh et al., 2016), and the results of randomized controlled trials providing subsidies for contraceptive use are mixed — e.g., Chin-Quee et al. (2010) and Desai and Tarozzi (2011) find no effect while Anukriti et al. (2021) and Athey et al. (2021) do, suggesting that the importance of supply-side constraints varies across settings. On the demand side, high fertility is strongly correlated with high *desired* fertility (Pritchett, 1994), but very little is known in quantitative terms about the causes of the gap between women's fertility intentions and the practice of contraceptive methods beyond evidence that partner's preferences matter for contraceptive use generally (see, e.g., Ashraf et al., 2014, 2018; Cassidy et al., 2021, for experimental evidence). Notably, however, nearly half of women not using contraceptives but desiring to avoid pregnancy cite either breastfeeding/amenorrhea or infrequent sex as the primary reason for not using contraception (44% across the 52 countries included in Sedgh et al., 2016) — and may therefore incorrectly believe that they face a low risk of pregnancy.[1] If many women underestimate pregnancy risk absent contraception, then simply recalibrating their beliefs may increase contraceptive use.

In this paper, we use detailed data on the subjective beliefs of women in Mozambique to study the role of both supply- and demand-side determinants of *whether*- and *what* contraceptive to use among adult women in union who do not wish to become pregnant. We quantify women's preferences over a broad set of contraceptive choices and attributes using a structural model and use estimates to predict how contraceptive use would respond to a range of potential technologies and family planning program strategies. We then conduct a validation exercise in which we create an exogenous information shock by informing women about the average risk of pregnancy in the population absent contraception. This provides an estimate of the ("first-stage") effect of this

[1] Close to half (47%) of women reporting infrequent sex as a reason for not using contraception report having sex in the preceding three months. Most women reporting breastfeeding or post-partum amenorrhea as the main reason for not using contraception do not meet the World Health Organization (WHO) criteria for lactational amenorrhea as protection against pregnancy (Sedgh et al., 2016).

information treatment on beliefs about pregnancy risk and a ("reduced-form") effect on intentions to use contraception in the future, as well as allow us to evaluate our model predictions regarding *actual use* against this exogenous benchmark.

In doing so, we make four contributions to existing literature: two substantive- and two methodological ones. Substantively, our main contribution is to provide novel evidence — consistent across our structural estimates and reduced-form validation exercise — that women's own perceived probabilistic risk of pregnancy absent any form of contraception contributes to the widespread discrepancy between pregnancy intentions and contraceptive use. This is an important substantive contribution given the absence of previous evidence going beyond self-reported reasons for non-use or very coarse proxies such as a binary indicator for whether the woman believes her fecundity to be impaired (Nettleman et al., 2007; Mosher et al., 2015; Embafrash and Mekonnen, 2019; Gahungu et al., 2021).[2]

Our second substantive contribution is to document probabilistic beliefs about contraception (and the absence thereof) and use them to structurally model its demand *in a developing country*, a type of setting in which beliefs, preferences, and both economic and societal constraints are likely to differ substantially from those previously studied (namely, predominantly college students in the US in Delavande (2008) and young Japanese women in Nakamura (2016)).

We further make two methodological contributions. First, in addition to estimating a structural model closely related to Delavande (2008), we obtain reduced-form estimates from an exogenous information shock. Namely, we carry out an information intervention at the end of our survey, in which we compare women before- and after- we provide them information about the WHO reference risk of pregnancy within 12 months when not using contraception (85%, communicated as "Studies show that, on average, out of every 20 sexually active women of reproductive age who do not use any contraceptive method, 17 will get pregnant within the next 12 months"). Further to directly testing for immediate changes in beliefs and in intended contraceptive use, we are able to compare the effect of the exogenous information provision on intended contraceptive use with the effect on *actual* contraceptive use that our model predicts given the observed exogenous change in beliefs.

Our second methodological contribution is to devise a new test of experimenter demand effects (EDE) to address the potential concern that the updates in beliefs and intentions we observe after our information intervention may be systematically biased — e.g., because the subject wants to please the person who gave them the new information. Specifically, we model EDE

[2]Structural estimates in Delavande (2008) could be used to predict the effect of changing own perceived risk of pregnancy on non-use, but this aspect is not investigated in the study — understandably so since 97 out of the 100 women included in the analysis already use modern contraception. Nakamura (2016) also analyses demand for contraception in a similar subjective expected utility framework but focuses on the choice between different modern methods so that non-use is not modeled.

as a form of measurement error and derive testable implications of the presence of EDE in beliefs and in intentions to use contraception. These implications can then be tested by comparing different estimates of the effect of beliefs on intentions using data obtained both before- and after treatment. Intuitively, EDE — whether in beliefs or intentions or both — introduces bias in post-treatment estimates, so estimates using before- and after-treatment data should differ if EDE is present. "Within-subject experiments" comparing the beliefs of the same individuals before- and after they receive some information are the "most common approach to date in the literature" (Fuster and Zafar, 2022, , p. 119). They have higher power than between-subject experiments — whereby different subjects are randomized into receiving or not the information, but may be more prone to experimenter demand effects. A similar test to the one we propose can be applied in other contexts and complements prior approaches which are appealing but more costly as they rely on either additional, qualitative data collection to validate survey data (Blattman et al., 2019) or on additional treatment arms in which experimenter demand is made more or less explicit (De Quidt et al., 2018; Mummolo and Peterson, 2019).

We first find, descriptively, that women generally hold accurate (or plausible) beliefs along many dimensions, but forty percent of respondents underestimate the probability of pregnancy absent contraception and the majority underestimates the efficacy of hormonal contraceptives (in the latter case, on average by as much as 3-5 times the true efficacy for injections and implants, respectively).

Identifying information gaps is a necessary condition for improved information to lead to changes in outcomes. It is however not a sufficient condition, since individuals may not take the variables on which they have miscalibrated beliefs into account when making decisions. Our structural model provides estimates of the utility "weights" associated with these variables, which enables us to predict the effect of a range of counterfactuals. One key finding of this exercise is that fully correcting beliefs about pregnancy risk absent contraception among women who underestimate this risk raises contraceptive use by about 6.7 pp among this group and by 2.7 pp overall. This is in contrast to correcting beliefs about contraceptive efficacy, which the model reveals would have a negligible effect despite the very large underestimation of the efficacy of hormonal methods prevailing in our sample.

Strikingly, our structural analysis also shows that, in our context, common supply-side interventions are unlikely to effectively increase use: even the most dramatic (and costly) increase in supply, removing all direct and indirect monetary costs of contraceptives, eliminating waiting times, and removing uncertainty about availability increases contraceptive prevalence by only 1.1 percentage points (pp). Similarly, new technologies with no side effects increase contraceptive prevalence by about 0.3 pp. Alternatively, changing men's fertility preferences and their 'approval' of contraceptives is more effective — if feasible. Aligning fertility preferences between women

and their partners increases contraceptive prevalence by 2.4 pp, and setting women's expectations that their partners will approve available forms of contraception to 100% raises contraceptive prevalence by 7.5 pp.

The findings from our validation exercise further show that, once informed of the population average risk of pregnancy absent contraception, women realign their probabilistic beliefs about their own risk of pregnancy with this population statistic. The fact that beliefs about own risk of pregnancy strongly respond to information about average population risk suggests that the initial gap is less due to private information about own risk of pregnancy relative to the average woman than to incorrect beliefs about overall population risk.

Importantly, our structural estimates are consistent with findings based on exogenous variation in beliefs about own risk of pregnancy absent contraception. Among the main target of our information shock — namely women who, at baseline, believe to be at a lower risk of pregnancy absent contraception than the general population (i.e., below 85%) — our information intervention increases own expected risk of pregnancy absent contraception by 23.5pp and intention to use contraceptives in the future by 4.4pp. This is very close to our structural prediction of the effect of a 23.5pp change in beliefs on *actual* contraceptive use (4.8pp). Reassuringly, our tests do not suggest the presence of EDE on either beliefs or intentions to use contraception among this key group of women. Women whose baseline beliefs are above 85% revise their beliefs downwards, in line with our information message, but they do not decrease their intentions to use contraception, thus assuaging concerns about unintended consequences.

In addition to the prior literature reviewed above and to which our study most directly contributes, we add to the growing number of economic studies incorporating beliefs data — extensively reviewed in Bachmann et al. (2022), which have the advantage of allowing preferences to be disentangled from beliefs without assumptions about these beliefs — e.g., that the subjective expectation used by the individual when making decisions is equal to the average outcome observed in the population. Our work also complements existing research on the correlation between contraceptive use and demographic, socio-economic and community characteristics (e.g., Ainsworth et al., 1996; Stephenson et al., 2007; Wulifan et al., 2015; Gahungu et al., 2021) and on the impact of family planning programs (reviewed in Miller and Babiarz, 2016). Our study is further related to a rich literature which has produced mixed experimental evidence of the effect of providing information on health and education beliefs and behaviors in developing countries (Dupas and Miguel, 2017; Muralidharan, 2017; Ciancio et al., 2020).

In the rest of the paper, we provide details about context, data collection and surveyed women's characteristics (Section 2), describe the beliefs data (Section 3) and present the model and estimation approach (Section 4), before reporting our model estimates and counterfactuals (Section 5) and validation exercise (Section 6). Section 7 concludes.

2 Context, Data Collection and Respondents' Characteristics

2.1 Context

Even in Sub-Saharan Africa (SSA), where desired fertility is high (4 children), total fertility is 25% higher than desired fertility (5.1 children, on average across the 32 SSA countries studied in Sedgh et al., 2016). In addition, 24% of married women aged 15-49 in SSA have an unmet need for family planning (23.1% in Mozambique) (World Development Indicators, 2019). This gap between fertility desires and modern contraceptive use is only marginally filled by the use of traditional methods. Indeed, in Sub-Saharan Africa, 27.7% of married women aged 15-49 use modern contraception whereas 31.5% use either modern or "traditional" contraception such as periodical abstinence and withdrawal. The corresponding figures for Mozambique are 25.3% and 27.1% (World Development Indicators, 2019).

With a GDP per capita of only US $426 per capita in 2017, Mozambique is one of the poorest countries in the world. Fertility is just above the average in Sub-Saharan Africa of 4.8 children per woman, and has been decreasing only slowly: the Mozambican total fertility rate (TFR) was 5.9 in 1996, and 5.2 by 2017 (World Development Indicators, 2019).

In the three provinces in the south of the country in which we collected our data, according to MISAU, INE and ICF (2016) the TFR ranges from 2.5 children per woman in the capital city Maputo to 4.7 in Gaza Province and contraceptive prevalence ranges from 42% to 47% (as in Kenya or Malawi in 2010).

2.2 Data Collection and Respondents' Characteristics

In keeping with the focus of our research — namely the causes of the gap between women's fertility intentions and contraceptive use — we only collected data from women who state that they do not want to have another child at least in the coming two years (following the Demographic and Health Surveys' cutoff) and who were likely to need contraception to achieve their fertility intention. Note that the wording of the questions about fertility desires follows the exact wording of the Demographic and Health Survey to speak directly to the policy debate surrounding unmet need. This, however, comes with the limitation that different respondents may give different answers if they have different perceived costs of contraception despite having the same fertility desires holding the cost of contraception constant. This could potentially result in women with high expected costs of contraception (monetary or otherwise) being less likely to be sampled.

More specifically, we used a screening questionnaire to identify women who: (1) were between

18 and 49, (2) were currently married or living maritally, (3) whose husband or partner, if working away, normally returned home at least once per month, (4) did not identify as infecund when asked about their pregnancy intentions, (5) were not pregnant, and (6) did not want any more children or wanted more but did not want another child in the coming two years. Out of the 758 women screened, 107 were deemed ineligible due to criteria (1) to (6). We also asked the remaining 651 women how likely they would be to state the same fertility intentions if the enumerator came one month later and asked them the same questions, and they all answered that they would either "certainly" (86%) or "probably" (14%) give the same answers.

The probabilistic beliefs survey instrument followed best practices in the area, including the inclusion of a training module and the use of visual aids (dried beans on a grid) (Delavande et al., 2011; Delavande and Kohler, 2012).[3] As part of the training module, respondents were asked questions about events they are familiar with such as the probability that they will go to the market in the coming 2 days/2 weeks, creating opportunities for the respondents to receive feedback on the consistency of their responses. After completing the training module, the respondents received no comments on their answers.

Using the same wording as in the DHS, we identified women's knowledge of contraceptive methods, prompting them with a brief description whenever they did not immediately say they knew of a method. For all the methods (modern or "traditional") that the respondent said they knew of, as well as for the "no method" alternative, we elicited women's probabilistic beliefs about all the main factors which previous literature has suggested may matter in the decision to use a contraceptive method. We asked about the expected direct costs and indirect costs (e.g., transport costs) of using each method they knew of, as well as about their expected chance of: pregnancy within 12 months; contracting a STD within 12 months; experiencing nausea or headaches; experiencing menstrual irregularities or vaginal infections; experiencing "other" negative side effects;[4] alteration of (their or their partner's) libido or sexual pleasure or interference with romance; getting pregnant within 12 months of discontinuation if wanting to get pregnant; obtaining the method when needed; approval by their partner; being able to use the method — or not using any method in the case of the "no method" alternative — without their partner's knowledge, if for any reason the respondent did not want their partner to know.[5] Responses to the latter question is our measure

[3] Based on evidence presented in Delavande et al. (2011), we asked respondents to express their answers out of 20 rather than out of 10 to improve precision.

[4] After being asked about nausea/headaches and menstrual irregularities, respondents were asked about their chances of "experiencing other negative effects on their health or day-to-day activities as a result of using" each method. This question is aimed at capturing health concerns about contraceptive use, whether relating to actual risks (e.g., breast discomfort, acne, mood swings, etc...) or not.

[5] Pregnancy risk and risk of contracting a STD within 12 months combine expected frequency/timing of intercourse and perceived risk per intercourse. If some women under-report perceived risks over 12 months absent contraception to avoid the potential stigma associated with frequent sex, this may bias our estimates. But as discussed in Section 6.2 (p.36), our data suggests that this is unlikely.

of perceived concealability. After eliciting women's probabilistic beliefs about contraception, we also asked, among others, about their intentions to use contraception in the future (following the DHS wording of "Do you intend to use a method to postpone or prevent getting pregnant, at some point in the future? Yes/No/Don't know"), about their partner's desired fertility, and about their sexual activity in the previous month and previous three months.[6]

Figure 1 provides an overview of the survey structure. An English translation of the full questionnaire can be found in Appendix A-7.

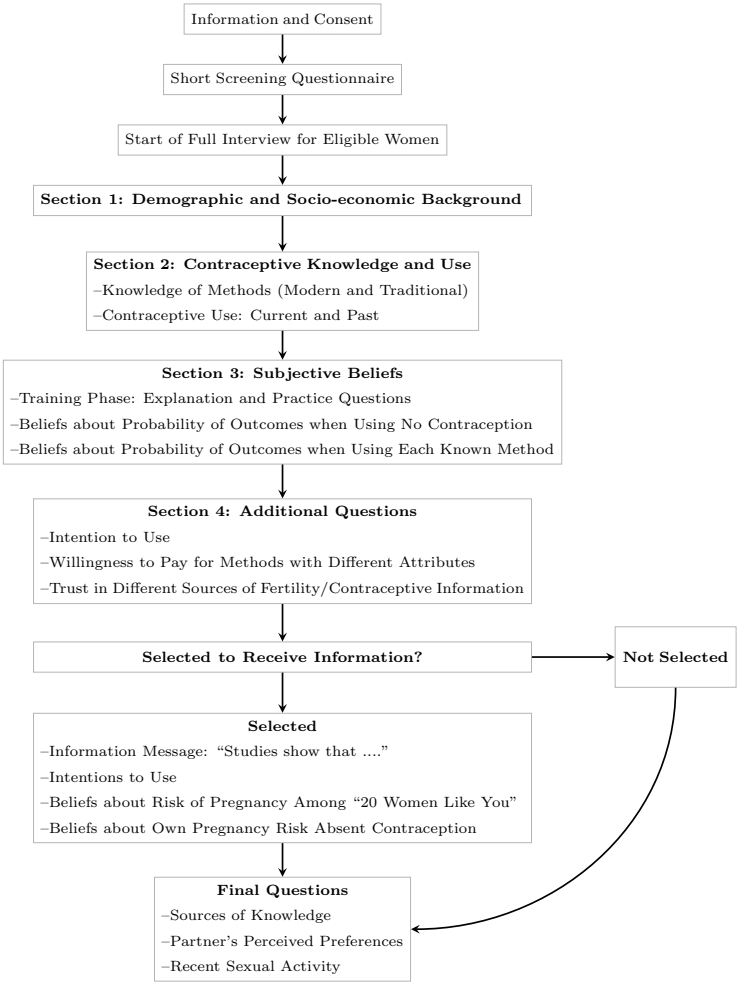

Figure 1: Questionnaire Overview
See Appendix A-7 for an English translation of the full questionnaire.

The survey collected data across nine districts of three provinces in Southern Mozambique

[6]To limit respondent fatigue and for comparability with the DHS, we elicit binary intentions to use contraception instead of choice probabilities. See Stinebrickner and Stinebrickner (2014) for a thorough discussion of the benefits of eliciting choice probabilities.

(Maputo city, Maputo Province and Gaza Province) between January and February, 2018. The door-to-door recruitment of respondents was guided by targets for the distribution of women's level of education based on the latest Demographic and Health Survey (DHS) at the time of fieldwork (DHS 2011) — the targeted proportions were achieved within a maximum 3 pp margin of error.

The enumerators carried out full interviews with 651 eligible women. Of these women, 20 are not sexually active (i.e., report not having had sex in the previous three months) and 24 qualify as infecund based on the DHS definition, and so we drop them from the sample.[7] We also drop 23 women who say they use family planning strategies other than the five main options we consider (injections, no family planning, contraceptive pill, implants and male condoms), such as IUDs (10 women) and traditional methods (6 women) as the number of women using each of these methods is too limited to allow estimation. Out of the 584 women in the resulting analytical sample, 14 women use a combination of methods (i.e., some combination of condom and hormonal method, except for one case combining the pill and implants). In the 13 cases combining a hormonal method with male condoms, we assign the woman to the hormonal method under the assumption that, in these cases, condoms are used mainly for protection against STDs rather than family planning. In the remaining case in which the pill and implants are combined, we assign the woman to implants as it is the most effective of the two methods and it seems likely that the pill was prescribed in order to combat the implants' side effects such as to regulate bleeding.

Respondents' characteristics are described in detail (Table A-1) and compared to those from a representative survey (Table A-2) in Appendix A-1. To summarize, the modal age group in our sample is 25-34 and the typical woman has either some primary schooling (44%) or some secondary schooling or above (42%), and women have on average 2.6 children. Thirty percent of our respondents are not using any contraceptive method despite all saying that they do not want to have a child (at least in the coming two years) and respondents knowing, on average, 5.4 contraceptive methods. The most popular contraceptive method is injections, followed by the pill, implants and male condoms. This is largely similar to the method mix reported among comparable women in the latest relevant representative survey, the 2015 AIDS Indicator Survey (AIS).

3 Beliefs Data

3.1 Data Validity

To check the extent to which respondents understand the concept of probability — although the word "probability" was not used when eliciting beliefs, we asked respondents to show the

[7] I.e., they started living maritally five or more years before the interview, are not currently using and have never used contraception, but have not had a child in the past five years and are not pregnant.

enumerator the number of dried beans (out of 20) that best reflected their chance of getting pregnant in the coming year, and then in the coming 5 years. Under 8% of women responded a larger probability in the coming year than in the coming 5 years at their first attempt. After the enumerator explained to these women that she expected a response indicating a larger probability in the coming 5 years than in the coming year as she would have 4 more years, 5% of women still give a lower probability of getting pregnant within 5 than within 1 year. In a robustness check, we exclude these women from the sample and find similar results. Note that, in this training phase, respondents were asked about their perceived risk of pregnancy without specifying whether using contraception or not. Other than in this robustness check, answers to these training questions about the woman's perceived chance of pregnancy in the next 12 months or 5 years were not used in the analysis.

We also asked women to tell us, for four different months in the calendar year (April 2018, July 2018, October 2018, and January 2019), the number of beans which best reflected the probability that it would rain in any given day during this month. While in the years prior to the survey there was much year-on-year variability in the number of rainy days in April and July, women should know that January is the peak of the rainy season while October is a reliably mostly dry month.[8] Figure A-1 shows the distribution of the difference between the expected probability of rain in any given day in January and October. The average difference in answers for the two months is 3.6 beans, compared to an actual difference — expressed in 5-percentage point beans — of 6.2 (3.7) between 2015 and 2017 (2009 and 2018). This suggests that women understood the survey instruments well and elicited probabilistic beliefs are reliable.

Reassuringly, women answer 95.4% of beliefs questions on average, 72% of women have at most 5% of missing answers and only 2% of women have 25% or more missing answers. Table A-3 also reports details of missing values by method and by belief, and Section A-3 shows that our main findings are robust to excluding women with any missing answers. Another possible concern in these types of data is "bunching" at focal values like 0%, 50%, or 100% (see Dominitz and Manski (1997)). Only five respondents concentrate all their answers in the values 0, 5, 10, 15 or 20 out of 20 beans and our conclusions are unaffected by their exclusion from the sample (see Section A-3).

3.2 Descriptive Statistics

Table 1 reports selected probabilistic beliefs statistics where answers out of 20 dried beans are converted in probabilities (out of 1) for convenience. For conciseness, in this subsection we only

[8] The number of rainy days by month between 2015 and 2017 is: 9 to 16 in April, 2 to 13 in July, 16 to 19 in January and 7 to 8 in October (`https://www.worldweatheronline.com/maputo-weather-averages/maputo/mz.aspx`).

highlight some key features of our sample's beliefs about themselves.[9] Descriptive statistics for the other alternative-specific beliefs can be found in Table A-4, and a longer discussion of the beliefs held by the women in our sample is provided in Appendix A-2.

The women in our sample appear to have a very good knowledge of the risk of pregnancy when using condoms. They report this risk to be 17% on average, which is within the 13%-18% pregnancy risk under typical use reported by the WHO.[10] Their average expected probability of pregnancy when using no method is high (78%), but it is slightly lower than the risk in the general population of sexually active women according to the WHO (85%) (WHO/RHR, 2016; WHO/RHR and CCP, Knowledge for Health Project, 2018). While it is not possible to say exactly what the true risk of pregnancy is for the women in our sample under each method, the risk incurred when using methods such as implants, for which there is no variability coming from user's adherence to instructions, should be close to the WHO effectiveness statistics unless the quality of contraceptive products or insertion is questionable. Estimates under common use — and therefore taking into account unreliable/low quality supply issues and delays in renewal — range, across developed and developing countries, from a failure rate of 0.05% for implants to 6% for injections over the course of one year (WHO/RHR, 2016; WHO/RHR and CCP, Knowledge for Health Project, 2018; Polis et al., 2016), and failure rates in Mozambique are *below* the median based on data from 43 DHS surveys (Polis et al., 2016). Given this, women appear to vastly overestimate the risk of contraceptive failure associated with these methods, which are at least three times more effective than indicated by the average sample beliefs.[11] Since the smallest non-zero probability respondents can assign to an event is 5 pp (1 bean) and previous evidence supports the hypothesis that individuals have an aversion to hold or report beliefs close to certainty (reviewed in Benjamin, 2019), it is perhaps not surprising that respondents tend to over-estimate the risk of pregnancy when using implants. However, the average risk of pregnancy associated with implants is 25%, or much more than what can be explained by the limited range of possible responses. Interestingly, Table 3 shows that users of hormonal methods are not better informed about these methods' risk of failure suggesting little learning from own use, as further discussed in Section 5.3 — and consistent with the idea that women rely on information about their wider peer group or other common sources of information rather than extrapolating from their own, single experience.

As in many other developing countries today, family planning methods are available free of

[9] We did not collect data on population beliefs or beliefs about "20 women like you" until women received the information shock described in Section 6.1.

[10] See WHO/RHR (2016) and WHO/RHR and CCP, Knowledge for Health Project (2018). These are based on the "best available source as determined by authors" (p. 383 of WHO/RHR and CCP, Knowledge for Health Project, 2018). Data from self-reports in developing countries uncorrected for underreporting of abortion indicate a lower rate of unintended pregnancies with male condoms (median of 5.4% Polis et al., 2016).

[11] One threat to adherence to the prescribed use of hormonal methods may be issues with method renewal. But the expected chance of obtaining hormonal methods when needed in our sample is very high (82-86%, see Table A-4).

charge in government facilities in Mozambique, and are also available at a cost from private providers. Consistent with the fact that, except for male condoms, at least 85% of users in the last DHS (2011) obtained their contraceptives from public providers, expected direct monetary costs are low (from 14 to 27 Meticais per month or an annual cost of no more than about 1% of GDP per capita).[12]

We also elicited women's expected probability of approval of each alternative contraceptive method by their coreligionists (i.e., individuals who share the same religion, whose opinions may or not align with the position of religious *authorities*), as well as their parents, friends and partner. Expected approval by coreligionists, friends and parents are thought of as capturing both opposition from people whose opinions women may value and opposition by the woman herself due to religious or cultural reasons. The women's expected probability of approval by others is generally low (60% or less), especially in the case of coreligionists. As expected, women who say that their partners want more children or want them earlier than them have a lower expected probability that their partners would approve of them using a method relative to not using a method.[13] Partners' fertility preferences — which do not vary within woman — are however not the only driver of differences in expected approval across alternatives, which vary within woman: the pairwise coefficient of correlation (ρ) in partner approval across the three hormonal methods is between .68 and .69, and that between condoms and hormonal methods between .37 and .47. Similarly, approval of the "no method" alternative is overall largely uncorrelated with that of specific contraceptive methods (ρ between -.12 and -.01) even though, unsurprisingly, over a quarter of women expecting a high chance (15/20 and above) of partner approval of injections expect a zero chance of approval of the no method alternative, for instance. Taken together, these data suggest that (i) many women believe that their partners are willing to use contraception to achieve the women's family plan even though they personally do not wish to avoid a pregnancy and (ii) method-specific attributes influence partners' willingness to use them.

[12] We are not aware of a survey of contraceptive prices in private facilities in Mozambique around the relevant time period, but follow Stover and Chandler (2017)'s advice of using data from Kenya as closest substitute, which we report in the top panel of Table 1. If costs in Kenya were similar to those in the three provinces of Mozambique in which we collected data, then it would suggest that respondents overestimate costs, although still expecting them to be relatively low. It is however possible that private facilities in these provinces charge more than the Kenyan average.

[13] For instance, the expected probability of approval if using injections minus the expected probability of approval if not using any method is 25 (2) pp on average among women whose partners have similar (higher) fertility preferences.

Table 1: Summary Statistics for Selected Alternative-Specific Variables

	If using:	Condoms	Implants	Injections	No Method	Pill
WHO P(Pregnancy w/i 12 months)		*0.18*	*0.01*	*0.06*	*0.85*	*0.09*
Average Monthly Costs (Metical): Private		*8.43*	*206.46*	*9.92*	*N/A*	*11.16*
Average Monthly Costs (Metical): Public		*0*	*0*	*0*	*N/A*	*0*
Nausea Risk		*N/A*	*0.01-0.03*	*0.02-0.04*	*N/A*	*0.2-0.4*
Menstrual Irreg.		*N/A*	*0.5-0.6*	*0.7-0.8*	*N/A*	*0.14-0.5*
Other Side Effects		*N/A*	*0.38*	*0.38*	*N/A*	*0.6*
P(Pregnancy within	Mean	0.17	0.25	0.19	0.78	0.35
12 mths)	SD	0.27	0.25	0.23	0.26	0.3
	Obs.	553	469	537	579	540
P(STD within	Mean	0.14	0.79	0.78	0.75	0.78
12 months)	SD	0.27	0.24	0.24	0.27	0.24
	Obs.	557	494	550	566	549
E(Method Cost)	Mean	22.47	25.64	27.03	0	14.07
	SD	130.85	190.58	196.86	0	99.16
	Obs.	554	498	549	584	545
E(Other Costs)	Mean	22.58	27.37	36.55	0	24.07
	SD	171.70	194.50	249.78	0	208.58
	Obs.	554	498	550	584	547
P(Menstrual Irreg.	Mean	0.06	0.52	0.58	0	0.46
or Vaginal Infections)	SD	0.18	0.26	0.30	0	0.31
	Obs.	540	430	529	584	517
P(Nausea or Headache)	Mean	0.03	0.24	0.21	0	0.44
	SD	0.116	0.265	0.258	0	0.319
	Obs.	539	414	507	584	503
P(Other Negative	Mean	0.06	0.33	0.31	0	0.31
Effects)	SD	0.164	0.266	0.296	0	0.272
	Obs.	539	440	523	584	516
P(Altered Libido,	Mean	0.26	0.15	0.19	0	0.14
Pleasure or Romance)	SD	0.32	0.22	0.27	0	0.24
	Obs.	533	418	513	584	497
P(Pregnancy after	Mean	0.81	0.69	0.69	0.73	0.75
Discontinuation)	SD	0.293	0.24	0.25	0.29	0.23
	Obs.	552	462	534	575	539
P(Partner Approval)	Mean	0.55	0.54	0.58	0.4	0.6
	SD	0.32	0.30	0.32	0.34	0.31
	Obs.	554	491	550	574	549
P(Hide from Partner)	Mean	0.05	0.32	0.42	0.32	0.38
	SD	0.18	0.30	0.34	0.33	0.32
	Obs.	558	487	550	573	551

Source: Reference figures in italics: WHO/RHR (2016), WHO/RHR and CCP, Knowledge for Health Project (2018). Side effect risks are from Burkman (2001) and Odwe et al. (2020). Private practice prices come from Stover and Chandler (2017). Public facility prices are all free (Global Development Support, 2017).. For all other figures: survey described in Section 2.2. P(·) stands for "probability of event happening" and E(·) is the expectation operator. "STD" refers to the perceived probability of contracting a STD. Costs are expected monthly costs. When the number of observations is less than 584, this is due to either some women not knowing of the relevant method and therefore the method not being in her choice set (see the last column of Panel B of Table A-1 for the number of women who know of each method), or to women not answering a question about a method (see Table A-3 for details of item non-response). Waiting time corresponds to the middle of the interval chosen by respondents and is expressed in minutes. Top 1% in terms of costs and waiting times removed.

In summary, women in our sample are, on average, well informed about the failure rate of the male condom method, but a large minority underestimates the probability of pregnancy when not using any contraception and the average respondent vastly overestimates (by a factor of 3 or more) the probability of pregnancy when using hormonal methods, resulting in a large underestimation of the ability of hormonal methods to protect women against pregnancy relative to using no method. Reassuringly, however, women do not generally appear to be under the misconception that hormonal methods have adverse effects on their ability to get pregnant after discontinuation. Women also understand perfectly well that only condoms protect against STDs, and have a high expected risk of contracting STDs when using no protection. Expected monetary costs, waiting times and other issues with supply are low. The expected probability of side effects is high and within a reasonable range compared to external sources, although our respondents do not fully appreciate the differences in risk levels between injections/implants compared to the pill. Finally, expected rates of "approval" by others are low for every available alternative that the women could choose including using no method.

Another important characteristic of these subjective beliefs data is their dispersion, even within groups defined by socioeconomic status and demographic characteristics.[14] If every woman with similar observable characteristics held the same beliefs, then there would be no need to collect subjective beliefs data to identify their preferences for different aspects of family planning — population averages (e.g., on the chance of pregnancy within 12 months for given observable characteristics) would suffice. This is however not the case. There is much variation in beliefs, as illustrated by the standard deviations reported in Table A-4. This is true even within demographic/SES group. For instance, the expected probability of pregnancy within 12 months varies much within age group, as shown in Figure 2.

In the next section, we use these data to identify women's preferences regarding the wide range of contraceptive characteristics about which we elicited beliefs and predict the effect of several interventions on contraceptive use.

4 Model and Estimation

4.1 Intuition

The idea of our modeling exercise is that women choose the alternative (no method, injections, pill, condoms or implants) associated with the highest utility when taking into account all the expected consequences of choosing each alternative in their choice set — i.e., all the methods they know of among injections, pill, condoms, implants plus the "no method" alternative. The

[14] This is a recurrent finding in subjective beliefs data, and was first noted by Dominitz and Manski (1996).

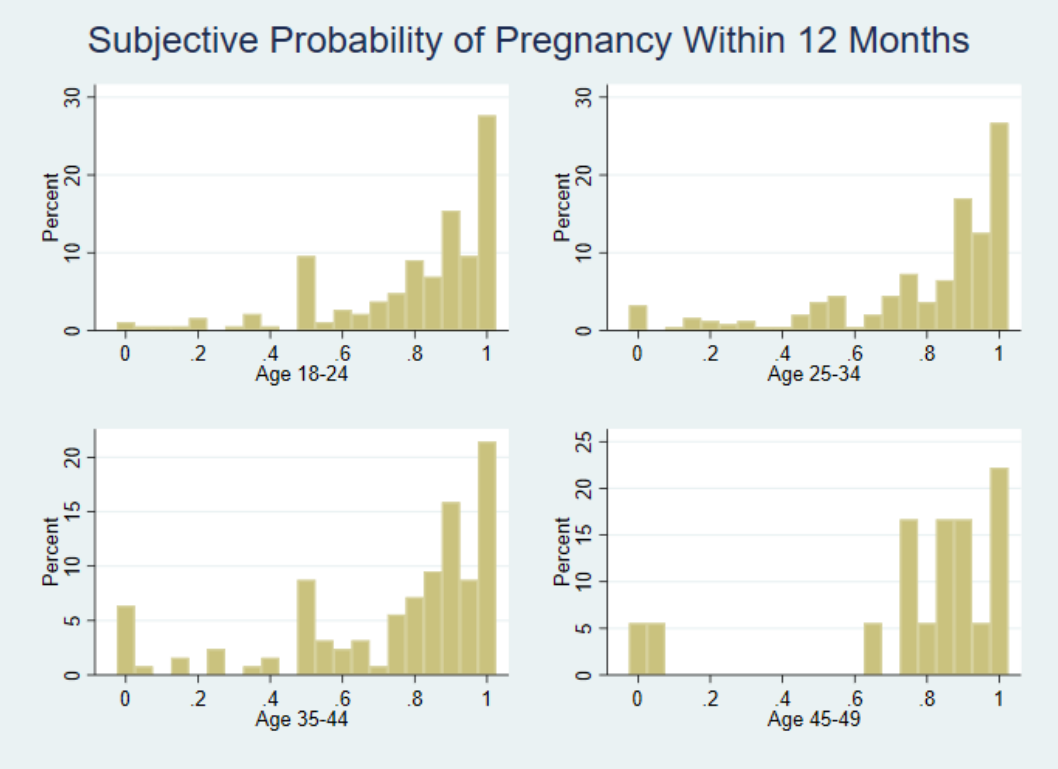

Figure 2

Source: Survey described in Section 2.2. Baseline beliefs measured prior to the information treatment described in Section 6.

combination of the contraceptive choice they make and their beliefs about the consequences of this choice provides information about how much they care about each of the perceived characteristics of each method. For illustration, consider the distribution of beliefs about partner approval for each potential method (rows) by method used (columns) (Table 2). Except for women using no method, for whom the highest expected level of partner approval would be achieved by using condoms, the method chosen is the one with the highest average expected rate of approval by partners. There is therefore a strong correlation between the perceived likelihood of partner approval and a woman's current method. If confirmed after controlling for women's method-invariant characteristics — including whether their partner wants more children or wants them earlier — and beliefs about the many other aspects of contraceptive methods, this would indicate that women have a strong preference for method approval by their partners.

Table 2: Perceived Probabilities of Approval by Partner

	Current Users of:									
	No Method		Injections		Pill		Implants		Condoms	
	mean	*N*	mean	*N*	mean	*N*	mean	*N*	mean	*N*
No Method	0.46	173	0.38	172	0.37	118	0.37	56	0.41	55
Injections	0.49	161	0.70	178	0.56	112	0.49	50	0.58	49
Pill	0.52	164	0.61	162	0.70	118	0.56	53	0.63	52
Implants	0.49	149	0.54	141	0.53	99	0.65	56	0.56	46
Condoms	0.53	161	0.52	171	0.56	113	0.51	54	0.72	55
N	176		178		119		56		55	

Source: Survey described in Section 2.2. Average perceived probabilities that the respondents' partners would approve of the woman choosing the alternative appearing in the row heading, by current method.

Similarly, we can compare, for each method used, women's expected risk of pregnancy within 12 months (Table 3). On average, women do not systematically choose the method they believe to have the lowest pregnancy risk. On the other hand, compared to women using contraceptive methods, women who do not use any method also have the lowest expected risk of pregnancy when not using any method. Without controlling for other women's characteristics and perceived methods attributes, however, it is difficult to say how much utility women derive from a reduction in the risk of pregnancy.

4.2 Decision Model

To shed light on women's preferences, we estimate an additive random utility model (ARUM) consistent with utility maximization, similar to Delavande (2008) but adapted to our context. In particular, we include beliefs about the method's concealability given findings in Ashraf et al.

Table 3: Perceived Probabilities of Pregnancy within 12 Months

	Current Users of:									
	No Method		Injections		Pill		Implants		Condoms	
	mean	N	mean	N	mean	N	mean	N	mean	N
No Method	0.71	171	0.82	178	0.84	119	0.77	56	0.76	55
Injections	0.20	158	0.18	176	0.21	104	0.20	52	0.17	47
Pill	0.35	157	0.38	161	0.32	119	0.38	52	0.36	51
Implants	0.25	138	0.25	135	0.25	98	0.23	55	0.22	43
Condoms	0.15	163	0.16	169	0.15	114	0.20	53	0.22	54
N	176		178		119		56		55	

Source: Survey described in Section 2.2. Average perceived probabilities that the respondent would get pregnant within 12 months if she used the alternative appearing in the row heading, by current method.

(2014), and study heterogeneity by partner's fertility preferences and women's intention to limit or simply delay pregnancy. Further notable departures from Delavande (2008) are that:

(i) we use a nested logit including a "no method" nest since many women in our sample use no contraception and we find evidence of correlation between hormonal methods' random shocks affecting method choice and

(ii) in our preferred specification, we include the default (i.e., absent contraception) risks of pregnancy and contracting an STD in the set of method-invariant characteristics, as explained in Section 4.3.

Formally, we start by modeling women as maximizing the following utility function:

$$\max_{m\in M_i}\left\{\sum_{j=1}^{J}\int u_j(e_j,z_i)dP_{im}(e_j)+\beta_m^{\top}z_i-\alpha E_i(c_m)+\xi_m+\varepsilon_{im}\right\},$$

where m corresponds to the contraception alternative and the index set M_i is woman i's choice set (i.e., all the methods she knows of among implants, injections, the pill, male condoms plus the "no method" method). We do not model demand for other methods as only 23 women use them, which is insufficient to estimate a model with more alternatives. The index j corresponds to the events for which we elicited beliefs in our survey (e.g., pregnancy within 12 months, contracting a STD within 12 months, ..., listed on p.7). Each one of these possible events is represented by a binary random variable $e_j, j = 1,\ldots,J$, recording whether the woman gets pregnant within 12 months, contracts a STD within 12 months, etc. The function u_j is the utility or disutility derived from event j happening and may also depend on z_i, a set of woman characteristics that do not vary by method. The perceived probability that the event j happens depends in turn on the contraception method adopted and is denoted by P_{im}. The method invariant characteristics z_i, encompassing, for example, age, education, ..., may also affect the utility for the method

differentially through $\beta_m^\top$. $E_i(c_m)$ is the subjective expected cost of using method m by woman i and ε_{im} is an idiosyncratic method×individual-specific random component of utility. Finally, ξ_m captures alternative-specific characteristics unobserved by us but relevant to the woman which we capture by alternative-specific intercepts as in the demand literature.[15]

With binary events e_j and data on the expected probability of event e_j happening and on the expected cost of each method, the probability of choosing method $\bar{m}$ can be written as:

$$\begin{aligned}
&Pr(\bar{m}|z_i, \{P_{im}(e_j), E_i(c_m)\}_{j\in 1,\ldots,n}^{m\in M_i}, M_i) \\
&= Pr\Bigg(\sum_{j=1}^{J} [\Delta u_j(z_i) P_{i\bar{m}}(e_j = 1)] + \beta_{\bar{m}}^\top z_i - \alpha E_i(c_{\bar{m}}) + \xi_{\bar{m}} + \varepsilon_{i\bar{m}} > \\
&\sum_{j=1}^{J} [\Delta u_j(z_i) P_{im}(e_j = 1)] + \beta_m^\top z_i - \alpha E_i(c_m) + \xi_m + \varepsilon_{im}, \forall m \in M_i, m \neq \bar{m} \Bigg)
\end{aligned} \tag{1}$$

where $\Delta u_j(z_i) = u_j(e_j = 1, z_i) - u_j(e_j = 0, z_i)$ is the difference in utility levels resulting from event j happening rather than not happening. In the empirical implementation we model these $\Delta u_j(z_i)$ as j-specific parameters allowing for (linear) dependence on z_i (namely, individual- and partner fertility preference measures) for specific js. Given data on woman i's subjective beliefs $P_{im}(e_j = 1)$ for every event category j and each method m in their choice set, expected methods costs $E_i(c_m)$ (e.g., waiting time, direct and other monetary costs) for every method and a distributional assumption on ε_{im}, we can estimate Equation (1) and thus identify women's preferences (Δu_j and α). Note that we use a subjective expected utility maximization approach, thus assuming that the precision of beliefs does not affect the decision process. Taking "deep uncertainty" into account would require further data and thus add substantially to an already long survey. In Giustinelli et al. (2022), for instance, beliefs about an individual's risk of dementia can be expressed as a range of probabilities in a follow-up question, or respondents could be asked to assign probabilities that the true probability falls within each of several bins. Taking into account beliefs precision would also require making assumptions about how this precision enters the utility function (e.g., maximin or minimax-regret in Giustinelli et al., 2022).

Consistent with our sample, which only includes women who express the wish to avoid preg-

[15] If income enters the indirect utility linearly, it cancels out in pairwise comparisons as highlighted in footnote 16. A richer specification, following Berry et al. (1995), would have the indirect utility for method m equal $(y_i - E_i(c_m))^\alpha \exp(\sum_{j=1}^{J} \int u_j(e_j, z_i) dP_{im}(e_j) + \beta_m^\top z_i + \xi_m + \varepsilon_{im})$ where y_i represents income. Taking logs and using the approximation $\ln(y_i - E_i(c_m)) \approx \ln y_i - E_i(c_m)/y_i$ for $y_i \gg E_i(c_m)$, one gets a (log-)utility equal to $\sum_{j=1}^{J} \int u_j(e_j, z_i) dP_{im}(e_j) + \beta_m^\top z_i - \alpha E_i(c_m)/y_i + \xi_m + \varepsilon_{im}$ plus the method-invariant term $\alpha \ln y_i$, which cancels out in pairwise comparisons. While we do not have data on income, specifications interacting expected monetary costs with age, age squared and education, usually employed in wage regressions, do not yield statistically significant estimates for those interactions. The p-value for a joint test on those coefficients is 0.29 and the effect of removing all supply-side barriers is +1.02p.p., even smaller than the one we encounter.

nancy, we do not model the choice of having a(nother) child but control for whether women wish to limit or simply delay pregnancy. Relatedly, we do not explicitly model the decision to abort an unwanted pregnancy. However the parameter $\Delta u_j(z_i)$ associated with $j =$"pregnancy within 12 months" captures the woman's disutility from getting pregnant which depends on the strength of her desire to avoid pregnancy and includes the disutility associated with obtaining an abortion if she expects to terminate a pregnancy in case it occurs.

If we assume that the ε_{im} are independent Type I extreme value random variables, then the probability of choosing $\bar{m}$ can be modeled as a conditional logit. A limitation of this model is its implied independence of irrelevant alternatives (IIA): the relative choice probabilities for any two alternatives does not depend on characteristics of other methods. This assumption is unlikely to be satisfied for methods which share many similarities, which is the case for the three hormonal methods. We relax the IIA assumption by adopting instead a nested logit, in which women are thought of choosing between three independent top-level limbs (no method, condoms, or hormonal methods) as well as choosing between three bottom-level branches (injections, implants, or the pill) within hormonal methods as depicted in Figure 3. Consequently the random shocks affecting the choice between no method, condoms, or hormonal methods are assumed to be independent, but random shocks affecting the choice between different hormonal methods are allowed to be correlated Type I extreme value random variables (see Cardell, 1997).

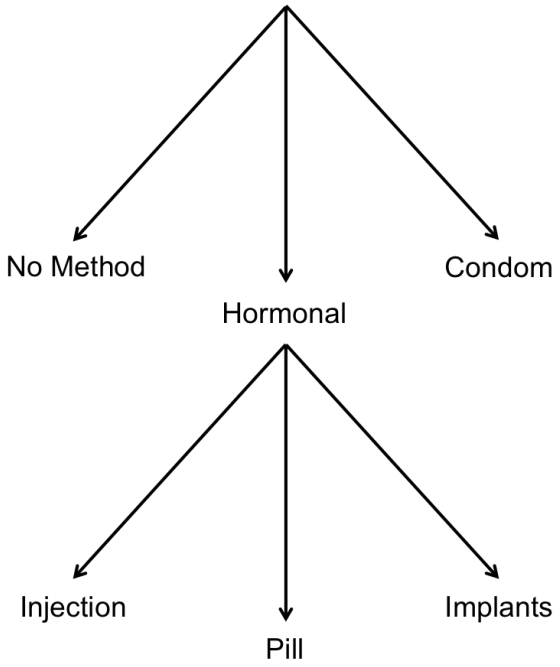

Figure 3: Nested Logit Tree

In this nested logit model, we estimate (i) the effect of method-invariant variables (z_i) on the

choice of broad type of method (no method, condoms, or hormonal methods) using the variation between women in these variables (e.g., education level, desire to limit vs. desire to space fertility) and (ii) the effect of alternative-specific variables (P_{im} and $E_i(c_m)$) using the variation in beliefs within woman between methods. The logit specification implies that any woman-specific additive "fixed effect" affecting beliefs over a given characteristic of methods (e.g., over a given $e_j = 1$ and/or over $E_i(c_m)$) is "factored-out" as long as it applies to all methods.[16] For instance, if a woman systematically underestimates or understates her expected chance of approval by her partner irrespective of the method used, this tendency to underestimate expected approval could be systematically correlated with the choice of method without leading to bias in our estimates.

We then use our estimates to predict choice probabilities in our different counterfactual scenarios. More specifically, the choice probability for option $\bar{m}$ is given by $Pr(\bar{m}|z_i, \{P_{im}(e_j), E_i(c_m)\}_{j\in 1,\ldots,n}^{m\in M_i}, M_i) = \frac{\exp(V_{\bar{m}}/\tau(\bar{m}))}{\exp(\text{IV}(\bar{m}))} \frac{\exp(\tau(\bar{m})\text{IV}(\bar{m}))}{\sum_n \exp(\tau_n \text{IV}_n)}$. The variable $V_{\bar{m}}$ denotes $\sum_{j=1}^{J}[\Delta u_j(z_i) P_{i\bar{m}}(e_j = 1)] + \beta_{\bar{m}}^{\top} z_i - \alpha E_i(c_{\bar{m}}) + \xi_{\bar{m}}$. IV_n denotes the "inclusive value" (i.e., expected utility) for nest n and is given by $\ln\left(\sum_{m\in B_n} \exp(V_m/\tau_n)\right)$, where B_n is the set of alternatives in nest n and $1-\tau_n^2$ is the correlation among alternatives in nest n. For limbs with only one alternative (condoms and no method), τ is equal to one, whereas the value of τ in the hormonal nest is estimated by the model. The notation $\text{IV}(\bar{m})$ and $\tau(\bar{m})$ correspond to the inclusive value and τ for the nest to which alternative $\bar{m}$ belongs.

One limitation of our modeling approach is that husbands' beliefs and preferences do not directly feature in the model. Instead, we allow husbands' beliefs and preferences and any intra-household bargaining considerations to matter in contraceptive decisions only through the lens of women's perceptions about their husbands' beliefs and preferences. We therefore cannot shed light on important questions such as whether women's beliefs about partners' fertility preferences or contraceptive approval are accurate, how correlated the spouses' beliefs and preferences are, or how much weight each partner has in contraception decisions. These are all interesting questions which we explore in ongoing work.

4.3 Preferred Specification

Our preferred specification includes *all* alternative-invariant variables such as woman's age group and alternative-specific variables — e.g., perceived probability of pregnancy with the index method. Alternative-invariant variables are summarized in Table A-1 (Panel A) and alternative-specific variables summarized in A-4 and listed on p.7. In brief, the method-invariant covariates included in all specifications control for age, education, religion, urban location, province, having a partner who wants more children (if a woman does not want any more) or wants them earlier (if

[16] More specifically, denoting P_{i1m} the subjective probability which woman i associates with event $e_1 = 1$ when using method m, then adding α_i to P_{i1m} for all methods m is cancelled out in pairwise comparisons.

she simply wants to delay fertility), a woman's number of children, and a woman's desire to limit (as opposed to simply delay) fertility.

Additionally, to increase our model's flexibility, our preferred specification also includes in the set of method-invariant covariates (z_i) a woman's expected probability of becoming pregnant within 12 months absent contraception and a woman's expected probability of contracting a STD within 12 months absent contraception — i.e., her "default" pregnancy and STD risks. There are several benefits of doing so. First, this allows the alternative-specific expected pregnancy and STD risks to differentially affect the utility of the "no method" and other alternatives.[17] Second, doing so allows a woman's default pregnancy and STD risks to affect choices between alternatives other than "no method."[18]

We allow for heterogeneity in preferences for three alternative-specific variables by interacting them with individual- and partner fertility preference variables, as we next explain. Our sample comprises two groups: women who simply want to space fertility — i.e., they want to have a(nother) child after two years — and those who want to limit fertility — i.e., they do not want another child in the future. Women who want to limit fertility may care more about the ability of a method to protect them against pregnancy than women who simply want to space fertility. Similarly, women who want to have children in the future may care more about the ability to resume fertility after discontinuation of the method. We therefore model $\Delta u_j(z_i)$ as a linear function of z_i where j is, in turn: (1) the pregnancy risk and (2) the probability of managing to get pregnant within 12 months of discontinuation and z_i is, in turn, an indicator for having (i) a "need for spacing" or (ii) a "need for limiting" fertility.[19]

Women may also value more the ability to conceal the use of a method from their partner if their partners disagree with their fertility intentions. Thus we also interact the subjective probability of being able to hide the use of the method from her partner with whether the woman's partner has or not higher fertility preferences.[20] In other words, we also model $\Delta u_j(z_i)$ as a linear function of

[17] For instance, in Equation 1, the utility associated with the "no method" alternative can now be affected by the perceived risk of pregnancy absent contraception through the relevant Δu_j, which is constant across alternatives, *and* through the alternative-specific coefficient associated with the perceived pregnancy risk absent contraception included in z_i.

[18] When eliciting beliefs about pregnancy (STD) risk under the use of each method, we ask the respondent to choose the number of beans which best reflects her chance of getting pregnant (contracting a STD) "as long as she continues to use the method (and assuming that she is using the method with all her partners, if there is more than one)." In their answers, women may therefore not reflect that they expect their use of the method to be discontinuous. Including the risk of pregnancy (STD) absent contraception in z_i addresses that since it is the pregnancy (STD) risk women revert to when they do not use a condom, miss pills, or are late for their next injection. For instance, if women expect to not use condoms every time they have sex, then their "default" pregnancy risk may influence their choice of condoms relative to injections.

[19] Note that we do not include a constant in this linear function as the two categories "need for spacing" and "need for limiting" exhaust all the possibilities given our sample selection criteria.

[20] I.e., whether she thinks or not that her partner wants more children (if she does not want to have any more) or wants another child sooner than her (if she simply wants to delay for at least 2 years).

z_i where j is the "probability of being able to hide the method" and z_i is, in turn, an indicator for having a partner who (i) has or (ii) does not have higher fertility preferences.

5 Estimation Results and Counterfactual Analysis

5.1 Estimation Results

In this subsection we discuss the findings obtained using the preferred model discussed in Section 4.3. Full nested logit estimates are reported in Table 4, which we use to produce the partial effects estimates of Table 5 and the counterfactuals of Section 5.2. We discuss the robustness of our findings to alternative specifications (including restricting the sample to women with no item non-response, including beliefs variables incrementally and using only variation between contraceptive methods) in Section A-3, and report estimates for a range of alternative specifications in Tables A-5, A-8 and A-10.

Confirming the pattern observed in the raw data, women are not significantly more likely to choose the alternative that they believe to be more effective to prevent pregnancy, but they are significantly less likely to go without contraception if their expected risk of pregnancy absent contraception — the woman's "default" pregnancy risk — is higher. The added flexibility coming from the inclusion of the woman's expected probability of pregnancy absent contraception in z_i (discussed in Section 4.3 p. 21) therefore turns out to be empirically important. If beliefs about pregnancy risks across the different contraceptive methods were very highly correlated within woman, it could explain why the effect of the alternative-specific pregnancy risk is not statistically significant. There is however quite a lot of within-woman variation, as shown in Table A-6, where only two pairwise correlation coefficients are above 0.5 (0.515 and 0.717).

Women also respond to their expected probability of experiencing side-effects: they are less likely to use methods associated with higher risks of nausea/vomiting, less likely to use methods associated with side effects not listed in our questions ("other negative effects"), but more likely to choose methods associated with menstrual irregularities — presumably because they value not having their periods or having lighter periods.

In addition, women prefer methods associated with a higher expected chance of conceiving after discontinuation, irrespective of their desire to have a(nother) child after two years. This suggests that women value fecundity in itself and/or believe that they may change their minds in the future.

The strongest explanatory factor in the choice of method is however a woman's expected probability that her partner would approve of the alternative. Recall that these estimates are net of the effect of the method-invariant variables listed in Table A-1 (Panel A) including whether the

woman's partner has higher fertility preferences than her. Therefore, here we find that a woman's expected approval by her partner is a key factor in her choice of family planning (FP) strategy even after conditioning on perceived disagreement between partners about fertility targets.

Interestingly, women whose partners have similar fertility desires to themselves are significantly *less* likely to opt for more concealable FP approaches, whereas concealability has no effect on method choice for women whose partners have higher fertility desires. This suggests that women have a distaste for concealability — consistent with Ashraf et al. (2014)'s finding that using concealable methods has a psychological cost — but that they are more willing to incur this utility cost when their partners do not want them to use contraception.

In our main specification, the effect of alternative-specific characteristics is estimated both from variation between contraceptive methods and variation between the "no method" alternative and contraceptive methods. In Section A-3, we discuss results from a specification modeling only the choice between contraceptive methods and find that the same alternative-specific characteristics significantly affect decisions as when choosing between all possible alternatives including the "no method" alternative.

There is also much to learn from characteristics which do not appear to matter in women's choices. Strikingly, women do not choose methods associated with a lower risk of contracting STDs, suggesting that the decision to use protection against STDs studied, e.g., in Cassidy et al. (2021), may be largely independent from that of using contraception in the setting we examine. This is not to say that women do not respond to STD risk when deciding whether to use condoms. Following the DHS wording, we asked women whether they "currently used any method to delay or prevent a pregnancy", and find similar rates of condom use (Table A-2). Due to the question wording, women who use condoms exclusively to prevent STDs may not report using them. Given our focus on modeling demand for contraception, this wording is however appropriate — if instead we categorized women as choosing the condom alternative when they are not doing so to prevent pregnancy, we may overstate the role of STD prevention in contraception decisions.[21] The expected probability of reduced libido and/or sexual pleasure of either partner and/or interference with romance does not appear to affect contraceptive choices.[22] In stark contrast with expected approval by her partner, expected approval by coreligionists, parents, or friends do not have any significant effect on the woman's choice of method when controlling for expected partner's approval, which points towards the importance of communication and/or bargaining between

[21] If beliefs about STD risks across the different contraceptive methods were very highly correlated within woman, it could explain why the effect of alternative-specific pregnancy risk is not statistically significant. Table A-6 shows that pairwise correlation between STD risk within-woman is below 0.5 except for the correlation of this risk between hormonal methods.

[22] This is the case whether we control for partner's expected approval of the method or not (full results available on request).

partners as opposed to fundamental religious or cultural barriers to contraceptive use.[23] Finally, none of the supply-side factors have a statistically significant effect except for expected costs of travel and other indirect costs, which have a negative effect on demand.

Table 5, which reports selected average partial effects and their standard errors indicate that standard errors associated with alternative-specific variables are small enough to detect subtle effects, suggesting that lack of statistical power is not driving our finding that a number of variables do not significantly affect demand.

Turning now to the effect of women's socioeconomic and demographic characteristics, we find that older women, women whose partners have higher fertility preferences and atheists are more likely to use no method relative to their likelihood of using a hormonal method, while women who do not want any more children are less likely to use no method.[24] Women who have more children are less likely to use condoms relative to their likelihood of using hormonal methods. Finally, belonging to a small religious category (accounting for 3% of the sample or less) also affects the probability of using condoms (e.g., Protestants are less likely to use them).

[23] While positively correlated, expected approval across these different dimensions appears to be sufficiently distinct to disentangle the independent effect of each. The correlation coefficients across the chance of approval by parents, coreligionists, friends, and husband indeed take values between 0.25 (for approval by husband vs. coreligionists) and 0.65 (for approval by friends vs. parents).

[24] The finding regarding atheists would be surprising if, as one may have expected, women who say that they do not have a religion were more likely to be more "modern". In our sample, however, the few (21) atheists are not easy to categorize. While they are 6 pp more likely to live in the capital city, they are more than twice as likely to have no schooling and they are 14 pp more likely to say that their partners have higher fertility desires than them.

Table 4: Preferred Specification Full Results

	Effect of Alternative-Specific Variables on Choice of Alternative	Effect of Alternative-Invariant Variables on Type of Alternative Relative to Hormonal	
		No Method	Condoms
Spacing × P(pregnancy)	0.001		
	(0.006)		
Limiting × P(pregnancy)	-0.009		
	(0.007)		
P(STD)	0.003		
	(0.010)		
P(nausea)	-0.009*		
	(0.004)		
P(menstrual irreg.)	0.010**		
	(0.005)		
P(other neg. effect)	-0.014**		
	(0.006)		
P(affect libido romance)	0.006		
	(0.006)		
Spacing × P(pregnancy after disc.)	0.019**		
	(0.009)		
Limiting × P(pregnancy after disc.)	0.024**		
	(0.010)		
P(parents approval)	0.011		
	(0.008)		
P(coreligionists approval)	0.004		
	(0.009)		
P(partner's approval)	0.061***		
	(0.012)		
P(friends' approval)	0.007		
	(0.009)		
Partner wants the same × P(hide method)	-0.013**		
	(0.006)		
Partner wants more kids × P(hide method)	-0.002		
	(0.011)		
P(obtain when needed)	0.011		
	(0.009)		
E(waiting time)	-0.002		
	(0.002)		
E(direct costs)	0.001		
	(0.001)		
E(other costs)	-0.001*		
	(0.000)		
Age 25-34		0.069	0.367
		(0.279)	(0.374)
Age 35-44		0.954**	0.942
		(0.402)	(0.582)
Age 45-49		1.680**	0.296
		(0.718)	(1.025)
Some primary schooling		0.343	0.271
		(0.353)	(0.569)
Secondary schooling and above		-0.235	0.270
		(0.399)	(0.594)

Urban		-0.049	0.366
		(0.286)	(0.402)
Maputo Province		0.109	0.829*
		(0.373)	(0.481)
Gaza Province		0.349	0.511
		(0.362)	(0.406)
Partner wants more kids		0.531**	0.216
		(0.246)	(0.353)
No. of children		-0.011	-0.496***
		(0.085)	(0.155)
Limiting		-0.524*	0.571
		(0.302)	(0.421)
Catholic		-0.221	-0.057
		(0.347)	(0.465)
Muslim		0.385	0.995
		(0.649)	(0.764)
Protestant		0.888	-14.615***
		(0.582)	(0.502)
Other religion		0.001	-0.156
		(0.257)	(0.370)
Atheist		1.101**	-0.324
		(0.487)	(1.281)
Doesn't know religion		0.278	2.932**
		(1.842)	(1.262)
P(pregnancy) absent contraception		-0.068***	-0.055*
		(0.022)	(0.033)
P(STD) absent contraception		0.027	-0.039
		(0.022)	(0.034)
Method-Varying Missing Value Indicators	Yes	N/A	N/A
Method-Invariant Missing Value Indicators	N/A	Yes	Yes
Alternatives		2761	
Women		584	

Source: own survey data described in Section 2.2, which provides details regarding our treatment of (14) women using a combination of methods and (23) women using methods other than the ones we model here. Robust standard errors in parentheses, * p<0.10 ** p<0.05 *** p<0.01. Missing values are set to zero. The method-specific intercept for the "No Method" alternative is normalized to zero. The effect of method-invariant variables on the utility associated with alternatives in the hormonal nest is normalized to zero. Alternative-specific intercepts relative to "No Method" and their associated standard errors are: -0.39 for condoms (SE:1.337), 0.243 for implants (SE: 0.731), 0.437 for injections (SE:0.731), 0.334 for the pill (SE: 0.730). The "No Method" nest τ and Condom nest τ are set to one, while the Hormonal nest τ is estimated to be 0.189 (SE: 0.047).

The signs of the nested logit coefficients show the direction of their effect on the probability of choosing each alternative. And provided the regressors are measured in the same unit (e.g., probability of pregnancy out of 20 and probability of nausea/vomiting out of 20), the magnitude of the coefficients reflects the relative importance of each method characteristic in the choice of method. Selected average partial effects are reported in Table 5 to illustrate the economic significance and precision of the point estimates. We report own- and cross-partial effects on the probabilities of choosing no method and choosing the most popular method (injections) for a range of variables.

Table 5: Selected Average Partial Effects Estimates

Average Partial Effect on Probability of Choosing :	No Method	Injections
Probability of Pregnancy Absent Contraception	-0.011	0.005
	(0.003)	(0.001)
Probability of Other Negative Effect of Injections	0.001	-0.008
	(0.004×10^{-1})	(0.003)
Probability of Partner Approving of Injections	-0.004	0.034
	(0.001)	(0.008)
Indirect Cost of Injections	0.005×10^{-2}	-0.004×10^{-1}
	(0.002×10^{-2})	(0.002×10^{-1})
Partner Wants More Kids	0.087	-0.036
	(0.039)	(0.020)
Woman Wants to Limit- Rather than Space Fertility	-0.11	0.033
	(0.043)	(0.026)
Sample size	584	556

Authors' calculations based on the preferred specification motivated in Section 4.3 whose results are reported in Table 4, expressed in terms of a one-unit increase. Units are beans for the first three rows and Meticais for the fourth row. Standard errors obtained by the Krinsky-Robb method using 1,000 replications in parentheses (Krinsky and Robb, 1986; Krinsky et al., 1990; Dowd et al., 2014). Point estimates in the first four rows are obtained by taking the relevant derivative of the choice probabilities reported on p.20, evaluating it at the values of the regressors for each observation, and then averaging over the sample. For the binary indicators corresponding to the last two rows, point estimates are obtained by taking the difference in the choice probabilities when the binary indicator is equal to one and when it is equal to zero, for each observation, and then averaging over the sample. Source: own survey data described in Section 2.2.

Expressing the effects of small deviations in terms of a one-unit change, a one-bean (5pp) increase in the probability of pregnancy absent contraception corresponds to a negative average partial effect on the probability of choosing no method of 1.1pp, and about half of this decrease translates into a positive average partial effect on the use of injections. Even considering the type of side effect with the largest nested logit coefficient ("other negative effects"), a one-bean (5pp) decrease in the probability of injections side effects only produces a negative 0.1pp partial effect on non-use. A one-bean (5pp) increase in the probability of the partner approving of injections leads to a 3.4pp partial effect on the use of injections, but most of this increase comes from substitution away from other methods, with a negative partial effect on non-use of only 0.43pp. The effect of increasing the indirect cost of using injections by one unit (Metical) is small, as the partial effect on the demand for injections is only negative 0.04pp. If we went from none- to all the women's partners having higher fertility desires than them, non-use would increase by 8.8pp and demand for injections would decrease by 3.6pp. This is not dissimilar to the effect of going from all women wanting to limit fertility to simply wanting to space it (11pp and 3.2pp, respectively).

In Section 5.2, we present a number of counterfactuals which illustrate further the absolute- and relative importance of different barriers to contraceptive use.

5.2 Counterfactual Analysis

We now turn to predicting the effect of alternative interventions on the method mix using estimates from our preferred specification (shown in Table 4). We consider the effect of alternative interventions on the predicted probabilities of using each of the five family planning strategies considered in our estimation. Results are reported in Figure 4 and in Table 6. For concision, here we focus mostly on the effect on the predicted probability of not using any method.

First, we estimate the effect of increasing the expected risk of pregnancy absent contraception to 85% (the WHO reference risk) for women who have a baseline expected probability under 85%. This is estimated to increase contraceptive use by 6.7 pp among this group of women (Figure 4-B) or 2.7 pp overall (Figure 4-A).[25] Interestingly, this increase in perceived risk of pregnancy absent contraception leads to an increase in the use of hormonal methods rather than condoms. This is consistent with the idea that, if women do not use a condom every single time they have intercourse or if the condom fails, they revert to their risk of pregnancy absent contraception — and indeed the coefficient associated with this risk in the condom nest is negative. Women in our sample believe that method effectiveness in preventing pregnancy is much lower than population estimates

[25] A counterfactual in which we set all beliefs about the pregnancy risk absent contraception to 85% irrespective of baseline belief leads to an overall predicted increase in use of 1.5 pp, compared to 2.7 pp in the counterfactual we report in Figure 4 (Panel A). See page 40 for a discussion of asymmetric responses to news that the risk is higher vs. lower than expected.

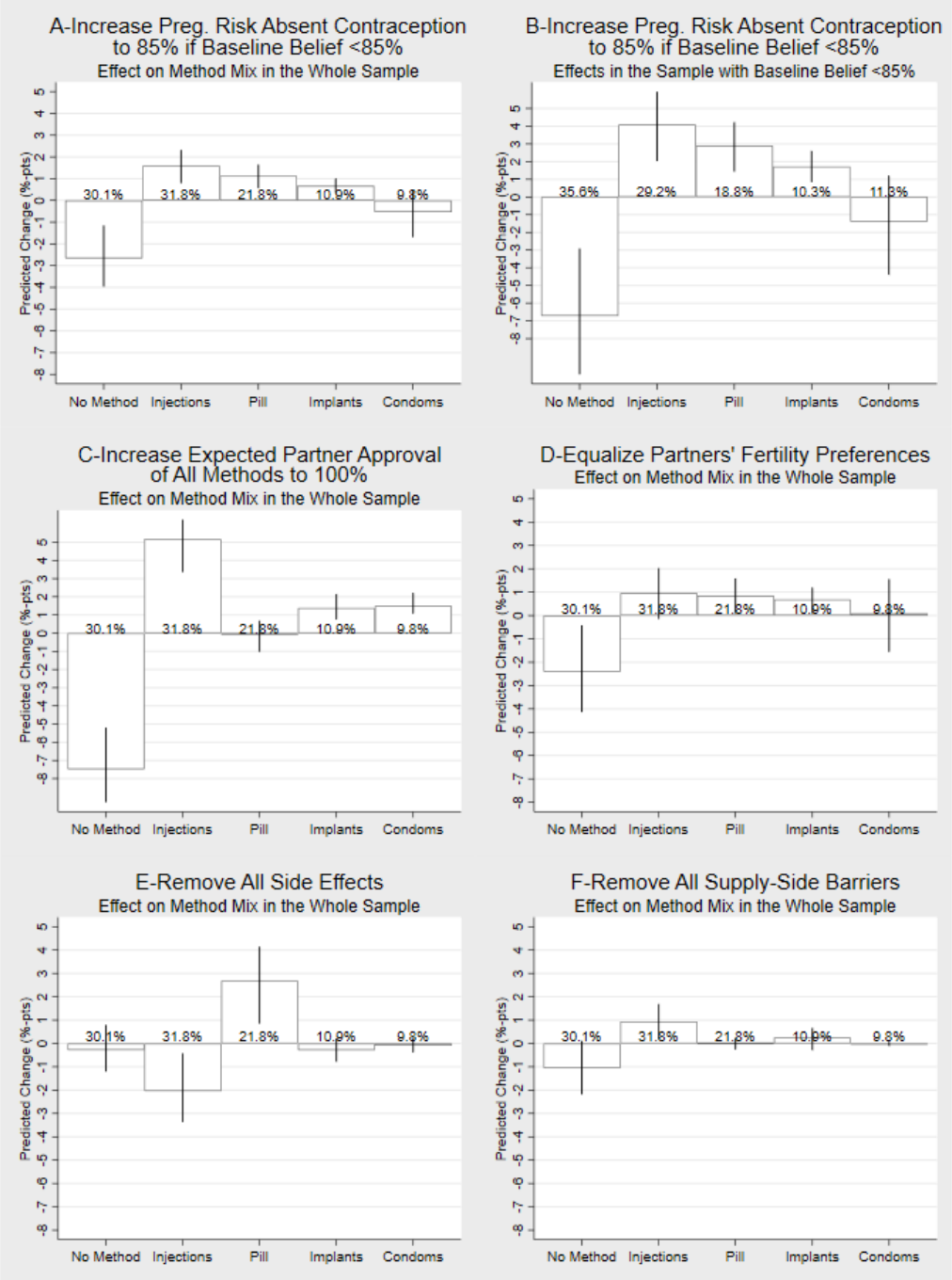

Figure 4: Counterfactuals

Notes: 95% confidence intervals obtained by the Krinsky-Robb method using 1,000 replications are presented as vertical lines (Krinsky and Robb, 1986; Krinsky et al., 1990; Dowd et al., 2014). The baseline share for each alternative is the share of women who choose the alternative among those who know of the alternative. Shares therefore add up to slightly more than 1 (up to 1.05). Since "No method" is in every woman's choice set, the reported changes in the share of women using no contraception can be interpreted as changes in prevalence for the whole sample.

suggest. But recall that our model estimates show that women do not significantly choose contraceptive methods that they believe to be more effective to prevent pregnancy, so we should not expect much change in demand from recalibrating beliefs about failure rates. Indeed, in a counterfactual setting women's beliefs about method effectiveness to be equal to population estimates, contraceptive prevalence only increases by 0.1pp (see last row of Table 6).

Second, we consider policies involving partners. Increasing to 100% the expected rate of approval by partners of all modern methods would increase contraceptive use by 7.5pp (Figure 4-C) mostly in favor of injections, while aligning the woman's partner's preferences for fertility with the woman's would increase contraceptive uptake by 2.4pp (Figure 4-D).

Third, we turn to an intervention targeting side effects. A major scientific breakthrough removing all side effects accompanied by a successful campaign convincing women of this progress would only increase contraceptive use by a statistically insignificant 0.3pp overall (Figure 4-E), and would mainly result in substitution of the pill — which respondents correctly believe to come with a higher risk of nausea — to injections. This is not to say that women do not care about side effects: rather, they value some side effects (menstrual irregularities — likely due to mild or no periods) while avoiding methods associated with a higher chance of nausea/headaches and of other negative effects. Indeed, if one could remove only the perceived negative side effects of hormonal methods but not their perceived side benefit, our model would predict an increase in contraceptive use by 1.8pp driven by an increase in the use of the contraceptive associated with the highest perceived chance of nausea/headaches, namely the pill (2.3pp). From a policy point of view, however, this does not seem feasible since the same hormones used in contraceptives are responsible for multiple side effects, good and bad.

Fourth, we turn to interventions targeting access to contraceptive supply both in terms of direct- and indirect monetary costs and in terms of supply reliability and availability. Removing all supply-side constraints — i.e., setting the expected probability of obtaining the method when needed to 100% and setting all monetary costs and waiting times to zero — would reduce unmet need by 1.1pp, an effect which is not quite statistically significant at 5% (Figure 4-F).

These counterfactual scenarios broadly match the main reasons generally self-reported for not using any contraception despite not wanting to get pregnant (low perceived risk of pregnancy, side effects, disapproval by the women themselves or those close to them, Sedgh et al., 2016), and additionally consider the effect of removing all supply-side barriers. Of these four approaches to reducing unmet need for family planning, two would likely be very costly (removing side effects and removing supply-side constraints). Our predictions indicate that they would also not be particularly effective in our setting, suggesting low cost-effectiveness. Much more encouragingly, increasing perceived method approval by partners and aligning fertility preferences within the couple would be a powerful tool to decrease unmet need, thus suggesting a fruitful direction

for future work. The cost of increasing the rate of method approval by partners is however unclear *a priori* and may be very high if it is due to aversion to contraceptive methods deep-rooted in patriarchal social norms. Although decreasing men's fertility preferences is possible (see, e.g., Ashraf et al., 2018), doing so to the extent that they would match the women's is likely to be costly too. Our counterfactuals however suggest that sizeable increases in contraceptive uptake would result from a potentially low-cost recalibration of women's beliefs about the risk of pregnancy absent contraception.

Table 6: Counterfactual Analysis

	Condom	Implants	Injections	No Method	Pill	*N*
P(0) = 17 if P(0)<17						
P(0)<17 Sample	-0.014	0.017	0.041	-0.067	0.029	1,076
Whole Sample	-0.005	0.007	0.016	-0.027	0.011	2,761
Full Approval	0.015	0.014	0.052	-0.075	-0.001	2,761
Same Fertility Preferences	0.001	0.007	0.010	-0.024	0.009	2,761
No Side Effects	-0.001	-0.003	-0.020	-0.003	0.027	2,761
No Supply Barriers	-0.001	0.002	0.009	-0.011	0.000	2,761
Correct Failure Rates	-0.001	0.001	-0.002	-0.001	0.003	2,761

Predicted changes in the probability of choosing each alternative based on the model reported Table 4, estimated on 2,761 observations. Source: own survey data described in Section 2.2, which provides details regarding our treatment of (14) women using a combination of methods and (23) women using methods other than the ones we model here. Side effects are defined as nausea or headaches, menstrual irregularities or vaginal infections, and "other" side effects. Supply barriers refer to direct and indirect monetary costs as well as waiting times and the inability to obtain the method when needed. P(0) stands for "perceived probability of pregnancy within 12 months absent contraception." "Same Fertility Preferences" means that the partners of all women want to limit (space) fertility if the woman says she wants to limit (space) it.

Having investigated the individual effect of addressing one type of barriers to contraceptive use at a time, we now illustrate what our estimates tell us about what would be needed to drastically reduce unmet need in our setting.

We first assess the overall contribution of demand-side factors to unmet need. The three demand-side interventions considered so far target, in turn, beliefs about the risk of pregnancy absent contraception, partners' fertility preferences, and partners' contraceptive approval. In an illustrative scenario where these three sources of unmet need are simultaneously and successfully addressed (namely, the expected risk of pregnancy absent contraception is set to 17 out of 20 for women with beliefs below 17, all partners are set to have the same fertility preferences as their wives, and the expected chance of partner approval is set to 20 for all four methods), unmet need is predicted to decrease by as much as 39% (from about 30 ppts to 18 ppts). If, in addition, we set all supply-side beliefs at the most favorable level (namely, set direct and indirect monetary costs to zero, all waiting times to zero, all perceived probabilities of being able to obtain the method

when needed to 100%, and set the probability of side effects to zero), unmet need is predicted to decrease by 42%.

Finally, we ask how much of the gap between fertility intentions and contraceptive use we can account for using the variables which statistically significantly influence the decision to use contraception according to our model estimates. The two following scenarios are not plausible policy outcomes but provide a useful accounting exercise. We first predict the effect of fully removing all the barriers to use contraception without changing women's characteristics, their own fertility preferences (i.e., whether women want to space or limit fertility), or leveraging women's taste for hormone-induced menstrual changes or their distaste for concealability.[26] In this scenario, unmet need is predicted to decrease by 51%. If in addition we assign all women to the 18-24 age group, assume that they all wish not to have any more children as opposed to some women simply wanting to wait at least two years, set the perceived chances of experiencing menstrual irregularities when using contraception to 20 out of 20 and finally set the probability of being able to hide the use of all methods to 0 when men and women have similar fertility preferences, our model would predict a 74% decrease in unmet need.

5.3 Threats to Identification

As explained in Section 4, the variation used to identify our model coefficients comes from both within-woman variation in beliefs about the attributes of each alternative and from between-women differences in characteristics and use. One limitation of the counterfactuals of section 5.2, as with any modeling exercise relying on observational data, is therefore that confounding factors correlated with both beliefs and contraceptive choices might bias estimates — although this risk is mitigated here by the collection of data covering a large array of factors that may influence contraceptive decisions and which would normally fall in the "unobservables" category.

In particular, one concern may be that women systematically report more favorable beliefs about the alternative they are currently using in order to justify their choices — i.e., they may practice "ex-post rationalization."[27] Or there might be learning effects — i.e., women's beliefs such as those regarding partner's expected approval may be influenced by use. If this were the case,

[26] More specifically, we set all beliefs about the chances of experiencing nausea and any other negative side effect to zero, set beliefs about the chances of managing to get pregnant within 12 months of discontinuation of a method to be equal to the highest probability across all alternatives in the woman's choice set, set the expected chance of approval by partners of all contraceptive methods to 20 (out of 20), set partners' fertility preferences to align with those of the respondents, set indirect monetary costs to be equal to zero, and set the expected risk of pregnancy absent contraception to 20.

[27] Ex-post rationalization bias has previously been discussed in the context of fertility intentions — an area in which women may be thought to be particularly prone to ex-post rationalization since admitting that a child was unwanted may bear a high psychological cost. Pritchett (1994), however, finds that actual fertility is equally correlated with different measures of self-reported desired fertility, irrespective of whether the measure is retrospective, suggesting very low bias.

then this may bias the nested logit estimates so that our model predictions may not be informative regarding the effect of changing beliefs.

Ex-post rationalization and learning effects do not, however, seem likely to be an important issue in our data for two reasons. First, women do not report more favorable beliefs about all aspects of the method they are currently using. For instance, women do not report a systematically lower risk of pregnancy for the contraceptive method they are currently using (Table 3). In particular, women using methods where the user has little role in the method's efficacy do not hold significantly more accurate beliefs about these methods' failure rates (t-test p-value: .34 (.59) for injections (implants)). Second, there is no evidence that women who have been using a contraceptive method for a longer period of time are more likely to report favorable beliefs about this method (including a higher expected probability of approval by their partners). As noted by Delavande and Zafar (2019), ex-post rationalization should arguably be stronger among individuals who have been with their current alternative for a longer period of time — i.e., their chosen university in the case of Delavande and Zafar (2019). However, in our data as in theirs, there is no indication that individuals who have been with their current alternative for a longer period of time report more favorable beliefs about this alternative. Table A-11 reports estimates obtained when regressing each belief variable in turn on the year the woman started using the contraceptive method she is currently using, a constant, and all the method-invariant characteristics included in Panel A of Table A-1. Only 2 out of 16 coefficients are statistically significant, and only marginally so. In one case (women who have started using the method more recently report higher probabilities of menstrual irregularities), the sign of the significant coefficient does not suggest ex-post rationalization.[28] In the other (women who have started using the method more recently report higher expected waiting times), the magnitude of the effect is very small — starting use one year later increases the expected waiting time by less than 30 seconds. More generally, the weakness of the correlation between stated beliefs and the duration of use of contraceptive methods also suggests that learning from use — which could bias our estimates — is limited. Taken together, the data are consistent with women relying on information about their wider peer group or other common sources of information rather than extrapolating from their own, single experience when forming beliefs about themselves — thus meeting a precondition for women to respond to new information based on population-level statistics.

Another concern might be that women state beliefs to justify their choices. The structure of the questions however means that a significant degree of sophistication would be required to provide a pattern of answers that artificially points to a particular reason for choosing a method. Women are never asked directly why they chose their current alternative. Instead, they are asked, in turn for

[28] Recall that the estimates reported in Table A-5 indicate that women prefer methods associated with menstrual irregularities (e.g., because this generally means light or no periods).

each event, about the chances of an event happening under each method in turn. If, for instance, women wanted to "pretend" that they had chosen their current alternative because of partner approval instead of side effects, for the effect of side effects to not appear significant in the demand model they would have had to manipulate answers to questions about beliefs about side effects without knowing that questions about beliefs about their partner's approval were coming. One particular concern may be that women report a high expected chance of side-effects and/or unreliable supply with methods which they do not use for some more difficult reason to acknowledge (e.g., their partner disapproves). However in this case we would find these two factors to play an important role in contraceptive decision, which, as reported in Section 5.2 is not the case.

In the next section, we present findings based on an exogenous information shock which do not suffer from the same identification threats and yet corroborate our model estimates, hence bolstering our confidence in these estimates.

6 Validation Exercise

To test the plausibility of our model predictions, we created an exogenous "shock" to beliefs about the probability of pregnancy absent contraception. First, this allows us to evaluate — without making any modeling assumptions — the effect of a simple information message on the perceived risk of pregnancy absent contraception and on intentions to use contraception in the future. We then compare the observed effect on intentions to use contraception to the effect on contraceptive use predicted by our model for the observed change in beliefs following our information message.[29]

6.1 Information Treatment

After eliciting the woman's beliefs about contraceptive methods, we asked her whether she intended to use contraception in the future (for the exact wording of the question, see p. 8). We then asked a number of questions including questions about the respondent's level of trust in health information messages obtained from (nine) different potential sources.[30]

Next, we proceeded to our information intervention. We selected a random subsample of women whom the enumerator informed that:[31]

[29]Unlike Wiswall and Zafar (2015), for instance, we do not exploit the information treatment for the purpose of identifying our structural model. This would have required eliciting again all the subjective beliefs variables we include in the model and either observing actual choices between alternatives after the information shock, or modelling (changes in) the subjective probability of choosing each alternative instead of actual choices.

[30]We found that there was a high level of trust in health professionals, especially in government facilities: 80.6% (93.9%) of respondents said that they would certainly trust a message about pregnancy risks if it came from a nurse (doctor) in a government facility compared to 70% if this information came from a radio or TV program, 63.9% if it came from a pharmacist or 47% if it came from a school teacher, for instance.

[31]We did not treat all the women in our sample in case further funding became available to measure additional

> "Studies show that, on average, out of every 20 sexually active women of reproductive age who do not use any contraceptive method, 17 will get pregnant within the next 12 months"

The enumerator then asked the respondent again about their intention to use contraceptives in the future, as well as asking them *two* questions about the expected probability of pregnancy within 12 months if not using any contraceptive. The first question was worded closely to the information message the participants had just received, except for asking specifically about women "like them":

> (i) "Imagine 20 women exactly like you at this moment. That is, 20 women identical in all aspects, including with the same lifestyle as yourself, a husband identical to yours, etc... Choose the number of beans which best reflects, in your opinion, the number of women among these 20 who will get pregnant in the coming 12 months, if they do not use any contraception?"

This is the first time in the survey that women are asked a question about their beliefs about the pregnancy risk of others.

The second question asked specifically about the respondent herself, and in exactly the same way as when the question was put to them in the main beliefs module — 40 or so minutes earlier:

> (ii) "Choose the number of beans which best reflects, in your opinion, the chance that you will get pregnant in the coming 12 months, if you do not use any contraception?"

We decided against asking again the control group about their intentions to use contraception and about their beliefs regarding pregnancy risks. While it would be good to know whether respondents revise their responses even in the absence of any new information, being asked the same question twice might also confuse the respondents (Haaland et al., 2023), and/or suggest that their first answer was wrong.

The exogenous variation exploited in the present analysis is the difference between answers given by the same women before and after they received our information message. In the next subsection, we discuss how we address the concern that women may just say what they think the experimenter wants to hear after receiving the information message.

outcomes in follow-up surveys. This, however, did not materialize within the time frame during which the IRB permitted us to retain respondents contact details (12 months). The randomization however ensures that the average treatment effect on the treated should be equal to the average treatment effect on the non treated. See Table A-12 for a comparison of characteristics of women who received- and did not receive our information message.

6.2 Mitigating Experimenter Demand Effects

Experimenter demand effects (EDE) — defined here as the difference between true and reported post-treatment outcomes — are a pervasive concern in experimental work. Recent studies find variable levels of treatment effect biases due to measurement error, with smaller levels found in common survey- and lab-experiment tasks in high-income countries (De Quidt et al., 2018; Mummolo and Peterson, 2019) than in a field experiment in a low-income country (Blattman et al., 2019). We address EDE concerns in three ways.

First, we look for indicative signs of EDE by studying the two measures of posterior beliefs we elicit. Our design gives respondents an opportunity to meet experimenter demand — if they perceive some — in a way that does not affect our analysis, by asking them about the risk of pregnancy "out of 20 women like them" (question (i) in the previous subsection). This may offer respondents an opportunity to "please" the interviewer if they wish to do so without affecting our estimates of the effect of the information message since we do not use responses to question (i) in our impact evaluation. Enumerators then ask the more personal question of what respondents think is their own probability of pregnancy absent contraception, which we use for impact evaluation purposes. Interestingly, we can reject that the average answer to the first question (15.7) is 17 (p-value of less than 0.0001), but not that the average answer to the second question (16.7) is 17 (p-value: 0.12). This does not suggest the presence of EDE since a question more closely worded to the information message would seem likely to encourage more social desirability bias. Figure 5 then plots answers to questions (i) and (ii). Unsurprisingly, answers are positively correlated ($\rho = 0.472$) but very few women simply answer 17 at either question, which is also encouraging from the point of view of EDE.[32]

While we did not probe women about differences in their answers to questions (i) and (ii), the pattern of responses would be consistent with respondents believing that women "like them" are less fecund than average, but that they themselves are more fecund than the average woman which they understood as being "like them." A comparison of answers to question (i) and (ii) also suggests that women are unlikely to under-report their expected pregnancy risk within 12 months to avoid the potential stigma associated with frequent sex. Indeed, if this were the case we would not expect women to report a *higher* expected risk of pregnancy for themselves than among 20 women like them.

Second, after reporting our results on the effect of an information shock on beliefs, we test formally for EDE. Appendix A-6 shows that the presence of EDE in either beliefs about pregnancy risk absent contraception or intended use would lead to inconsistent estimates of the effect of beliefs on intentions in the post-treatment data. Comparing estimates of the effect of beliefs on

[32]The dispersion of both variables is similar (3.84 for answers to (i) and 3.71 for answers to (ii)), suggesting that the use of beans in question (ii) does not introduce additional sampling variation.

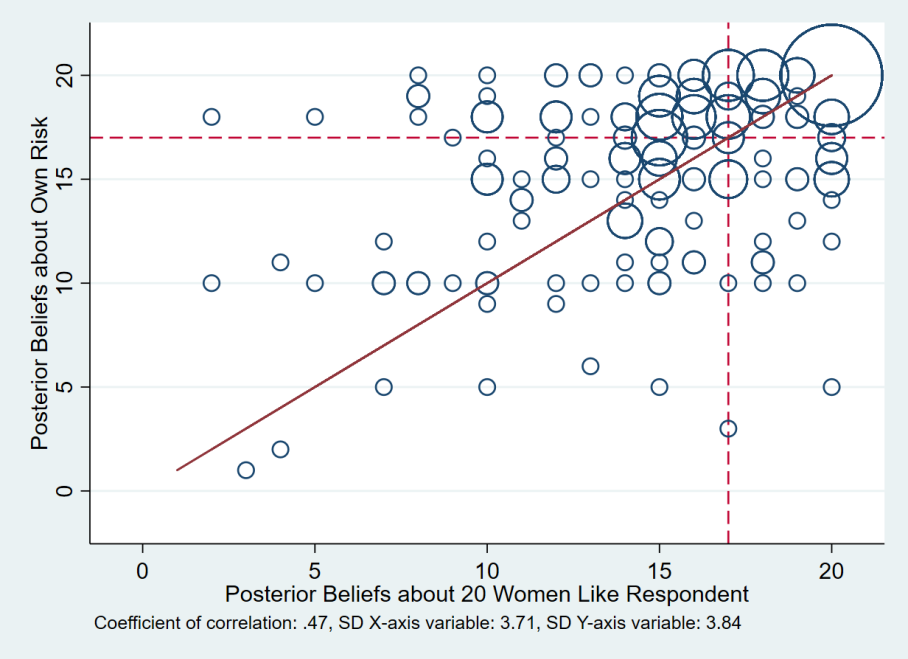

Figure 5: Posterior Beliefs About Own Risk of Pregnancy Absent Contraception vs. Risk Among 20 Women Like Respondent

Source: Survey described in Section 2.2. Note: Beliefs about risk among others were not elicited prior to receiving the information about population risk.

intentions before and after receiving the information treatment can thus provide a combined test of EDE on beliefs and intended use.

To fix ideas, let reported intended take-up by individual i in period $t = 0$ ("before information provision") or $t = 1$ ("after information provision") be denoted by y_{it}, and reported beliefs in period t be denoted by b_{it}. The probability model for y_{it} is then given by

$$y_{it} = \mathbf{1}[\beta_0 + \beta_1 b_{it} - u_{it} \geq 0].$$

Noting that $b_{i1} = b_{i0} + \Delta b_i$, we can express the regression for period $t = 1$ as

$$y_{i1} = \mathbf{1}[\beta_0 + \beta_1 b_{i0} + \beta_1 \Delta b_i - u_{i1} \geq 0].$$

In the presence of experimenter demand effects on beliefs in response to the information message, $b_{i1} = b^*_{i1} + v_i$ and $b_{i0} = b^*_{i0}$, where $b^*_{it}, t = 0, 1$ are true beliefs and v_i is the EDE on beliefs. The MLE for the regression of y_{i0} on b_{i0} provides a consistent estimator of β_1 whether or not beliefs or contraceptive intentions are misreported after the information treatment. But, as discussed in Appendix A-6 in the context of a logit model, when there is EDE, the MLE estimator for the coefficients on b_{i0} and on Δb_i in a regression of y_{i1} on b_{i0} and Δb_i usually leads to an asymptotic

bias for β_1 (see Stefanski and Carroll (1985)).

Setting now aside its repercussions for beliefs, if experimenter demand affects reported intended take-up, then

$$\mathbb{E}(y_{i1}|b_{i0},\Delta b_i) = \alpha_0 + (1-\alpha_0-\alpha_1)F(\beta_0+\beta_1 b_{i0}+\beta_1\Delta b_i),$$

where $\alpha_0 = \mathbb{P}(y_{i1}=1|y_{i1}^*=0)$ and $\alpha_1 = \mathbb{P}(y_{i1}=0|y_{i1}^*=1)$ are miss-classification probabilities and y_{i1}^* is true take-up intention as opposed to reported take-up intention, y_{i1} (see Hausman et al., 1998). Following Hausman et al. (1998), it can then be shown, for mis-classification probabilities close to zero, that the MLE will be inconsistent. All in all, if when regressing y_{i0} on b_{i0} and y_{i1} on b_{i0} and Δb_i, we cannot reject that the three coefficient estimates associated with beliefs are the same, there is no evidence for experimenter's demands effects on *either* beliefs or reported take-up intention.

Finally, we carry out our validation exercise. Namely, we compare the effect of the information shock on intentions to use contraception to the effect on *actual* contraceptive use which our ARUM model would predict given the observed pre-post information shock change in beliefs. Finding consistent results is reassuring both in terms of the soundness of our ARUM model and in terms of EDE concerns.

6.3 Results

In Table 7, we report, for four samples of treated women, changes in average beliefs about the risk of pregnancy absent contraception, changes in intentions to use contraception in the future, and the p-values corresponding to two tests. The first is a t-test of differences in the before- and after-information answers. For the binary outcome, we also implement a McNemar test, which is a popular test for before-after treatment comparisons of this type of outcomes (Fagerland et al., 2013).[33]

We find that women update their stated expected chance of pregnancy in line with the new information (from 15.8 to 16.7 out of 20, on average, Table 7 Panel A) and these updates are statistically significant. As can be seen in Panel B, as expected a much larger upwards beliefs revision is observed among women who expected a risk of pregnancy absent contraception below 17 at baseline. The extent of the recalibration is striking, as it nearly fully realigns the women's beliefs with the information provided: women who expected a risk lower than 17 increase their belief by 0.90 (standard error: 0.08) bean for each bean below 17 at baseline. Conversely, women

[33] We follow Fagerland et al. (2013)'s recommendation and use the "mid-p" version of the test. The mid-p test avoids the loss of power associated with the exact test version while not violating the nominal level of the test in any of Fagerland et al. (2013)'s simulations, and it is well-suited to cases where the binary indicator has a small number of "zeroes" as we have here.

who at baseline expected a risk equal to 17 or larger reduce their belief of the risk of pregnancy by 0.98 (standard error: 0.23) bean for each bean above 17 at baseline, resulting in an average drop from 18.9 to 17.2 in this subsample (Table 7 Panel C).[34] This suggests that, while women may have private information about how their own fecundity and frequency of sexual intercourse differs from the population average, most of the baseline discrepancy between the sample's beliefs and the population average is due to miscalibrated beliefs about the population average.

Next, we test for the presence of EDE. More specifically, we first estimate a binary logit model regressing baseline future contraceptive intentions on baseline beliefs about the risk of pregnancy when not using contraception (b_0), controlling for all the woman characteristics listed in Panel A of Table A-1. We then estimate a logit model regressing post-treatment intentions on baseline beliefs about the risk of pregnancy when not using contraception and their before-after treatment change in this belief (Δb), controlling for the same woman characteristics. We do so separately for women who have a baseline own expected risk below the reference figure of 17 (85%) and for those with baseline beliefs equal to 17 and above, and then compare, within each of these two groups, the three estimates of the effect of beliefs on intentions. If we cannot reject that all three estimates are the same, then we cannot reject the absence of EDE. To increase the power of our test to reject the null of no EDE, our regressions of baseline intentions on baseline beliefs use all available observations, whether or not they were randomized into receiving the information treatment. Note that we cannot instead split the sample by baseline *population* beliefs since we did not elicit these beliefs prior to informing respondents of the average risk in the population.

One concern could be that our information, while it is narrowly targeted at one belief, might also change other beliefs that matter for contraceptive decisions. If this were the case, then it would bias our post-treatment estimates of the effect of beliefs about the risk of pregnancy absent contraception on intended contraceptive use and would make it *more* likely to reject the null of no EDE.

The analysis is done separately for women who have priors below- and above the value of 17 provided in the information intervention because they would seem likely to perceive different experimenter demand effects, if there were such effects. In particular, if there are experimenter demand effects on intentions to use contraception, then the estimated effects of beliefs on stated intentions depend on two misclassification probabilities: the probability to report intending to use contraception when in fact the woman does not intend to use it (α_0) and vice-versa (α_1). These two misclassification probabilities are likely to differ depending on women's prior beliefs being above or below 17 since the latter may feel expected to over-report intending to use contraception

[34] While we cannot estimate exactly the updating regression used in Haaland et al. (2023)'s discussion of typical effect sizes due to only observing beliefs once for women who do not receive the information message, the short-term learning rates we obtain here are at the high end of the range reported in Haaland et al. (2023), namely 0.18 to 0.8.

but not the former.

Table 8 reports these results. We cannot reject the absence of EDE on either beliefs or intentions either for women with $b_0 < 17$ or $b_0 \geq 17$, with p-values for joint χ^2 tests of equality between the three estimates for the effect of beliefs on intentions equal to a minimum of 0.281 (among women with $b_0 \geq 17$). While no test of a null of "no EDE" can completely rule out the presence of EDE, and the power of our statistical test is limited by the size of the available sample, the three point estimates are broadly of the same magnitude for the main target — women who underestimate the risk of pregnancy absent contraception at baseline — which would be unlikely to be the case if there was sizable EDE in either beliefs about pregnancy risk or intentions among this group. For women with $b_0 \geq 17$, there is a statistically insignificant but substantial difference between the estimated effects of Δb and b_0, so that we are cautious not to put as much weight on results for this group — who is also not the main group of interest for our treatment.

The results of our EDE test also speak indirectly to two distinct potential concerns. First, one concern could have been that women do not trust the information we provide, or do not take it into consideration (e.g., due to some private information). But finding no statistically significant difference between the marginal effects of belief revisions and baseline beliefs on intention to use contraception among women underestimating this risk at baseline suggests that these women appear to both trust the information we provided and largely internalize perceived *increases* in the risk of pregnancy. Second, finding no statistically significant difference in estimated marginal effects before and after receiving the information message makes it unlikely that the effect on intentions simply comes from a salience effect. One concern could have been that we observe an increase in intentions to use contraception simply because women temporarily put more weight on pregnancy risk after receiving our information message. But in this case one would expect a larger marginal effect of expected pregnancy risk absent contraception on intended use post-treatment.

On the other hand, the very small estimated effect of beliefs updates for women who do not underestimate the pregnancy risk at baseline, although statistically indistinguishable from the effect of their baseline beliefs, suggests that women are less responsive to *reductions* in the perceived risk of pregnancy. The asymmetric responses to "good" and "bad" news are consistent with women preferring to err on the side of caution. This finding is reassuring because one potential concern about our information intervention would have been that, when we inform women with $b_0 > 17$ of the population average risk, they may *reduce* their contraceptive use, which is not the case here. In fact, they *increase* slightly their intention to use contraception (by 2.9 percentage points) despite decreasing their expected risk of pregnancy, on average (Table 7 Panel C). This could be due to, e.g., the information message leading to more precise beliefs about the high risk of pregnancy absent contraception, or to a degree of EDE since our EDE test is less conclusive for this group.

Table 7: Effects of the Information Intervention

	Before	After	#Obs	Difference	P-value of T-test	P-value of McNemar Mid-P test
Panel A: Whole sample receiving the information message						
Expected probability of pregnancy within 12 months (out of 20 beans)	15.84	16.68	287	0.85	0.010	
Intends to use contraception in the future	0.88	0.91	288	0.035	0.007	0.007
Panel B: Sample of women with baseline beliefs $<$17						
Expected probability of pregnancy within 12 months (out of 20 beans)	11.20	15.92	113	4.73	0.000	
Intends to use contraception in the future	0.85	0.89	113	0.044	0.058	0.070
Panel C: Sample of women with baseline beliefs $\geq$17						
Expected probability of pregnancy within 12 months (out of 20 beans)	18.85	17.18	174	-1.67	0.0000	
Intends to use contraception in the future	0.90	0.93	175	0.029	0.059	0.070
Panel D: Sample of women not using contraception						
Expected probability of pregnancy within 12 months (out of 20 beans)	15.07	16.56	84	1.49	0.020	
Intends to use contraception in the future	0.64	0.72	85	0.082	0.019	0.021

Details of the intervention are provided in Section 6.1. As in the t-test, the null hypothesis of the McNemar test is that the treatment has no effect. "Expected probability of pregnancy within 12 months" refers to perceived own risk. Beliefs about risk among others were *not* elicited prior to receiving the information about population risk.

Finally, we investigate the effect of our information shock on intention to use contraception in the future and compare these reduced-form estimates to our structural model estimates. Among women with baseline beliefs about the risk of pregnancy without contraception below 17 (Panel B of Table 7), the average increase in the expected probability of pregnancy without protection is 4.7 beans out of 20 (and the p-value of a t-test comparing before- and after- treatment beliefs is < 0.001). A counterfactual increasing beliefs among women who expect a risk below 17 at baseline by the average change observed in the data and thus matching this increase in beliefs on average predicts an increase by 4.8pp in contraceptive use among this group (based on the model in Table 4).[35] In our validation exercise, we find that intention to use contraception among this group increases by 4.4pp after receiving our information shock. Although less statistically significant than the effect observed in the (much larger) full sample (Panel A of Table 7), this figure is close to our model prediction of 4.8pp, which is reassuring both from the point of the reliability of our structural model estimates and in terms of EDE concerns.

Finding similar results is also reassuring from the point of view of other concerns which our information shock alone could have raised. One concern might have been that women's stated intentions may abstract from their partners' preferences. If this were the case, however, we would expect the structural estimates, which take partner's expect approval and fertility preferences into account, to be much smaller, which is not the case.

Women who are not currently using contraception are likely to be more responsive to new information about the risk of pregnancy absent contraception, although we cannot model this heterogeneity in our ARUM model in which not using is a possible outcome. Among women who are not using contraception, our treatment increases intention to use contraception by as much as 8.2pp (p-value of McNemar test: 0.03). Unsurprisingly, this is much larger than the predicted effect using the coefficients obtained when estimating the ARUM model on the whole sample — namely a 1.6pp increase in actual use.[36]

7 Conclusion

Many women in low-income countries are not using contraception despite wanting to avoid pregnancy. This is especially puzzling given policy efforts to ensure that modern contraceptives are readily available at low- or no cost to the user. In this paper we document, in a Mozambican

[35] For 36 women, this leads to beliefs of 20.7 out of 20. If we cap beliefs at 20, the counterfactual analysis predicts an increase by 4.7pp. If instead we restrict the sample to treated women only and predict the change in contraceptive use based on their revised individual beliefs, the model predicts an increase in contraceptive use of 5.3pp among this group.

[36] This is the predicted effect on contraceptive use when increasing beliefs by the 1.5 beans average increase in the expected probability of pregnancy absent contraception observed in the sample of women who are currently not using contraception (see Table 7 Panel D).

Table 8: Testing for Experimenter Demand Effects

	$b_0 < 17$			$b_0 \geq 17$		
	b_0	Δb	N	b_0	Δb	N
Panel A: Logit Coefficients						
Before Treatment	0.086		231	0.254		327
	(0.038)			(0.178)		
After Treatment	0.173	0.124	106	0.684	0.004	159
	(0.108)	(0.084)		(0.551)	(0.133)	
P-Value Difference	0.744			0.281		
Panel B: Marginal Effects						
Before Treatment	0.010		231	0.021		327
	(0.004)			(0.015)		
After Treatment	0.013	0.009	106	0.019	.0001	159
	(0.008)	(0.006)		(0.016)	(0.004)	
P Value Difference	0.743			0.285		

Estimated effect of baseline beliefs about pregnancy risk absent contraception (b_0) and before-after treatment changes in these beliefs (Δb) on intentions to use contraception. Logit model estimates with dependent variable defined either as baseline intentions to use contraception ("Before" row) or post-treatment intentions to use contraception ("After" row), controlling for all the woman characteristics listed in Panel A of Table A-1. The last row of each panel is the p-value of a joint χ^2 test of equality across the three coefficients of interest. To increase power, regressions of baseline intentions on baseline beliefs include all women, whether or not they were randomized into receiving the information. See Appendix A-6 for the econometric results underpinning our tests.

setting, the subjective beliefs regarding contraception of women who wish to avoid pregnancy. We find that they hold plausible beliefs overall, except that a large minority underestimates the risk of pregnancy absent contraception and the majority overestimates the risk of failure associated with hormonal methods.

Using these data to estimate a structural model of the choice between the main alternatives adopted by women in this country (including using no contraception), we find that supply issues and side-effects taken as a whole do not contribute much to low take-up, which calls for interventions beyond the current policy focus of improving the quantity and quality of contraceptive supply. Our structural estimates also point to the importance of partners' preferences for contraceptive methods — as well as- and independently to partners' fertility preferences. Our findings therefore highlight the importance of involving men in interventions aimed at increasing contraceptive take-up. The extent to which men's preferences are amenable to change may however be limited in the short run.

Crucially, we identify a new, promising avenue for immediate change, namely recalibrating beliefs about the risk of pregnancy absent contraception. We find support for this intervention via two independent exercises: first, in our structural model — identified from variation in beliefs and actual contraceptive use in our observational data — and second, through a validation exercise comparing women's beliefs and intentions to use contraception before- and after we inform them of the pregnancy risk absent contraception in the general population. Importantly, our structural model estimates and predictions based on those estimates hold constant a rich set of other constraints including cost and partner approval. In addition, the concordance between our structural estimates and our findings based on an exogenous information shock suggest that miscalibrated beliefs about pregnancy risk act as a barrier to contraceptive use independently of other barriers such as partner disapproval.

More precisely, our structural estimates indicate that increasing by 23.5pp the expected pregnancy risk absent contraception among the women who underestimate this risk would increase contraceptive take-up by about 4.8pp among this group (1.9pp overall). Among this group of women, our experiment increases the expected risk of pregnancy absent contraception by 23.5pp and intention to use contraceptives in the future by 4.4pp, which is close to our structural estimate of 4.8pp. Among women not currently using contraception, intention to use contraceptives increases by as much as 8.2pp after informing them of the pregnancy risk absent contraception in the general population.

In Mozambique, modern contraceptive use (unmet need for contraception) went from 20.8% (18.9%) in 2003 to 25.3% (23.1%) in 2015. In Sub-Saharan Africa as a whole, contraceptive use (unmet need for contraception) went from 16% (25.6%) in 2000 to 26.3% (24%) in 2014 (all figures taken from World Development Indicators, 2019). Given this slow pace of progress — and

even negative trend in the case of unmet need for contraception in Mozambique, an information message targeting low perceived risk of pregnancy could be a valuable low-cost instrument to increase contraceptive take-up in the short run. Two open questions, which we address in ongoing work, are to what extent low perceived risk of pregnancy contributes to low contraceptive take-up in different high-fertility contexts, and how, in practice, to effectively address information gaps in this domain.

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Online Appendix - Not for Publication

A-1 Respondents' Characteristics

In Panel A of Table A-1, we report demographic and socioeconomic characteristics of the women in our analytical sample. In Panel B, we report key descriptive statistics regarding contraception.

While all the women in our sample say — as per our sample selection criteria — that they do not want to have a child (at least in the coming two years), 30% are not using any contraceptive method. The most popular contraceptive method is injections, followed by the pill, implants and male condoms.

In 30% of cases, women report that their partners have higher fertility preferences than them.[37] There is however only limited correlation between not using a method and having a partner who has higher fertility preferences. In particular, a larger share of women are not using contraception when their partners have higher fertility preferences (37%), but the rate of women not using contraception is still high among women whose partners have similar fertility preferences (27%).

In Table A-2, we compare key characteristics of women in our sample (Col. 1) with two samples from the latest relevant representative survey, the 2015 AIDS Indicator Survey (AIS). Col. 2 reports summary statistics for women who were interviewed in the same three provinces and meet our analytical sample's eligibility criteria, while Col. 3 reports summary statistics for women who meet the same criteria and were interviewed in the whole of Mozambique. The women in our sample tend to be younger. At least in part because of this, on average they have fewer children than their counterparts in the AIS and are also more likely to have secondary education and above. They are quite similar in terms of whether they use contraception and which method they use (e.g., 30% of our sample reports not using contraception vs. 28% in the same three provinces in the 2015 AIS). The only notable difference is that they are 5 percentage points less (more) likely to use the pill (implants). A comparison of Columns (2) and (3) confirms that the three provinces we targeted have higher levels of economic development than the rest of country as well as higher levels of contraceptive use conditional on not wanting another child within two years.

[37] More precisely, 30% of respondents answer "yes" when asked, towards the end of the interview, whether her partner wants to have more children (if the respondent said she did not want anymore) or whether her partner wants to have a child sooner than her (if she said that she wanted to have another child, but wanted to wait at least 2 years).

A-2 Detailed Discussion of Beliefs Descriptive Statistics

Respondents have a very high expected unprotected probability of contracting a STD in the coming 12 months, and a good understanding of the fact that condoms, and condoms only, protect against STDs.

As in many other developing countries today, family planning is available free of charge in government facilities in Mozambique, and are also available at a cost from private providers. Consistent with the fact that, except for male condoms, at least 85% of users in the last DHS (2011) obtained their contraceptives from public providers, expected costs are low (from 14 to 27 Meticais per month or an annual cost of no more than about 1% of GDP per capita). We are not aware of a survey of contraceptive prices in private facilities in Mozambique around the relevant time period, but follow Stover and Chandler (2017)'s advice of using data from Kenya as closest substitute, which we report in the top panel of Table 1. If costs in Kenya were similar to those in the three provinces of Mozambique in which we collected data, then it would suggest that respondents overestimate costs, although still expecting them to be relatively low. It is however possible that private facilities in these provinces charge more than the Kenyan average.

Monthly indirect costs such as transport costs associated with each method vary from 23 (condom) and 37 (injections) Meticais per month, and the ranking of method by costs reflects what would be expected given the accessibility and frequency of administration of each method.[38]

Other variables related to supply also reflect the relative ease with which modern FP methods can be obtained, with an average expected waiting time of 19 (condoms) to 23 (injections and implants) minutes and an expected probability of being able to obtain the method when needed of 82% (implants) to 90% (condoms).

The women interviewed hold plausible beliefs regarding the probability of side effects. First, they understand that the risk of side effects is very low with condoms, but that hormonal methods come with a risk of nausea/vomiting, menstrual irregularities, and other side effects. It is difficult to compare the reported probabilities with an objective measure, but the range of values appears reasonable (from around 20% for nausea (injections) to 58% for menstrual irregularities (injections)) in light of reliable information stating that these and other side effects are "common to very common" for each of the three hormonal methods covered here (e.g., https://bnf.nice.org.uk). In terms of external statistics, estimates vary but a detailed clinical evaluation of Norplant users in Bangladesh has, for instance, found that close to 30% of users experienced amenorrhea during the

[38] In particular, the indirect cost of the pill and condoms, which are obtained from a range of providers including pharmacies, is lower than that of injections, which are overwhelmingly obtained from public health posts (MISAU, INE and ICF, 2013) and the indirect cost of obtaining implants, which are also obtained from a restricted range of providers, is lower than the indirect cost of obtaining injections, as would be expected by the difference in frequency of application.

first year, while 27.6% (18.6%) reported that menstrual pain worsened (improved) (Akhter et al., 1993), while estimates in Burkman (2001) and Odwe et al. (2020) for menstrual irregularities range from 14-50% for the pill to 70-80% for injections. For the incidence of nausea, Burkman (2001) and Odwe et al. (2020) report a near-zero risk with implants and injections, but a 20-40% risk with the pill; while the risk of other side effects ranges from 38% for implants and injections to 60% for the pill. All in all, we conclude that women's beliefs about the overall risk of side effects is broadly in line with actual risks, although our respondents do not fully understand differences between hormonal methods (e.g., the much higher risk of menstrual irregularities but lower risk of other side effects with injections relative to the pill).

Interestingly, on average women also hold reasonable beliefs about the effect of contraceptive methods on the ability to conceive after discontinuation. The average expected probability of managing to conceive in the 12 months following discontinuation if they decided that they wanted to get pregnant is 69% for implants and injections, 73% for the pill and 81% for condoms, compared to a 75% expected probability of managing to conceive within the coming 12 months if they decided that they wanted to get pregnant and were not currently using any contraceptive. In this sample, there is therefore no evidence of the mistaken belief that modern contraception has long-term effects on the ability to conceive.

We also elicited women's expected probability of approval of each alternative contraceptive method by their coreligionists (i.e., individuals who share the same religion, whose opinions may or not align with the position of religious *authorities*), as well as their parents, friends and partner. Expected approval by coreligionists, friends and parents are thought of as capturing both opposition from people whose opinions women may value and opposition by the woman herself due to religious or cultural reasons. The women's expected probability of approval by others is generally low (60% or less), especially in the case of coreligionists. As expected, women who say that their partners want more children or want them earlier than them have a lower expected probability that their partners would approve of them using a method relative to not using a method.[39] Partners' fertility preferences — which do not vary within woman — are however not the only driver of differences in expected approval across alternatives: the pairwise coefficient of correlation in partner approval across the three hormonal methods is between .67 and .71, and that between condoms and hormonal methods between .37 and .47. Similarly, approval of the "no method" alternative is overall largely uncorrelated with that of specific contraceptive methods (ρ between -.06 and -.01) even though, unsurprisingly, over a quarter of women expecting a high chance (15/20 and above) of partner approval of injections expect a zero chance of approval of the no method alternative, for instance. Taken together, these data suggest that (i) many women believe that their partners are

[39] For instance, the expected probability of approval if using injections minus the expected probability of approval if not using any method is 25 (2) pp on average among women whose partners have similar (higher) fertility preferences.

willing to use contraception to achieve the women's family plan even though they personally do not wish to avoid a pregnancy and (ii) alternative-specific attributes influence partners' willingness to use them.

Women's answers to questions about the probability of being able to hide from their partner the use of each method or non-use of any method are also plausible. Reassuringly, the vast majority of respondents do not think they would be able to use male condoms without the knowledge of their partners. For the other methods and for using no method, the expected probability of being able to hide use or non-use from partners varies between 32% (implants and doing nothing) and 42% (injections). This suggests that women took into consideration the fact that men can infer the use or non-use of contraception based not only on the direct observation of use of the method but also from side effects such as menstrual irregularities and pregnancy (non-)occurrences.

In summary, women in our sample are, on average, well informed about the failure rate of the male condom method, but underestimate somewhat the probability of pregnancy when not using any contraception and vastly overestimate (by a factor of between about 3 and 5) the probability of pregnancy when using hormonal methods — resulting in a large underestimation of the ability of hormonal methods to protect women against pregnancy relative to using no method. Reassuringly, however, women do not generally appear to be under the misconception that hormonal methods have adverse effects on their ability to get pregnant after discontinuation. Women also understand perfectly well that only condoms protect against STDs, and have a high expected risk of contracting STDs when using no protection. Expected monthly costs, waiting times and other issues with supply are low. The expected probability of side effects is high and within a reasonable range. Finally, expected rates of approval by others are low for any action that the women could take including using no method.

A-3 Robustness Checks

In our preferred model, missing values about alternative-specific characteristics are set to zero and we include one binary variable per alternative-specific belief indicating missing values. We do so because most women answer most beliefs questions and, given the large number of characteristics-by-method questions, excluding women on the basis of having any missing answer substantially reduces sample size and may lead to a selected sample.[40] In this subsection we show that our our main conclusions are not affected by this imputation or a number of other potential concerns about data reliability.

Reassuringly, women answer 95.4% of beliefs questions on average, 72% of women have at most 5% of missing answers and only 2% of women have 25% or more missing answers (see Table A-3). The large number of beliefs variables asked from respondents (75.6 on average) however leads to a significant reduction in sample size when keeping only women with no missing answers (49%), and the pattern of non-response appears to be non-random. For instance, better educated women, women in urban areas and women whose partners have higher fertility preferences than themselves are significantly more likely to answer all the questions.

In Table A-5, we report estimates for a number of specifications, starting from a model controlling only for women's characteristics and the subjective risk of pregnancy associated with each method, and building up the set of covariates up to our preferred model (column 9). For each model we estimate, we report (i) results obtained with the full sample (2761 observations from 584 women), where missing values are set to zero and missing value indicators included and (ii) results obtained when women with any missing value are excluded from the sample. Across all samples and specifications in which they are included, the expected probability of partner's approval of the method, the probability of other negative effects, woman's age and the perceived risk of pregnancy absent contraception are consistently statistically significant determinants of women's decisions (with little variation in the magnitude of these effects across specifications). For a given set of covariates, results obtained with or without imputing are largely qualitatively similar despite some quantitative differences. To assess the extent to which this affects our counterfactuals, in Table A-9 we compare counterfactuals obtained with our preferred specification with (column 9 of Table A-5) and without (column 10 of Table A-5) imputing missing values. While there are some quantitative differences between the two sets of estimates, the qualitative pattern and overall conclusions are robust to the exclusion of women with any missing value. In particular, the predicted effect on contraceptive use of increasing to 85% the expected risk of pregnancy absent contraception of women with beliefs below the population average (17 out of 20) is almost identical (among women

[40] In the linear regression model, there is a trade-off between potential biases arising from the use of indicators to account for missing values when missingness is related to covariates as suggested below and the loss of precision resulting from the exclusion of observations with missing values (see Jones, 1996).

with beliefs below 17, it is 0.067 in one case and 0.064 in the other).

We additionally test the robustness of our estimates to the possibility that non-response is systematically correlated with high- or low- subjective probabilities. To do so, we set missing observations for a given regressor to either all be equal to small values (mean minus one standard deviation) or all to be equal to large values (mean plus one standard deviation) and re-estimate the model using the data thus obtained. We first do so for one regressor at a time — resulting in 42 sets of estimates — and report in Table A-7 the minimum (Column (2)) and maximum values (Column (3)) of each parameter estimate across all these sets of estimates. In addition, we re-estimate the model after assigning all missing values of each regressor to either a small or large value with probability 0.5,[41] and report the results in the last column of Table A-7. Results are largely stable, both qualitatively and quantitatively. The few sign reversals observed pertain to coefficients that are too small to be statistically significant in our baseline model, except for that associated with the expected value of "other costs", which is small but negative and significant at 10% in our main analysis, but has a very small, counter-intuitively positive coefficient in some small/large value imputation scenarios.

In Table A-8, we report results from further robustness checks in which we estimate our preferred model on three additional samples in which we exclude observations for which our beliefs data might be less reliable. As can be seen by comparing the first column of Table A-8, which reports our baseline results, with each of the other three columns, results are largely robust to (i) excluding the five respondents who concentrate all their answers in the values 0, 5, 10, 15 or 20 out of 20 beans (column 2) (ii) excluding methods which may not genuinely belong to the woman's consideration set, operationalized here as methods for which a woman answered fewer than 13 out of the 16 questions used to construct our alternative-specific variables (column 3) and (iii) excluding the 28 women who answered a higher chance that they would get pregnant within 12 months than within 5 years in the training section of the interview (column 4). The only noticeable difference is that, in the latter set of results, the effect of expected costs is qualitatively similar but the pattern is more extreme as the coefficient associated with direct (indirect) monetary costs becomes more positive (negative).

In Table A-10, we compare our baseline results (column 1) with estimates obtained with only two nests in the model (no method vs. any method) (column 2) or when focusing on the choice between contraceptive methods among current users only (column 3). Results are qualitatively similar across the three sets of results. The only notable differences are that (i) chances of pregnancy after discontinuation do not significantly affect choices in the two-nest model (column 2)

[41] I.e., we assign all missing values for regressor 1 to its mean value minus one standard deviation with probability 0.5 or all missing values for this regressor to its mean value plus one standard deviation with probability 0.5, and assign all missing values for regressor 2 to its mean value minus one standard deviation with probability 0.5 or all missing values for this regressor to its mean value plus one standard deviation with probability 0.5, etc....

and (ii) quantitatively, choices are more responsive to alternative-specific characteristics when focusing on the choice of method among users (column 3).

A-4 Appendix Tables

Table A-1: Summary Statistics for Method-Invariant Variables

	Mean	SD	Count
Panel A			
Age 18-24	0.32		584
Age 25-34	0.43		584
Age 35-44	0.22		584
Age 45-49	0.03		584
# Children	2.61	1.72	584
No Schooling	0.14		584
Some Primary Schooling	0.44		584
Some Secondary Schooling	0.42		584
Urban	0.47		584
Maputo City	0.22		584
Maputo Province	0.38		584
Gaza Province	0.39		584
Partner Wants More Children or Wants them Earlier	0.30		584
Muslim	0.03		584
Christian	0.47		584
Catholic	0.13		584
Protestant	0.03		584
Other Religion	0.30		584
No Religion	0.04		584
Doesn't Know Religion	0.01		584
Panel B[a]			
No Method	0.30		584
Injections	0.32		556
Pill	0.21		557
Implants	0.11		502
Male Condom	0.10		562
Sex Last Month	0.88		584
Sex Last Quarter	0.11		584
Sex Activity Missing	0.01		584
# Methods Known	5.40	1.63	584
# Methods Known (Main Four)	3.73	0.60	584
N			584

Source: Survey described in Section 2.2. [a]Panel B reports the share of women who are using each method among the sample of those who know about this method. As not every woman knows about each method, the shares add up to slightly more than 1. The number of observations reported in the last column is less than 584 for modern methods because not all women in our sample know every method.

Table A-2: Comparison Between Sample and Population Characteristics

	Dataset	AIS 2015 (3 Provinces)	AIS 2015 (All)
Panel A			
Age 18-24	0.32	0.23	0.27
Age 25-34	0.43	0.39	0.36
Age 35-44	0.22	0.31	0.29
Age 45-49	0.03	0.07	0.08
# Children	2.61	3.70	4.20
No Schooling	0.14	0.09	0.22
Some Primary Schooling	0.44	0.61	0.53
Some Secondary Schooling	0.42	0.30	0.25
Panel B			
No Method	0.30	0.28	0.44
Injections	0.32	0.30	0.30
Pill	0.21	0.26	0.17
Implants	0.11	0.06	0.05
Male Condom	0.10	0.10	0.04
N	584	475	1469

Sources: Survey described in Section 2.2 (column 1); Maputo City, Maputo Province and Gaza Province samples of the 2015 AIDS Indicators Survey (MISAU, INE and ICF, 2016) meeting the same sample selection criteria as in column 1 (column 2); All women interviewed for the 2015 AIDS Indicators Survey (MISAU, INE and ICF, 2016) meeting the same sample selection criteria as in column 1 (column 3). Selection criteria: age between 18-49, cohabiting, does not want to have a(nother) child within two years, is not infecund, is not pregnant and uses one of the five alternatives listed in Panel B.

Table A-3: Non-Response Across Women, by Belief, and by Method

Distribution Across Women	
Average Missing	0.047
0 missing answers	0.49
$<$5% missing	0.72
$\geq$25% missing	0.02
Share Missing by Belief	
P(Pregnancy w/i 12 months)	0.031
P(STD)	0.016
P(Method Cost)	0
P(Other Costs)	0
P(Obtaining on Time)	0.014
E(Waiting Time)	0.031
P(Nausea or Headache)	0.080
P(Menstrual Irreg.)	0.061
P(Altered libido, etc...)	0.081
P(Other Negative Effects)	0.060
P(Pregnancy after Disc.)	0.037
P(Parents Approval)	0.071
P(Relig. Approval)	0.144
P(Partner Approval)	0.016
P(Friends Approval)	0.057
P(Hide from Partner)	0.015
Share Missing by Method	
No Method	0.026
Condoms	0.033
Implants	0.074
Injections	0.044
Pill	0.047

Source: Survey described in Section 2.2.

Table A-4: Summary Statistics for All Alternative-Specific Variables

	If using:	Condoms	Implants	Injections	No Method	Pill
	# in choice set[a]	562	502	556	584	557
P(Pregnancy w/i 12 months)	Mean	0.17	0.25	0.19	0.78	0.35
	SD	0.268	0.252	0.231	0.258	0.3
	Obs.	553	469	537	579	540
P(STD)	Mean	0.14	0.79	0.78	0.75	0.78
	SD	0.267	0.235	0.238	0.269	0.24
	Obs.	557	494	550	566	549
E(Method Cost)	Mean	22.47	25.64	27.03	0	14.07
	SD	130.848	190.582	196.857	0	99.159
	Obs.	554	498	549	584	545
E(Other Costs)	Mean	22.58	27.37	36.55	0	24.07
	SD	171.702	194.499	249.779	0	208.577
	Obs.	554	498	550	584	547
P(Obtaining on Time)	Mean	0.9	0.82	0.84	1	0.86
	SD	0.169	0.223	0.224	0	0.201
	Obs.	554	486	551	584	549
E(Waiting Time)	Mean	18.75	23.34	23.46	0	21.56
	SD	12.716	19.625	19.714	0	16.747
	Obs.	536	464	525	584	535
P(Nausea or Headache)	Mean	0.03	0.24	0.21	0	0.44
	SD	0.116	0.265	0.258	0	0.319
	Obs.	539	414	507	584	503
P(Menstrual Irreg.	Mean	0.06	0.52	0.58	0	0.46
or Vaginal Infections)	SD	0.175	0.259	0.296	0	0.306
	Obs.	540	430	529	584	517
P(Other Negative Effects)	Mean	0.06	0.33	0.31	0	0.31
	SD	0.164	0.266	0.296	0	0.272
	Obs.	539	440	523	584	516
P(Altered Libido,	Mean	0.26	0.15	0.19	0	0.14
Pleasure or Romance)	SD	0.323	0.219	0.271	0	0.235
	Obs.	533	418	513	584	497
P(Pregnancy after	Mean	0.81	0.69	0.69	0.73	0.75
Discontinuation)	SD	0.293	0.24	0.245	0.291	0.23
	Obs.	552	462	534	575	539
P(Parents Approval)	Mean	0.61	0.5	0.53	0.28	0.54
	SD	0.31	0.304	0.311	0.278	0.313
	Obs.	529	465	516	532	522
P(Relig. Approval)	Mean	0.49	0.39	0.39	0.3	0.39
	SD	0.35	0.309	0.307	0.299	0.317
	Obs.	488	435	470	490	479
P(Partner Approval)	Mean	0.55	0.54	0.58	0.4	0.6
	SD	0.32	0.303	0.324	0.335	0.31
	Obs.	554	491	550	574	549

P(Friends Approval)	Mean	0.56	0.49	0.51	0.27	0.54
	SD	0.321	0.312	0.315	0.27	0.317
	Obs.	535	471	529	544	526
P(Hide from Partner)	Mean	0.05	0.32	0.42	0.32	0.38
	SD	0.177	0.298	0.343	0.33	0.316
	Obs.	558	487	550	573	551

Source: Survey described in Section 2.2. [a] Number of respondents who know about the method. P(.) stands for "probability of event happening" and E(.) is the expectation operator. "Pregnancy" and "STD" refer to the perceived probability of pregnancy occurring or of contracting a STD, respectively, within 12 months. Costs are expected monthly costs. Waiting time corresponds to the middle of the interval chosen by respondents and is expressed in minutes. Top 1% in terms of costs and waiting times removed.

Table A-5: Full Nested Logit Estimates for Alternative Specifications and Samples

	Method's P(pregnancy) w/i 12 months		Add P(STD) and P(partner's approval)		Add No Method P(pregnancy)		Add supply-side		All	
Impute Missing Values?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Alternative-Specific Variables										
Spacing × P(pregnancy	-0.008	-0.013	-0.003	0.002	0.001	0.004	0.001	0.005	0.001	0.009
w/i 12 months	(0.014)	(0.016)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.009)
Limiting × P(pregnancy)	-0.024	-0.034**	-0.015*	-0.011	-0.010	-0.008	-0.009	-0.007	-0.009	-0.003
w/i 12 months	(0.024)	(0.016)	(0.009)	(0.009)	(0.008)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
P(STD)			0.012	0.012	0.007	0.006	0.005	0.002	0.003	-0.006
			(0.010)	(0.011)	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.008)
P(partner's approval)			0.065***	0.068***	0.066***	0.066***	0.059***	0.054***	0.061***	0.048***
			(0.011)	(0.012)	(0.011)	(0.012)	(0.014)	(0.014)	(0.012)	(0.016)
P(obtain when needed)							0.012	0.013*	0.011	0.017*
							(0.008)	(0.007)	(0.009)	(0.010)
E(waiting time)							-0.001	-0.002	-0.002	-0.002
							(0.001)	(0.002)	(0.002)	(0.002)
E(direct costs)							0.001	0.002***	0.001	0.002**
							(0.001)	(0.001)	(0.001)	(0.001)
E(other costs)							-0.001	0.000	-0.001*	0.000
							(0.000)	(0.001)	(0.000)	(0.002)
P(nausea)									-0.009*	-0.008
									(0.004)	(0.005)
P(menstrual irreg.)									0.010**	0.004
									(0.005)	(0.005)
P(other neg. effect)									-0.014**	-0.016**
									(0.006)	(0.008)
P(affect libido romance)									0.006	0.006
									(0.006)	(0.006)
P(preg. after disc.)									0.019**	0.018
× Spacing									(0.009)	(0.012)

P(preg. after disc.)									0.024**	0.011
× Limiting									(0.010)	(0.010)
P(parents approval)									0.011	0.015
									(0.008)	(0.009)
P(coreligionists approval)									0.004	0.003
									(0.009)	(0.010)
P(friends' approval)									0.007	-0.000
									(0.009)	(0.009)
Partner wants the same									-0.013**	-0.005
× P(hide method)									(0.006)	(0.006)
Partner wants more									-0.002	-0.005
× P(hide method)									(0.011)	(0.011)
No Method Nest: Method-Invariant Variables (Relative to Hormonal Nest)										
Age 25-34	0.161	0.014	0.163	-0.293	0.111	-0.276	0.057	-0.149	0.069	-0.196
	(0.249)	(0.267)	(0.261)	(0.288)	(0.268)	(0.291)	(0.269)	(0.321)	(0.279)	(0.404)
Age 35-44	1.016***	0.989***	1.017***	0.830**	0.870**	0.764*	0.851**	0.871**	0.954**	0.934*
	(0.344)	(0.366)	(0.366)	(0.396)	(0.375)	(0.392)	(0.377)	(0.424)	(0.402)	(0.565)
Age 45-49	1.758**	1.679**	1.651**	1.726**	1.686**	1.773**	1.672**	1.740**	1.680**	1.707*
	(0.689)	(0.698)	(0.687)	(0.686)	(0.705)	(0.703)	(0.697)	(0.728)	(0.718)	(0.937)
Some Primary	0.135	0.100	0.262	0.171	0.334	0.136	0.343	0.424	0.343	0.150
	(0.291)	(0.320)	(0.313)	(0.387)	(0.326)	(0.379)	(0.326)	(0.399)	(0.353)	(0.562)
≥ Secondary	-0.600*	-0.612*	-0.437	-0.403	-0.320	-0.354	-0.311	-0.375	-0.235	-0.540
	(0.334)	(0.361)	(0.353)	(0.421)	(0.368)	(0.417)	(0.368)	(0.438)	(0.399)	(0.589)
Urban	0.110	0.236	-0.030	-0.033	-0.063	-0.111	-0.024	0.083	-0.049	0.255
	(0.251)	(0.270)	(0.264)	(0.292)	(0.272)	(0.293)	(0.269)	(0.312)	(0.286)	(0.425)
Maputo Province	0.380	0.476	0.223	0.199	0.175	0.106	0.176	0.071	0.109	0.017
	(0.332)	(0.346)	(0.344)	(0.361)	(0.360)	(0.372)	(0.361)	(0.407)	(0.373)	(0.524)
Gaza Province	0.138	0.170	0.227	0.172	0.228	0.158	0.293	0.089	0.349	0.319
	(0.313)	(0.325)	(0.326)	(0.344)	(0.343)	(0.353)	(0.344)	(0.389)	(0.362)	(0.466)
Partner wants more	0.655***	0.670***	0.358	0.386	0.452*	0.438*	0.453*	0.321	0.531**	0.932***
kids	(0.216)	(0.233)	(0.230)	(0.265)	(0.237)	(0.265)	(0.238)	(0.292)	(0.246)	(0.340)
No. of children	-0.115	-0.109	-0.073	-0.065	-0.070	-0.061	-0.065	-0.026	-0.011	-0.052
	(0.082)	(0.086)	(0.081)	(0.090)	(0.084)	(0.090)	(0.085)	(0.094)	(0.085)	(0.117)

Limiting	-0.325	-0.256	-0.407	-0.325	-0.415	-0.377	-0.418	-0.361	-0.524*	-0.220
	(0.296)	(0.342)	(0.292)	(0.322)	(0.294)	(0.318)	(0.289)	(0.342)	(0.302)	(0.416)
Catholic	-0.421	-0.192	-0.409	-0.360	-0.219	-0.241	-0.231	-0.032	-0.221	0.188
	(0.333)	(0.347)	(0.344)	(0.359)	(0.347)	(0.357)	(0.346)	(0.374)	(0.347)	(0.440)
Muslim	0.230	0.271	0.250	0.047	0.341	0.068	0.358	0.089	0.385	0.926
	(0.594)	(0.597)	(0.630)	(0.668)	(0.656)	(0.688)	(0.653)	(0.904)	(0.649)	(1.122)
Protestant	0.722	0.700	0.777	0.983*	0.826	0.932	0.813	1.087*	0.888	1.046
	(0.505)	(0.525)	(0.601)	(0.578)	(0.594)	(0.573)	(0.569)	(0.595)	(0.582)	(0.882)
Other religion	-0.077	-0.062	-0.079	-0.073	0.043	-0.041	0.049	-0.173	0.001	-0.433
	(0.228)	(0.247)	(0.240)	(0.272)	(0.247)	(0.273)	(0.246)	(0.292)	(0.257)	(0.430)
Atheist	0.752	0.745	0.713	0.641	0.892**	0.742	0.951**	0.366	1.101**	1.115*
	(0.482)	(0.505)	(0.444)	(0.509)	(0.448)	(0.512)	(0.450)	(0.610)	(0.487)	(0.648)
Doesn't know religion	1.442	0.829	1.472	0.067	1.041	0.138	0.362	-15.977***	0.279	-13.688***
	(1.178)	(1.283)	(1.369)	(1.698)	(1.456)	(1.781)	(1.751)	(0.929)	(1.842)	(1.255)
P(preg.) absent contra.					-0.083***	-0.071***	-0.081***	-0.080***	-0.068***	-0.081**
					(0.022)	(0.024)	(0.022)	(0.026)	(0.022)	(0.034)
P(STD) absent contra.					0.034	0.027	0.034	0.021	0.027	-0.004
					(0.021)	(0.022)	(0.022)	(0.025)	(0.022)	(0.030)
Condom Nest: Method-Invariant Variables (Relative to Hormonal Nest)										
Age 25-34	0.304	0.066	0.235	-0.037	0.212	0.013	0.360	0.233	0.368	0.113
	(0.360)	(0.382)	(0.351)	(0.383)	(0.355)	(0.394)	(0.371)	(0.448)	(0.374)	(0.528)
Age 35-44	0.790	0.642	0.767	0.617	0.768	0.682	0.878	1.045	0.943	0.990
	(0.538)	(0.580)	(0.541)	(0.598)	(0.563)	(0.631)	(0.569)	(0.645)	(0.582)	(0.898)
Age 45-49	0.566	0.266	0.468	0.139	0.587	0.335	0.597	-0.111	0.296	-13.926***
	(1.206)	(1.181)	(1.073)	(0.976)	(1.072)	(1.003)	(0.984)	(0.986)	(1.025)	(1.078)
Some primary	0.420	0.449	0.416	0.405	0.445	0.457	0.299	0.558	0.271	0.687
	(0.612)	(0.679)	(0.586)	(0.691)	(0.583)	(0.691)	(0.539)	(0.677)	(0.569)	(0.826)
$\geq$ Secondary	0.403	0.343	0.330	0.211	0.393	0.292	0.193	0.071	0.270	0.041
	(0.632)	(0.691)	(0.604)	(0.703)	(0.598)	(0.694)	(0.558)	(0.695)	(0.594)	(0.861)
Urban	0.438	0.310	0.373	0.144	0.339	0.116	0.353	0.546	0.367	0.206
	(0.390)	(0.419)	(0.392)	(0.425)	(0.399)	(0.435)	(0.404)	(0.494)	(0.402)	(0.593)
Maputo Province	0.751	0.581	0.704	0.613	0.760	0.680	0.750	0.897	0.829*	0.559
	(0.479)	(0.501)	(0.480)	(0.517)	(0.480)	(0.508)	(0.484)	(0.557)	(0.481)	(0.645)

Gaza Province	0.523	0.420	0.429	0.284	0.580	0.444	0.536	0.530	0.511	0.454
	(0.427)	(0.435)	(0.410)	(0.441)	(0.401)	(0.428)	(0.407)	(0.456)	(0.406)	(0.502)
Partner wants more	0.221	0.177	0.103	0.022	0.125	0.010	0.188	-0.148	0.216	0.096
kids	(0.343)	(0.352)	(0.344)	(0.369)	(0.337)	(0.362)	(0.337)	(0.398)	(0.353)	(0.486)
No. of children	-0.511***	-0.465***	-0.499***	-0.443***	-0.499***	-0.447***	-0.537***	-0.519***	-0.496***	-0.540**
	(0.149)	(0.158)	(0.148)	(0.155)	(0.154)	(0.164)	(0.158)	(0.176)	(0.155)	(0.243)
Limiting	0.674	0.668	0.724*	0.713	0.678	0.641	0.646	0.823*	0.572	1.081*
	(0.419)	(0.443)	(0.413)	(0.447)	(0.413)	(0.447)	(0.407)	(0.487)	(0.421)	(0.596)
Catholic	0.060	0.114	-0.037	-0.175	-0.004	-0.128	0.036	0.049	-0.057	0.269
	(0.450)	(0.473)	(0.453)	(0.503)	(0.453)	(0.509)	(0.459)	(0.551)	(0.465)	(0.603)
Muslim	0.844	0.837	0.860	0.855	0.854	0.812	0.683	-0.293	0.995	0.485
	(0.735)	(0.716)	(0.711)	(0.716)	(0.732)	(0.737)	(0.780)	(1.518)	(0.764)	(1.782)
Protestant	-14.011***	-13.402***	-13.398***	-13.408***	-14.615***	-13.647***	-14.615***	-14.629***	-14.615***	-13.879***
	(0.413)	(0.435)	(0.443)	(0.466)	(0.455)	(0.482)	(0.460)	(0.550)	(0.502)	(0.754)
Other religion	-0.081	-0.227	-0.155	-0.324	-0.178	-0.378	-0.182	-0.032	-0.156	0.059
	(0.369)	(0.388)	(0.357)	(0.385)	(0.363)	(0.396)	(0.363)	(0.421)	(0.370)	(0.512)
Atheist	-0.306	-0.383	-0.301	-0.374	-0.316	-0.442	-0.388	-0.552	-0.324	-13.960***
	(1.105)	(1.092)	(1.093)	(1.084)	(1.121)	(1.157)	(1.162)	(1.290)	(1.281)	(1.198)
Doesn't know religion	2.567*	2.275	2.552*	2.388*	2.349*	2.557**	2.777**	3.331**	2.933**	2.590**
	(1.361)	(1.394)	(1.449)	(1.350)	(1.391)	(1.264)	(1.270)	(1.463)	(1.262)	(1.228)
P(preg.) absent contra.					-0.051	-0.055*	-0.058*	-0.031	-0.055*	-0.073
					(0.033)	(0.034)	(0.033)	(0.038)	(0.033)	(0.047)
P(STD) absent contra.					-0.028	-0.041	-0.032	-0.074**	-0.039	-0.082*
					(0.033)	(0.034)	(0.033)	(0.037)	(0.034)	(0.042)
Method-Specific Intercepts (Relative to No Method)										
Condoms	-1.604**	-1.260	-1.379*	-1.082	-0.895	-0.512	-0.443	-0.696	-0.390	0.121
	(0.803)	(0.839)	(0.792)	(0.885)	(0.959)	(1.061)	(0.959)	(1.144)	(0.987)	(1.337)
Implants	0.338	-0.272	0.297	0.176	-0.295	-0.525	-0.087	-0.223	0.243	-0.161
	(0.721)	(0.791)	(0.544)	(0.624)	(0.677)	(0.755)	(0.687)	(0.833)	(0.731)	(1.035)
Injections	0.619	0.396	0.512	0.362	-0.079	-0.348	0.100	-0.074	0.437	-0.021
	(0.563)	(0.590)	(0.534)	(0.615)	(0.674)	(0.751)	(0.686)	(0.833)	(0.731)	(1.037)
Pill	0.540	0.203	0.397	0.271	-0.208	-0.440	-0.022	-0.162	0.334	-0.071
	(0.593)	(0.638)	(0.535)	(0.617)	(0.675)	(0.753)	(0.685)	(0.833)	(0.730)	(1.035)

No Method τ	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(72.036)	(1.420)	(5.849)	(1.282)	(3.518)	(4.288)	(6.526)	(11.102)	(7.971)	(10.209)
Condom τ	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	(4.517)	(16.898)	(2.353)	(2.025)	(247.185)	(97.815)	(4.689)	(355.785)	(10.611)	(77.518)
Hormonal τ	0.286	0.683**	0.225***	0.202***	0.224***	0.190***	0.191***	0.152***	0.189***	0.134***
	(0.273)	(0.342)	(0.055)	(0.057)	(0.050)	(0.051)	(0.053)	(0.043)	(0.047)	(0.049)
Miss. Val. Indicators	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Alternatives	2761	2491	2761	2336	2761	2336	2761	2047	2761	1360
Women	584	527	584	491	584	491	584	428	584	285

Estimates of the preferred specification described and motivated in Section 4.3 are reported in Column (9). See Section 5.1 for a discussion of the results in this column and Section A-3 for a discussion of results in the other columns and in alternative specifications (e.g., using only variation between contraceptive methods). Source: own survey data described in Section 2.2, which provides details regarding our treatment of (14) women using a combination of methods and (23) women using methods other than the ones we model here. Robust standard errors in parentheses, * $p<0.10$ ** $p<0.05$ *** $p<0.01$. Missing values set to zero and indicators for missing values included in Columns (1), (3), (5), (7) and (9). All the other columns exclude cases with any missing value for any of the included variables. The method-specific intercept for the "no method" alternative is normalized to zero. The effect of method-invariant variables on the utility associated with alternatives in the hormonal nest is normalized to zero.

Table A-6: Within-Woman Correlation of Beliefs about Pregnancy and STD Risks

	P(Pregnancy)					P(STD)				
	Condom	Implants	Injections	No method	Pill	Condom	Implants	Injections	No method	Pill
P(Pregnancy):										
Condom	1									
Implants	0.282	1								
Injections	0.245	0.717	1							
No method	-0.0793	-0.0848	-0.0751	1						
Pill	0.515	0.477	0.369	-0.0394	1					
P(STD):										
Condom	0.366	0.0128	-0.0850	-0.0182	0.260	1				
Implants	-0.119	-0.127	-0.122	0.178	-0.0361	0.0623	1			
Injections	-0.108	-0.139	-0.114	0.200	-0.0696	0.0303	0.887	1		
No method	-0.121	-0.161	-0.104	0.270	-0.0764	-0.0144	0.457	0.424	1	
Pill	-0.0949	-0.146	-0.156	0.139	-0.0495	0.0382	0.894	0.835	0.424	1

Source: own survey data described in Section 2.2. Pairwise correlation coefficients. Sample sizes vary (between 449 and 561) across coefficients since respondents are only asked about their beliefs regarding the contraceptive methods they know of- and due to item non-response. See the last column of Panel B of Table A-1 for the number of women who know of each method and Table A-3 for details of item non-response.

Table A-7: Robustness to Imputing Missing Values as Being All Equal to Small or Large Values

	Baseline	One Variable At a Time		All Variables At the Same Time
		Min	Max	
Spacing × P(pregnancy)	0.0014	0.0001	0.0018	0.0034
Limiting × P(pregnancy)	-0.0086	-0.0113	-0.0083	-0.0100
P(STD)	0.0034	0.0015	0.0056	-0.0006
P(nausea)	-0.0087	-0.0102	-0.0074	-0.0152
P(menstrual irreg.)	0.0104	0.0089	0.0129	0.0164
P(other neg. effect)	-0.0143	-0.0152	-0.0121	-0.0045
P(affect libido romance)	0.0058	0.0039	0.0091	-0.0049
Spacing × P(pregnancy after disc.)	0.0185	0.0167	0.0197	0.0160
Limiting × P(pregnancy after disc.)	0.0240	0.0215	0.0255	0.0215
P(parents approval)	0.0106	0.0072	0.0118	0.0153
P(coreligionists approval)	0.0042	0.0018	0.0071	0.0002
P(partner's approval)	0.0605	0.0580	0.0640	0.0503
P(friends' approval)	0.0068	0.0054	0.0087	0.0137
Partner wants the same × P(hide method)	-0.0133	-0.0157	-0.0121	-0.0147
Partner wants more kids × P(hide method)	-0.0025	-0.0033	-0.0008	-0.0007
P(obtain when needed)	0.0107	0.0079	0.0120	0.0131
E(waiting time)	-0.0018	-0.0032	-0.0015	-0.0008
E(direct costs)	0.0009	-0.0001	0.0009	0.0000
E(other costs)	-0.0007	-0.0007	0.0002	0.0000
No method: Age 25-34	0.0689	0.0276	0.1259	0.1159
No method: Age 35-44	0.9540	0.9191	0.9983	0.9388
No method: Age 45-49	1.6799	1.5806	1.8313	1.9453
No method: Some primary schooling	0.3430	0.2251	0.3827	0.2411
No method: Secondary schooling and above	-0.2349	-0.3095	-0.2124	-0.4208
No method: Urban	-0.0495	-0.1051	-0.0315	-0.2073
No method: Maputo Province	0.1095	0.0594	0.1577	0.0229
No method: Gaza Province	0.3489	0.3213	0.3788	0.2382
No method: Partner wants more kids	0.5308	0.4951	0.5460	0.5262
No method: No. of children	-0.0111	-0.0325	-0.0051	-0.0829
No method: Limiting	-0.5236	-0.5466	-0.4877	-0.4327
No method: Catholic	-0.2211	-0.2955	-0.1867	-0.3231
No method: Muslim	0.3849	0.3064	0.4266	0.2427
No method: Protestant	0.8876	0.8141	0.9520	0.8242
No method: Other religion	0.0014	-0.0691	0.0220	-0.0082
No method: Atheist	1.1008	1.0114	1.1276	0.8781
No method: Doesn't know religion	0.2781	0.1910	1.2545	1.2071
No method: P(pregnancy) absent contraception	-0.0684	-0.0749	-0.0617	-0.0933
No method: P(STD) absent contraception	0.0271	0.0251	0.0301	0.0503
Condoms: Age 25-34	0.3675	0.3140	0.3890	0.1638
Condoms: Age 35-44	0.9425	0.8784	0.9657	0.6817
Condoms: Age 45-49	0.2963	0.2293	0.4133	0.5617

Condoms: Some primary schooling	0.2709	0.2458	0.3320	0.4568
Condoms: Secondary schooling and above	0.2696	0.1975	0.3576	0.3987
Condoms: Urban	0.3664	0.3331	0.3885	0.2922
Condoms: Maputo Province	0.8288	0.7984	0.8584	0.7176
Condoms: Gaza Province	0.5111	0.4823	0.5659	0.5636
Condoms: Partner wants more kids	0.2161	0.1815	0.2410	0.2416
Condoms: No. of children	-0.4961	-0.5210	-0.4762	-0.4834
Condoms: Limiting	0.5712	0.5522	0.6239	0.7073
Condoms: Catholic	-0.0574	-0.0801	-0.0201	-0.0647
Condoms: Muslim	0.9951	0.8387	1.1893	0.9558
Condoms: Protestant	-14.6149	-14.6338	-14.6066	-14.6174
Condoms: Other religion	-0.1558	-0.1971	-0.1390	-0.1475
Condoms: Atheist	-0.3244	-0.3794	-0.2534	-0.3274
Condoms: Doesn't know religion	2.9320	2.7858	3.1782	2.4694
Condoms: P(pregnancy) absent contraception	-0.0554	-0.0579	-0.0518	-0.0438
Condoms: P(STD) absent contraception	-0.0392	-0.0412	-0.0368	-0.0226
Condoms: Constant	-0.3892	-0.6845	-0.2748	-1.4572
Implants: Constant	0.2435	0.0344	0.3474	-0.4628
Injections: Constant	0.4376	0.2216	0.5519	-0.2485
Pill: Constant	0.3342	0.1233	0.4380	-0.3249
No method τ	1.0000	1.0000	1.0000	1.0000
Condom τ	1.0000	1.0000	1.0000	1.0000
Hormonal τ	0.1893	0.1828	0.2140	0.2029

Source: own survey data described in Section 2.2. Column (1): missing values set to zero and indicators for missing values included (see column 9 of Table A-5). Column (2): minimum value among the 42 estimates obtained for the coefficient when the missing values for any one variable are all set to be equal to the mean minus one standard deviation or to the mean plus one standard deviation. Column (3): maximum value among the 4 estimates obtained for the coefficient when the missing values for any one variable are all set to be equal to the mean minus one standard deviation or to the mean plus one standard deviation. Column (4): coefficient estimate obtained when all the missing values for each variable are randomly set (with probability 0.5) to being either equal to the mean minus one standard deviation or to the mean plus one standard deviation for all missing observations. The method-specific intercept for the "no method" alternative is normalized to zero. The effect of method-invariant variables on the utility associated with alternatives in the hormonal nest is normalized to zero.

Table A-8: Robustness to Sample Restrictions

	Main Specification	Exclude if only $0, 5, 10, 15, 20$	Exclude if fewer than 13 out of 16 answers for method	Exclude if P(preg.) 5 yrs$<$1 yr
	(1)	(2)	(3)	(4)
Alternative-Specific Variables				
Spacing × P(pregnancy)	0.001	0.001	0.001	0.001
	(0.006)	(0.006)	(0.005)	(0.006)
Limiting × P(pregnancy)	-0.009	-0.009	-0.009	-0.012
	(0.007)	(0.007)	(0.007)	(0.007)
P(STD)	0.003	0.003	0.004	0.004
	(0.010)	(0.010)	(0.010)	(0.011)
P(nausea)	-0.009*	-0.009*	-0.009**	-0.008*
	(0.004)	(0.005)	(0.004)	(0.005)
P(menstrual irreg.)	0.010**	0.011**	0.010**	0.010**
	(0.005)	(0.005)	(0.005)	(0.005)
P(other neg. effect)	-0.014**	-0.014**	-0.014**	-0.014**
	(0.006)	(0.006)	(0.006)	(0.007)
P(affect libido romance)	0.006	0.006	0.006	0.006
	(0.006)	(0.006)	(0.006)	(0.006)
Spacing × P(pregnancy after disc.)	0.019**	0.019**	0.018**	0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
Limiting × P(pregnancy after disc.)	0.024**	0.024**	0.024**	0.026***
	(0.010)	(0.010)	(0.009)	(0.010)
P(parents approval)	0.011	0.011	0.011	0.012
	(0.008)	(0.008)	(0.008)	(0.008)
P(coreligionists approval)	0.004	0.003	0.005	0.001
	(0.009)	(0.009)	(0.008)	(0.010)
P(partner's approval)	0.061***	0.061***	0.060***	0.062***
	(0.012)	(0.012)	(0.011)	(0.012)
P(friends' approval)	0.007	0.007	0.007	0.006
	(0.009)	(0.009)	(0.009)	(0.010)
Partner wants the same × P(hide)	-0.013**	-0.013**	-0.013**	-0.014**
	(0.006)	(0.006)	(0.006)	(0.006)
Partner wants more kids × P(hide)	-0.002	-0.002	-0.002	-0.005
	(0.011)	(0.011)	(0.011)	(0.011)
P(obtain when needed)	0.011	0.011	0.011	0.017*
	(0.009)	(0.009)	(0.009)	(0.009)
E(waiting time)	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
E(direct costs)	0.001	0.001	0.001	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
E(other costs)	-0.001*	-0.001*	-0.001*	-0.004***
	(0.000)	(0.000)	(0.000)	(0.001)
No Method Nest: Method-Invariant Variables				

Age 25-34	0.069	0.094	0.052	0.054
	(0.279)	(0.281)	(0.280)	(0.290)
Age 35-44	0.954**	0.979**	0.923**	1.038**
	(0.402)	(0.403)	(0.404)	(0.420)
Age 45-49	1.680**	1.690**	1.680**	1.577**
	(0.718)	(0.716)	(0.706)	(0.725)
Some primary	0.343	0.311	0.336	0.434
	(0.353)	(0.359)	(0.356)	(0.364)
Secondary schooling and above	-0.235	-0.238	-0.287	-0.320
	(0.399)	(0.404)	(0.401)	(0.412)
Urban	-0.049	-0.043	-0.062	-0.025
	(0.286)	(0.287)	(0.287)	(0.296)
Maputo Province	0.109	0.087	0.097	0.027
	(0.373)	(0.375)	(0.371)	(0.389)
Gaza Province	0.349	0.340	0.342	0.249
	(0.362)	(0.364)	(0.361)	(0.381)
Partner wants more kids	0.531**	0.534**	0.501**	0.536**
	(0.246)	(0.247)	(0.247)	(0.260)
No. of children	-0.011	-0.000	-0.020	0.009
	(0.085)	(0.085)	(0.085)	(0.088)
Limiting	-0.523*	-0.531*	-0.503*	-0.490
	(0.302)	(0.303)	(0.302)	(0.312)
Catholic	-0.221	-0.210	-0.213	-0.162
	(0.347)	(0.348)	(0.351)	(0.354)
Muslim	0.385	0.391	0.389	0.344
	(0.649)	(0.649)	(0.645)	(0.723)
Protestant	0.888	0.910	0.894	1.039*
	(0.582)	(0.584)	(0.576)	(0.595)
Other religion	0.001	0.014	-0.040	0.068
	(0.257)	(0.259)	(0.259)	(0.263)
Atheist	1.101**	1.109**	1.053**	1.140**
	(0.487)	(0.487)	(0.493)	(0.492)
Doesn't know religion	0.278	0.309	0.237	0.439
	(1.842)	(1.845)	(1.839)	(1.795)
P(pregnancy) absent contraception	-0.068***	-0.069***	-0.062***	-0.084***
	(0.022)	(0.022)	(0.022)	(0.024)
P(STD) absent contraception	0.027	0.027	0.024	0.013
	(0.022)	(0.023)	(0.022)	(0.022)
Condoms Nest: Method-Invariant Variables				
Age 25-34	0.368	0.365	0.343	0.456
	(0.374)	(0.375)	(0.372)	(0.387)
Age 35-44	0.943	0.935	0.935	1.029*
	(0.582)	(0.583)	(0.578)	(0.600)
Age 45-49	0.296	0.270	0.328	0.338
	(1.025)	(1.025)	(1.016)	(1.026)

Some primary	0.271	0.253	0.253	0.193
	(0.569)	(0.573)	(0.572)	(0.584)
Secondary schooling and above	0.270	0.251	0.255	0.348
	(0.594)	(0.597)	(0.595)	(0.601)
Urban	0.367	0.367	0.337	0.438
	(0.402)	(0.401)	(0.403)	(0.414)
Maputo Province	0.829*	0.813*	0.827*	0.903*
	(0.481)	(0.481)	(0.479)	(0.510)
Gaza Province	0.511	0.492	0.510	0.833*
	(0.406)	(0.407)	(0.406)	(0.426)
Partner wants more kids	0.216	0.216	0.229	0.112
	(0.353)	(0.353)	(0.353)	(0.375)
No. of children	-0.496***	-0.489***	-0.506***	-0.492***
	(0.155)	(0.155)	(0.155)	(0.164)
Limiting	0.572	0.565	0.576	0.566
	(0.421)	(0.421)	(0.419)	(0.438)
Catholic	-0.058	-0.065	-0.069	-0.237
	(0.465)	(0.465)	(0.467)	(0.502)
Muslim	0.995	0.989	0.987	0.848
	(0.764)	(0.762)	(0.763)	(0.798)
Protestant	-14.615***	-14.609***	-14.895***	-14.399***
	(0.502)	(0.503)	(0.498)	(0.533)
Other religion	-0.156	-0.163	-0.148	-0.212
	(0.370)	(0.371)	(0.369)	(0.393)
Atheist	-0.324	-0.341	-0.367	-0.530
	(1.281)	(1.280)	(1.296)	(1.569)
Doesn't know religion	2.932**	2.928**	2.901**	3.089**
	(1.262)	(1.264)	(1.263)	(1.242)
P(pregnancy) absent contraception	-0.055*	-0.055*	-0.054*	-0.081**
	(0.033)	(0.033)	(0.033)	(0.034)
P(STD) absent contraception	-0.039	-0.038	-0.039	-0.040
	(0.034)	(0.034)	(0.034)	(0.037)
Method-Specific Intercepts				
Condoms	-0.389	-0.371	-0.398	-0.604
	(0.987)	(0.989)	(0.983)	(1.022)
Implants	0.244	0.251	0.198	-0.162
	(0.731)	(0.734)	(0.728)	(0.770)
Injections	0.438	0.442	0.390	0.038
	(0.731)	(0.733)	(0.728)	(0.765)
Pill	0.334	0.339	0.288	-0.072
	(0.730)	(0.733)	(0.727)	(0.767)
No Method τ	1.000	1.000	1.000	1.000
	(3.909)	(163.878)	(6.691)	(5.965)
Condom τ	1.000	1.000	1.000	1.000
	(4.069)	(18.856)	(24.710)	(4.278)

Hormonal τ	0.189***	0.193***	0.187***	0.194***
	(0.047)	(0.048)	(0.047)	(0.048)
Missing Value Indicators	Yes	Yes	Yes	Yes
Alternatives	2761	2737	2588	2638
Women	584	579	574	556

Source: Estimates of Equation (1) using own survey data described in Section 2.2. Robust standard errors in parentheses, * p<0.10 ** p<0.05 *** p<0.01. Missing values set to zero and indicators for missing values included in all columns. The main specification corresponds to column 9 of Table A-5. The method-specific intercept for the "no method" alternative is normalized to zero. The effect of method-invariant variables on the utility associated with alternatives in the hormonal nest is normalized to zero.

Table A-9: Counterfactual Analysis With and Without Imputing Missing Values

Panel A: Including Missing Values Indicators (Col. 9 Table A-5)						
	Condom	Implants	Injections	No Method	Pill	*N*
P(0) = 17 if P(0)<17						
P(0)<17 Sample	-0.014	0.017	0.041	-0.067	0.029	1,076
Whole Sample	-0.005	0.007	0.016	-0.027	0.011	2,761
Full Approval	0.015	0.014	0.052	-0.075	-0.001	2,761
Same Fertility Preferences	0.001	0.007	0.010	-0.024	0.009	2,761
No Side Effects	-0.001	-0.003	-0.020	-0.003	0.027	2,761
No Supply Barriers	-0.001	0.002	0.009	-0.011	0.000	2,761
Correct Failure Rates	-0.001	0.001	-0.002	-0.001	0.003	2761.000
Panel B: Excluding Women With Any Missing Value (Col. 10 Table A-5)						
	Condom	Implants	Injections	No Method	Pill	*N*
P(0) = 17 if P(0)<17						
P(0)<17 Sample	-0.031	0.018	0.043	-0.064	0.040	1,076
Whole Sample	-0.012	0.007	0.017	-0.025	0.016	2,761
Full Approval	0.016	0.018	0.032	-0.058	-0.004	2,761
Same Fertility Preferences	0.006	0.007	0.019	-0.045	0.016	2,761
No Side Effects	-0.005	-0.002	-0.017	-0.012	0.037	2,761
No Supply Barriers	-0.003	-0.002	0.016	-0.009	-0.002	2,761
Correct Failure Rates	0.001	-0.003	0.004	0.002	-0.004	2761.000

Predicted changes in the probability of choosing each alternative based on the model reported in the relevant column of Table A-5, which is either estimated on 2,761 observations (Panel A) or 1,360 observations (Panel B). Model specification described and motivated in Section 4.3. See Section 5.2 for a discussion of results in Panel A and Section A-3 for a discussion of results in Panel B. Source: own survey data described in Section 2.2, which provides details regarding our treatment of (14) women using a combination of methods and (23) women using methods other than the ones we model here. Side effects are defined as nausea or headaches, menstrual irregularities or vaginal infections, and "other" side effects. Supply barriers refer to direct and indirect monetary costs as well as waiting times and the inability to obtain the method when needed. P(0) stands for "perceived probability of pregnancy within 12 months absent contraception." "Same Fertility Preferences" means that the partners of all women want to limit (space) fertility if the woman says she wants to limit (space) it.

Table A-10: Robustness to Changes in Nesting Structure and to Modelling Demand Among Users Only

	(1) Preferred Specification	(2) Two Nests	(3) Users Only
Alternative-Specific Variables			
Spacing × P(pregnancy)	0.001	0.003	0.000
	(0.006)	(0.006)	(0.013)
Limiting × P(pregnancy)	-0.009	-0.009	-0.018
	(0.007)	(0.008)	(0.015)
P(STD)	0.003	0.015**	0.021
	(0.010)	(0.007)	(0.026)
P(nausea)	-0.009*	-0.009*	-0.021*
	(0.004)	(0.005)	(0.011)
P(menstrual irreg.)	0.010**	0.011**	0.021**
	(0.005)	(0.005)	(0.010)
P(other neg. effect)	-0.014**	-0.017**	-0.034**
	(0.006)	(0.007)	(0.015)
P(affect libido romance)	0.006	0.005	0.018
	(0.006)	(0.006)	(0.015)
Spacing × P(pregnancy after disc.)	0.019**	0.013	0.044**
	(0.009)	(0.009)	(0.022)
Limiting × P(pregnancy after disc.)	0.024**	0.014	0.052**
	(0.010)	(0.011)	(0.022)
P(parents approval)	0.011	0.005	0.026
	(0.008)	(0.008)	(0.022)
P(coreligionists approval)	0.004	-0.006	0.020
	(0.009)	(0.009)	(0.022)
P(partner's approval)	0.061***	0.057***	0.135***
	(0.012)	(0.010)	(0.036)
P(friends' approval)	0.007	0.015*	0.022
	(0.009)	(0.009)	(0.026)
Partner wants the same × P(hide method)	-0.013**	-0.015**	-0.032**
	(0.006)	(0.006)	(0.016)
Partner wants more kids × P(hide method)	-0.002	-0.003	-0.007
	(0.011)	(0.008)	(0.023)
P(obtain when needed)	0.011	0.007	0.032
	(0.009)	(0.009)	(0.020)
E(waiting time)	-0.002	-0.002	-0.005
	(0.002)	(0.002)	(0.004)
E(direct costs)	0.001	0.001	0.002
	(0.001)	(0.000)	(0.001)
E(other costs)	-0.001*	-0.000	-0.000
	(0.000)	(0.000)	(0.001)
No Method Nest: Method-Invariant Variables			
Age 25-34	0.069	-0.004	

	(0.279)	(0.264)	
Age 35-44	0.954**	0.780**	
	(0.402)	(0.390)	
Age 45-49	1.680**	1.580**	
	(0.718)	(0.673)	
Some primary schooling	0.343	0.289	
	(0.353)	(0.331)	
Secondary schooling and above	-0.235	-0.297	
	(0.399)	(0.369)	
Urban	-0.049	-0.114	
	(0.286)	(0.266)	
Maputo Province	0.109	-0.025	
	(0.373)	(0.351)	
Gaza Province	0.349	0.199	
	(0.362)	(0.340)	
Partner wants more kids	0.531**	0.522**	
	(0.246)	(0.231)	
No. of children	-0.011	0.042	
	(0.085)	(0.079)	
Limiting	-0.524*	-0.578**	
	(0.302)	(0.289)	
Catholic	-0.221	-0.164	
	(0.347)	(0.332)	
Muslim	0.385	0.187	
	(0.649)	(0.622)	
Protestant	0.888	1.095*	
	(0.582)	(0.575)	
Other religion	0.001	0.068	
	(0.257)	(0.241)	
Atheist	1.101**	1.051**	
	(0.487)	(0.464)	
Doesn't know religion	0.279	-0.633	
	(1.842)	(1.486)	
P(pregnancy) absent contraception	-0.068***	-0.067***	
	(0.022)	(0.020)	
P(STD) absent contraception	0.027	0.034	
	(0.022)	(0.021)	
Condoms Nest: Method-Invariant Variables			
Age 25-34	0.368		0.392
	(0.374)		(0.458)
Age 35-44	0.943		1.621**
	(0.582)		(0.651)
Age 45-49	0.296		-0.142
	(1.025)		(1.135)
someprimary	0.271		-0.044

	(0.569)		(0.638)
Secondary schooling and above	0.270		-0.063
	(0.594)		(0.629)
Urban	0.367		0.158
	(0.402)		(0.483)
Maputo Province	0.829*		0.976
	(0.481)		(0.597)
Gaza Province	0.511		0.580
	(0.406)		(0.488)
Partner wants more kids	0.216		0.356
	(0.353)		(0.444)
No. of children	-0.496***		-0.581***
	(0.155)		(0.198)
Limiting	0.572		0.432
	(0.421)		(0.505)
Catholic	-0.057		-0.439
	(0.465)		(0.571)
Muslim	0.995		1.392*
	(0.764)		(0.822)
Protestant	-14.615***		-13.097***
	(0.502)		(0.636)
Other religion	-0.156		-0.462
	(0.370)		(0.446)
Atheist	-0.324		0.445
	(1.281)		(1.102)
Doesn't know religion	2.932**		3.045**
	(1.262)		(1.349)
P(pregnancy) absent contraception	-0.055*		-0.074**
	(0.033)		(0.034)
P(STD) absent contraception	-0.039		-0.029
	(0.034)		(0.040)
Method-Specific Intercepts			
Condoms	-0.389	0.001	
	(0.987)	(0.651)	
Implants	0.243	0.188	-0.225
	(0.731)	(0.660)	(1.042)
Injections	0.437	0.463	0.234
	(0.731)	(0.660)	(1.032)
Pill	0.334	0.335	-0.012
	(0.730)	(0.659)	(1.034)
No Method τ	1.000		
	(3.638)		
Condom τ	1.000		
	(74.168)		
Hormonal τ	0.189***		

	(0.047)		
No Method τ		1.000	
		(17.431)	
Any Method τ		0.295***	
		(0.062)	
Condom τ			1.000
			(8.659)
Hormonal τ			0.449***
			(0.148)
Missing Value Indicators	Yes	Yes	Yes
Alternatives	2761	2761	1530
Women	584	584	406

Source: Estimates of variants of Equation (1) using own survey data described in Section 2.2. Robust standard errors in parentheses, * p<0.10 ** p<0.05 *** p<0.01. Missing values set to zero and indicators for missing values included in all columns. The main specification corresponds to column 9 of Table A-5. The method-specific intercept for the "no method" (condoms) alternative is normalized to zero in the first two columns (the last column). The effect of method-invariant variables on the utility associated with alternatives in the hormonal nest ("any method" nest) is normalized to zero in columns 1 and 3 (column 2).

Table A-11: Beliefs and Duration of Use

	Effect of Year Started Using Method		
	Coef.	S.E.	Observations
P(pregnancy)	0.104	(0.074)	393
P(STD)	0.045	(0.087)	394
P(nausea)	-0.024	(0.083)	391
P(menstrual irreg.)	0.163*	(0.093)	393
P(other neg. effect)	-0.035	(0.076)	392
P(affect libido romance)	0.083	(0.079)	390
P(pregnancy after disc.)	0.040	(0.064)	386
P(parents approval)	0.035	(0.083)	374
P(coreligionists approval)	0.083	(0.091)	334
P(partner's approval)	-0.062	(0.077)	395
P(friends' approval)	-0.022	(0.082)	383
P(hide method)	-0.001	(0.095)	395
P(obtain when needed)	-0.069	(0.053)	396
E(waiting time)	0.416*	(0.245)	379
E(direct costs)	1.337	(2.392)	390
E(other costs)	0.535	(2.519)	390

Each row corresponds to estimates obtained when regressing beliefs on the year the woman started using the contraceptive method she is currently using, a constant, and all the method-invariant characteristics included in Panel A of Table A-1. Standard errors in parentheses, * p<0.10 ** p<0.05 ***.

Table A-12: Characteristics of Treated and Untreated Samples

	Untreated Mean	Treated Mean	Difference	T-test P-value
Age 25-34	0.39	0.46	-0.07	0.09
Age 35-44	0.26	0.18	0.08	0.03
Age 45-49	0.03	0.03	0.01	0.68
Some primary schooling	0.47	0.42	0.05	0.23
Secondary schooling and above	0.38	0.45	-0.08	0.06
Urban	0.47	0.48	-0.02	0.69
Maputo Province	0.40	0.37	0.03	0.50
Gaza Province	0.40	0.39	0.01	0.81
Partner wants more kids	0.29	0.30	-0.00	0.90
No. of children	2.76	2.45	0.32	0.03
Limiting	0.39	0.36	0.02	0.55
Catholic	0.16	0.09	0.07	0.02
Muslim	0.02	0.04	-0.02	0.12
Protestant	0.03	0.03	-0.00	0.95
Other religion	0.30	0.30	0.01	0.89
Atheist	0.02	0.05	-0.03	0.04
Doesn't know religion	0.01	0.01	-0.00	0.97
Not Using	0.31	0.30	0.01	0.75
Injections User	0.30	0.31	-0.00	0.97
Implant User	0.10	0.09	0.00	0.86
Pill User	0.20	0.20	-0.00	0.95
Condoms User	0.09	0.10	-0.01	0.60
(Before-treatment) Intention to Use	0.86	0.88	-0.02	0.47
Baseline Beliefs about Pregnancy Risk Absent Contraception	15.44	15.84	-0.40	0.35

Source: Survey described in Section 2.2. Treated women are women randomly selected to receive the pregnancy risk information message described in Section 6. Total sample size: 584, including 296 untreated and 288 treated women.

A-5 Appendix Figures

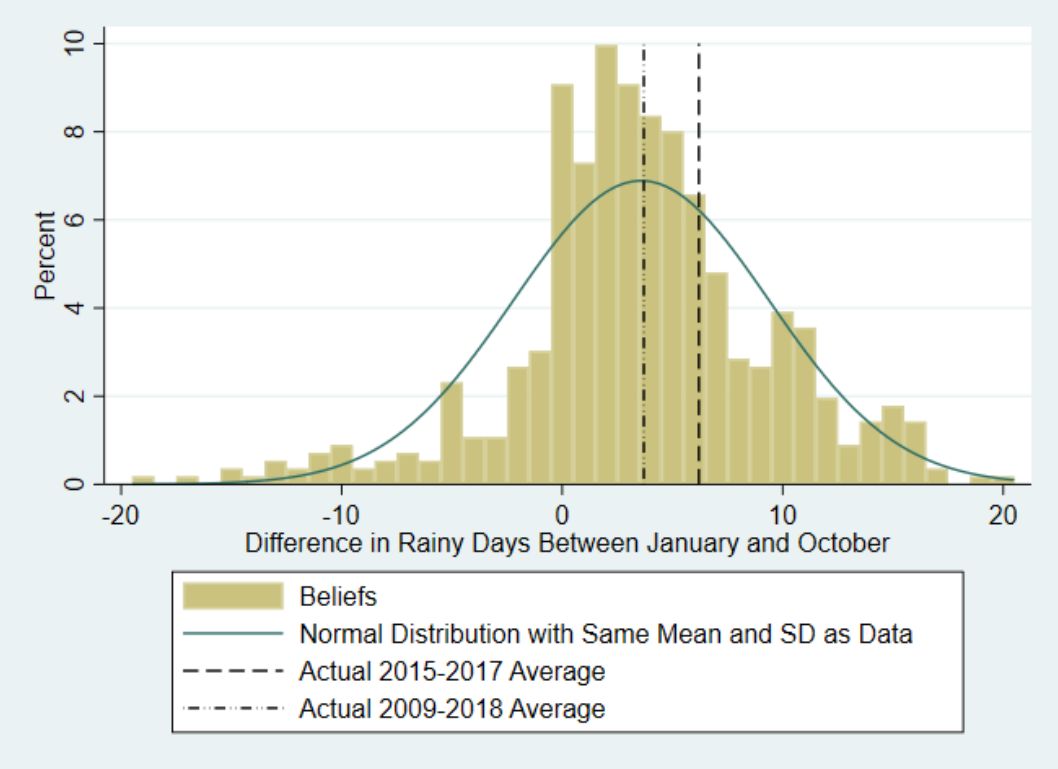

Figure A-1

Sources: `https://weather-and-climate.com/average-monthly-Rainy-days,maputo,Mozambique` ("Actual") and survey described in Section 2.2 ("Data").

A-6 Experimenter Demand Econometrics

Let the intended use reported in period t = 0 ("before information provision") or t=1 ("after information provision") for individual i be given by y_{it}. Reported beliefs in period t are denoted by b_{it} and unobserved determinants of intended take-up are represented by u_{it} which we assume to be i.i.d. and distributed according to a c.d.f. given by $F(\cdot)$, which is known by the researcher (e.g., standard normal or logistic, corresponding to the probit or logit, respectively). As in the discrete choice model adopted in the paper, the probability model for y_{it} is given by:

$$y_{it} = \mathbf{1}[\beta_0 + \beta_1 b_{it} - u_{it} \geq 0], \tag{2}$$

where all beliefs and intentions variables may vary across individuals and time periods while regression parameters are assumed constant. Note also that we can express this relationship for period $t = 1$ as

$$y_{i1} = \mathbf{1}[\beta_0 + \beta_1 b_{i0} + \beta_1 \Delta b_i - u_{i1} \geq 0],$$

where $\Delta b_i = b_{i1} - b_{i0}$.

A-6.1 Potential Source of Bias 1: Experimenter Demand on Beliefs

If reported beliefs respond to the experimenter's demand in $t = 1$ but not in period $t = 0$,

$$b_{i1} = b_{i1}^* + v_i \quad \text{and} \quad b_{i0} = b_{i0}^*,$$

where $b_{it}^*, t = 0, 1$ are true beliefs. Let $\mathbb{E}(v_i) = 0$ and $\text{var}(v_i) = \sigma_v^2$. In this case, Stefanski and Carroll (1985) examine the properties of the ML estimator for model (2) when $F(\cdot)$ is a logistic distribution (i.e., $F(x_i) = 1/(1+e^{-x_i})$). Under additional conditions, they demonstrate that, when σ_v^2 is small, the large sample distribution for the ML estimator $\hat{\beta} \equiv (\hat{\beta}_0, \hat{\beta}_{b_0}, \hat{\beta}_{\Delta b})$ is normal with mean given by

$$\beta - \sigma_v^2 \mathbb{E}\left[f(X^\top\beta)XX^\top\right]^{-1}\left(\frac{1}{2}\mathbb{E}\left[f'(X^\top\beta)X\right]\beta^\top\Sigma + \mathbb{E}\left[f(X^\top\beta)\right]\Sigma\right)\beta,$$

where we drop the i subscripts for simplicity, $X = [1, b_0^*, \Delta b^*]$, $f(\cdot) = F'(\cdot)$ and $f'(\cdot) = F''(\cdot)$ (see their Theorem 1 and discussion). The matrix Σ in our case is a diagonal matrix with one in the third row and column and zeroes everywhere else. Experimenter's demand will thus imply that the estimator for the coefficients will be asymptotically biased. As noted by Stefanski and Carroll (1985), while in most data generating configurations this bias will tend to be negative and thus lead to an attenuation, it can be positive, which will tend to happen when $|X^\top\beta|$ is large with high

enough probability, for example. Conversely, if there are no experimenter's demand repercussions for beliefs, both $\hat{\beta}_{b_0}$ and $\hat{\beta}_{\Delta b}$ will be asymptotically unbiased for β_1 as will the estimator for the slope coefficient of y_0 on b_0. If this is not the case, this is suggestive of experimenter's demand on beliefs after information provision.

A-6.2 Potential Source of Bias 2: Experimenter Demand on Take-Up Intentions

Setting aside its repercussions for beliefs, if experimenter's demand affects reported intended take-up, then

$$\mathbb{E}(y_1|b_0,\Delta b) = \alpha_0 + (1-\alpha_0-\alpha_1)F(\beta_0+\beta_1 b_0+\beta_1\Delta b), \tag{3}$$

where $\alpha_0 = \mathbb{P}(y_1=1|y_1^*=0)$ and $\alpha_1 = \mathbb{P}(y_1=0|y_1^*=1)$ are miss-classification probabilities and y_1^* is true take-up intention as opposed to reported take-up intention, y_1 (see Hausman et al. (1998) and Bollinger and David (1997)).[42]

As demonstrated in Hausman et al. (1998), ignoring misclassification produces inconsistent estimates for β_0 and β_1. If missclassification is ignored in estimation, the MLE will converge to the values a_0, a_1 and a_2 that maximise the expected (pseudo) log-likelihood function:

$$\mathbb{E}\left[y_1 \ln F(a_0+a_1 b_0+a_2\Delta b) + (1-y_1)\ln(1-F(a_0+a_1 b_0+a_2\Delta b))\right],$$

with respect to $[a_0,a_1,a_2]$, which Hausman et al. (1998) denote by $\beta^E(\alpha_0,\alpha_1) \equiv \left[\beta_0^E(\alpha_0,\alpha_1),\beta_b^E(\alpha_0,\alpha_1),\beta_{\Delta b}^E(\alpha_0,\alpha_1)\right]$. The expectation above obeys the data generating process (with potential missclassification), so we follow Hausman et al. (1998) in highlighting the dependence of the pseudo-parameter β^E on (α_0,α_1). In our context, $\beta^E(0,0) = [\beta_0,\beta_1,\beta_1]$, and as noted there:

$$\begin{aligned}
\left|\frac{\partial\beta^E}{\partial\alpha_0}\right|_{\alpha_0=\alpha_1=0} &= -\left\{\mathbb{E}\left[\frac{f(X^\top\beta)^2}{F(X^\top\beta)(1-F(X^\top\beta))}XX^\top\right]\right\}^{-1}\mathbb{E}\left[\frac{f(X^\top\beta)}{F(X^\top\beta)}X\right] \\
\left|\frac{\partial\beta^E}{\partial\alpha_1}\right|_{\alpha_0=\alpha_1=0} &= \left\{\mathbb{E}\left[\frac{f(X^\top\beta)^2}{F(X^\top\beta)(1-F(X^\top\beta))}XX^\top\right]\right\}^{-1}\mathbb{E}\left[\frac{f(X^\top\beta)}{1-F(X^\top\beta)}X\right],
\end{aligned}$$

where $X=[1,b_0,\Delta b]$ (which is here measured without error) and $f(\cdot)=F'(\cdot)$. Since those expres-

[42] Following Hausman et al. (1998), we assume for simplicity that the miss-classification probabilities do not depend on further variables. Meyer and Mittag (2017) show that a more general specification, where missclassification is represented by a general (binary) miss-classification indicator, allowing the miss-classification probabilities to depend on further variables leads to a coefficient on b_t that is different from β_1 and to a further misspecification of $F(\cdot)$, the distribution of unobservables (see Section 2.2 in their paper). Unsurprisingly, as they point out, the MLE for model (2) will not be consistent.

sions are non-zero, this implies that the MLE will be inconsistent for β_0 and β_1 when misreporting is non-zero and small (i.e., α_0, α_1 are close to zero, which according to Hausman et al. (1998) "might be the most common case facing a researcher"). The degree of inconsistency will depend on the distribution of the data as noted in the expressions above. Given this, as in the case of experimenter's demand bias on beliefs, the probability limits for the two coefficient estimators ($\hat{\beta}_{b_0}$ and $\hat{\beta}_{\Delta b}$) will correspond to $\beta_b^E(\alpha_0, \alpha_1)$ and $\beta_{\Delta b}^E(\alpha_0, \alpha_1)$, which are in turn generically different from $\beta_b^E(0,0) = \beta_{\Delta b}^E(0,0) = \beta_1$ and from each other (except perhaps in knife-edge cases). And while we analyse both sources of experimenter's demand bias separately, if they are both present it is implausible that the biases will "cancel out" except in non-generic circumstances.

A-6.3 Testable Implications

For either source of potential bias, one can compare the estimates for the coefficients on b_0 and Δb in $t = 1$ and the estimates for the coefficient on b_0 in (2) for $t = 0$. If those three coefficient estimates are not statistically significantly different from each other, there is no evidence for experimenter's demands effects on beliefs or reported take-up intention.

If the researcher is not interested in tracing the origin of bias, the detection of experimenter's demand bias either in beliefs or in take-up intention can more simply be achieved by comparing the coefficient estimates for (2) in $t = 0$ and $t = 1$ separately. While they both estimate β_1, analogous derivations imply that they would differ in the presence of either form of experimenter's demand bias. If the researcher is interested in tracing the source of bias, however, decomposing b_1 into Δb and b_0 in $t = 1$ provides an opportunity to test for the presence of bias due specifically to take-up intentions. Indeed, when experimenter's bias is due solely to misrepresented take-up intentions, the partial effects for b_0 and Δb in (3) will be given by:

$$\frac{\partial \mathbb{E}[y_1|b_0, \Delta b]}{\partial b_0} = \frac{\partial \mathbb{E}[y_1|b_0, \Delta b]}{\partial \Delta b} = (1 - \alpha_0 - \alpha_1)\beta_1 f(\beta_0 + \beta_1 b_0 + \beta_1 \Delta b).$$

Whereas the detection of experimenter's demand bias (either in beliefs or in take up) can be achieved by comparing the coefficient estimates for (2) in $t = 0$ and $t = 1$ separately, decomposing b_1 into Δb and b_0 in $t = 1$ allows one to ascertain that experimenter's demand bias is due to take-up intentions and not to beliefs when the marginal effects for Δb and b_0 are equal. (Note that if there is evidence for experimenter's demand effects on beliefs, nothing can be concluded regarding experimenter's demand repercussions for reported take-up intentions.)

Note that we have maintained throughout the assumption that u_{it} is i.i.d.. This assumption implies that the variance of unobservables is unchanged between periods 1 and 2. This assumption is not needed with a continuous outcome, but it is required in a binary outcome model such as

ours because the model identifies $\frac{\beta_1}{\sigma_u}$ rather than β_1. If one had time-varying covariates that are not targeted by the intervention, one may check that the variance of these covariates is constant to assess the plausibility of this assumption. Such check is however not feasible in our case, as the only variables we elicit both before and after the information shock are intentions to use contraception and beliefs about own risk of pregnancy.

A-6.4 Application to Different Contexts

The test we propose is tailored to our context. In this subsection, we outline how it can be adapted to other settings where a treatment is designed to impact an outcome y_t through its effect on a mediating variable b_t.

Between-subjects experiments All our results follow if we use the subscript t to denote experimental arms instead of time periods, so that our test can be directly applied to between-subjects experiments. The assumptions we make in our derivation would then also apply to experimental arms instead of time periods. For instance, u_{it} would be assumed to have the same known distribution in both experimental groups.

Linear model In this case, the model is simply

$$y_t = \beta_0 + \beta_1 b_t + u_t.$$

And we can express the regression for period $t = 1$ as

$$y_1 = \beta_0 + \beta_1 b_0 + \beta_1 \Delta b + u_1,$$

where $\Delta b = b_1 - b_0$. Still focusing on experimenter's demand in response to a treatment which takes place between $t = 0$ and $t = 1$,

$$b_1 = b_1^* + v \quad \text{and} \quad b_0 = b_0^*,$$

where $b_t^*, t = 0, 1$ are true values of the mediating variable. Let $\sigma_v^2 = \text{var}(v)$. In this case, one can establish that

$$\text{plim}(\hat{\beta}_{\Delta b}) = \beta_1 \left[1 - \frac{\sigma_v^2 + \text{cov}(v, \widetilde{\Delta b^*})}{\sigma_v^2 + (1 - R^2_{\Delta b^* b_0})\sigma^2_{\Delta b^*}} \right] \neq \beta_1$$

(see, e.g., Bound et al. (2001)). $\hat{\beta}_{\Delta b}$ is the OLS estimator for the coefficient on Δb, $R^2_{\Delta b^* b_0}$ is the population coefficient of determination for a linear regression of $\Delta b^* = b_1^* - b_0^*$ on b_0, and $\widetilde{\Delta b^*}$

is the residual from the best linear projection of Δb^* on b_0. If Δb^* and b_0 are independent and $\text{cov}(v, \widetilde{\Delta b^*}) = 0$, one gets the usual attenuation bias formula for a classical measurement error in a simple regression.

Similarly, experimenter's demand will imply that the OLS estimator for the coefficient on b_0 ($\hat{\beta}_{b_0}$) is not consistent for β_1 either (see Levi (1973) when measurement error is classical). Conversely, if there are no experimenter's demand repercussions for the mediating variable, both $\hat{\beta}_{b_0}$ and $\hat{\beta}_{\Delta b}$ will be consistent for β_1 as will the estimator for the slope coefficient of y_0 on b_0. Again, if this is not the case, this is suggestive of experimenter's demand on the mediating variable after information provision.

Note that if the outcome variable is continuous, unlike in the binary outcome case, the assumption that u_t is i.i.d. is not required.

Other types of measurement error Here we focus on experimenter demand effects, which threaten internal validity "because more than the independent variable of interest is changing between treatments" (de Quidt et al., 2019, p.384), and are a leading concern in experimental studies. In doing so, we abstract from the possibility of measurement error that may exist in the absence of any treatment. A fruitful area for further work would be to derive a test which relaxes this assumption.

A-7 Full Questionnaire (Translated from Portuguese)

Preliminary Selection Questionnaire for Respondents

Select the language to use in the interview
1 Portuguese
2 Changana

Checklist for Informed Consent:

Have you read information regarding informed consent?
1 Yes
2 No
If = 2, Prompt interviewer with message 'Please read the consent information'

Does the participant consent?
1 Yes
2 No
If = 2, Prompt interviewer with message 'Cannot proceed if the participant does not consent'

Was the information card distributed?
1 Yes
2 No
If = 2, Prompt interviewer with message 'Cannot proceed before card is distributed'

Province
1 City of Maputo
2 Maputo Province
3 Gaza Province

Address
‘_____’

Questions and Filters

Q1. How old are you? [Register 98 if Doesn’t Know]
‘_____’

If outside 18 to 49, END INTERVIEW and mark as incomplete

Q2. Are you currently married or living with a man?

1 Yes, she is married

2 Yes, lives with a man as husband and wife

3 No, not in a union (includes widow/divorced without new partner)

If = 3, END INTERVIEW and mark as incomplete

Q2b. Does the husband/man you live with works far away and only comes back less than once a month?

1 Yes, he works far away and comes back less than once a month

2 Does not work far away

3 Works far away but usually comes back at least once a month

If = 1, END INTERVIEW and mark as incomplete

Q3. Are you pregnant?

1 Yes

2 No

3 Doesn't know

4 No answer

If = 1, 4, END INTERVIEW and mark as incomplete

Q4. Now I'd like to ask you some questions about the future. Would you like to have (another) child or would you prefer not to have (more) children?

1 Have another child

2 Does not want anymore

3 Can't get pregnant

4 Undecided/doesn't know

If = 3 or 4, END INTERVIEW and mark as incomplete

If = 2, go to Q6

Q3b. CHECK Q3 [INTERVIEWER: Please repeat question Q3. "Are you pregnant]

1 Is pregnant

2 Not pregnant or not sure

If = 1, END INTERVIEW and mark as incomplete

Q5. How long would you like to wait from now until the birth of another child? [INTERVIEWER: Do not read the answers to the respondent]

1 Months ____

2 Years ____

3 Not sure, but more than 2 years

4 Not sure, but less than 2 years

5 Can't get pregnant

6 After the wedding

98 Other (specify)

99 Doesn't know

If = 2, Enter the number of years under Q5.2

If = 1, Enter the number of months under Q5.1

If = 4, 5, 6, 99, END INTERVIEW and mark as incomplete

Q6. If I asked you again in a months time if you wanted to have more children and when you would like to have them, do you think you: [READ OPTIONS]

1 Would definitely give the same answers as now

2 Would probably give the same answers as now

3 Would be just as likely to give the same answers as now or something different

4 Would probably give different answers than the ones I gave now

5 Surely would give different answers than I did now

If = 3, 4, 5, END INTERVIEW and mark as incomplete

Main Questionnaire

Section 1: Characteristics of the Respondent

101. Respondents age [Saved response to Q1]

102. Have you ever attended school?

1 Yes

2 No

99 Doesn't know/No answer

If = 2, go to 104

103. What is the highest level of education you have completed?

1 Literacy course

2 Incomplete lower school

3 Completed lower school

4 Incomplete high school

5 Complete high school

6 Technical education

7 Teacher training course

8 Higher education

99 Doesn't know/No answer

104. What is your religion?

1 Catholic

2 Muslim

3 Zione / Zion

4 Evangelic / Pentecostal

5 Protestant/Anglican

6 Christian

7 No religion

98 Other (specify)

99 Doesn't know/No answer

105. In which language did you learn how to speak?

1 Emakhuwa

2 Portuguese
3 Xitsonga
4 Cisena
5 Elomwe
6 Echuwabo
7 Shona
98 Other (specify)

106. In the last 12 months, have you ever been away from home for more than a month?
1 Yes
2 No
99 Doesn't know/No answer

107. Have you ever had a child born alive?
1 Yes
2 No
99 Doesn't know/No answer
If = 2, go to 114

108a. How many live-born male children did you have in total in your life?
'_____'
108b. How many live-born daughters did you have in total in your life?
'_____'
If $108a + 108b = 0$, prompt interviewer with message 'Check the answer to question 107'

109a. How many male children born alive have died?
'_____'
If $109a > 108a$, prompt interviewer with message 'Check the answer to question 108a'
109b. How many female children born alive have died?
'_____'
If $109b > 108b$, prompt interviewer with message 'Check the answer to question 108b'

110. In what year and month was your last son/daughter born? [ASK: When is your last son/daughter's birthday?] *[Register 9998 if they don't know the year]*
MONTH

1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December
99 Don't know the month
YEAR (must be between 1980 and 9998)
'_____'

111. When you became pregnant with your last son/daughter, did you want to have a child at that moment?

1 Yes
2 No
If = 1, go to 113

112. Did you want to have a child later or did you not want to have any (more) children?

1 Later
1 I didn't want to have any more

113. Have your periods returned since the birth of your last child?

1 Yes
2 No
99 Doesn't know/No answer
If = 2, go to 115

114. When did your last menstrual period begin?

1 Less than a week ago

2 Less than a month ago
3 Less than three months ago
1 Less than a year ago
2 More than a year ago
3 Menopausal/hysterectomized
4 Before the last pregnancy
5 Never menstruated
99 Doesn't know

115. What is your marital status? *[IF MORE THAN ONE CASE APPLIES, APPLY FILTER CORRESPONDING TO THE HIGHEST RESPONSE IN THE LIST]*
1 Married or cohabiting
2 Divorced/separated
3 Widow
4 Never been married and never lived together
If = 2, 3, 4, END INTERVIEW and mark as incomplete

116. In the last 12 months, has your husband/partner been away from home for more than a month?
1 Yes
2 No
99 Doesn't know/No answer

117. Does your husband/partner currently live with you or do they live elsewhere?
1 Lives with her
2 Lives elsewhere
3 Lives with her on the weekends
98 Other

118. Do you know if your husband/partner has any other wife(ves) besides you?
1 Yes, he does
2 He doesn't
99 Doesn't know
If = 2 or 99, go to 121

119. Including yourself, in total, how many wives does your husband/partner have? *[Mark*

98 if Doesn't Know]
(must be between 2 and 98) '____'
If 119 has range (7,97), prompt interviewer with message 'Check the number you entered. Use 98 if Doesn't know'

120. Are you the first, second, … wife? [Mark order number – Enter 98 if Doesn't know]
(must be between 1 and 98) '_____'
If 120 has range (7,97), prompt interviewer with message 'Check the number you entered. Use 98 if Doesn't know'
If 120 > 119, prompt interviewer with message 'Check previous answer'

121. In what month and year did you marry or start living with a man for the first time?
[Mark 9998 if they don't knowthe year]
MONTH
1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December
99 Don't know the month

[121.1] YEAR (must be between 1980 and 9998) '_____'
If 121.1 has range (2019,9997), prompt interviewer with message 'Check the number you entered. Use 9998 if Doesn't know'

If 2017-121.1>101, prompt interviewer with message 'Correct the year they got married or the age of the respondent'

Section 2: Knowledge and Use of Contraception

INTERVIEWER: Check the presence of other people. Before continuing, make every effort to ensure privacy. Answer questions 200a, 200b, 200c, and 200d without asking the respondent the questions.

Are other people present?

200a. Boy/man over 10 years old?
1 Yes
2 No
200b. Boy under 10?
1 Yes
2 No
200c. Another woman/girl over 10 years old?
1 Yes
2 No
200d. Another girl under 10 years old?
1 Yes
2 No

201. Do you know if there are days between one menstrual period and another when there is a higher risk of getting pregnant if the woman has sexual intercourse?
1 Yes
2 No
99 Doesn't know/No answer
If = 2 or 99, go to 203

202. Is this moment immediately before the period begins, during the period, immediately after the period ends, in the middle of the cycle, or at another moment?
1 Immediately before the period starts
2 During the period
3 Immediately after the end of the period
4 In the middle of the cycle
98 Other [specify]
99 Doesn't know/No answer

If = 98, ask 202a

203. Now I would like to talk a little about ways or methods of family planning – various ways or methods that couples use to delay or avoid pregnancy. What contraceptive methods do you know or have heard of? *[FOR METHODS NOT MENTIONED ASK: DO YOU KNOW OR HAVE HEARD OF (READ THE NAME AND DESCRIPTION OF THE METHOD)]*

a. Female sterilization (tubal ligation). PROBE: Women can have surgery to stop having children

b. Male sterilization (vasectomy) PROBE: Men can have surgery to stop having children

c. Intrauterine device (IUD) PROBE: A midwife or doctor may place a device in a woman's uterus to prevent pregnancy.

d. Contraceptive injections PROBE: Women can receive an injection for one or more months to prevent pregnancy

e. Implant PROBE: Women can have several small rods placed in their arm by a doctor or nurse that can prevent pregnancy for one or more years.

f. Pill PROBE: Women can take a pill every day to prevent pregnancy

g. Male condom PROBE: Men can use a condom during sexual intercourse

h. Female condom PROBE: Women can place a condom specifically designed for women in their vagina before sexual intercourse

i. Diaphragm PROBE: The diaphragm is like a little hat that women can put inside their vagina.

j. Lactation amenorrhea method PROBE: After a birth, you would be protected from getting pregnant while breastfeeding frequently until you see your period again.

k. Periodic sexual abstinence PROBE: Couples can avoid having sex during the days of the month when the woman is most at risk of becoming pregnant.

l. Coitus interruptus PROBE: Men can be careful during sex and withdraw before finishing, ejaculating outside the vagina.

m. Emergency contraception PROBE: As an emergency measure after unprotected sexual intercourse, a woman can take special pills within three days to prevent pregnancy.

n. Other methods PROBE: Couples can use other methods or ways different from the previous ones to avoid pregnancy. Do you know or have you heard of any other method? *[Interviewer: inquire specifically about traditional methods/superstitions – these should be included if the respondent believes they reduce the likelihood of becoming pregnant]*

204. CHECK Q3: *[INTERVIEWER: Please re-ask Question Q3: Are you currently pregnant?]*

1 Not pregnant or don't know

2 Is pregnant

If = 2, END INTERVIEW'and mark as incomplete

205. Are you currently using any method to delay or avoid pregnancy?

1 Yes

2 No

If = 2, go to 208

206. What method do you currently use? *[SHOW CARD 206] [SELECT ALL METHODS MENTIONED. IF MORE THAN ONE METHOD IS MENTIONED, FOLLOW THE INSTRUCTIONS FOR THE HIGHEST METHOD IN THE LIST]*

1 Female sterilization

2 Male sterilization

3 IUD

4 Injections

5 Implants

6 Pill

7 Male condom

8 Female condom

9 Diaphragm

10 Lactation amenorrhea

11 Periodic sexual abstinence

12 Coitus interruptus

13 Emergency contraception

14 Other (specify)

15 Other modern methods

16 Other traditional methods

LIST 1: List of all known family planning methods among:

1 Female sterilization

2 Male sterilization

3 IUD

4 Injections

5 Implants

6 Pill

7 Male condom

8 Female condom

9 Diaphragm

10 Lactation amenorrhea
11 Periodic sexual abstinence
12 Coitus interruptus
13 Emergency contraception
14 Other (specify)
15 Other modern methods
16 Other traditional methods

207. Since what year and month have you continually used the methods from *LIST 1* without interruption? *PROBE: How long have you been using the methods from* LIST 1 *uninterruptedly?*
MONTH
1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December
99 Don't know the month
YEAR [207.1] *[mark 99 if they don't know]* '_____' If 207.1 has range (100,1985), prompt interviewer with message 'Check the year. Mark 99 if the respondent does not know the year'

208. Have you ever used or tried to use any other method to avoid pregnancy?
1 Yes
2 No
If = 2, go to Section3

208.1 Which ones?
1 Female sterilization
2 Male sterilization
3 IUD

4 Injections
5 Implants
6 Pill
7 Male condom
8 Female condom
9 Diaphragm
10 Lactation amenorrhea
11 Periodic sexual abstinence
12 Coitus interruptus
13 Emergency contraception
14 Other (specify)
If 208.1 contains answer(s) to 206, prompt interviewer with message 'Check the answer to question 206'

209.1 Why did you stop using the methods from *LIST 1*? *[SHOW CARD 209 - Record the first reason]*

1 Got pregnant while using
2 I wanted to get pregnant
3 Husband/partner objected
4 I wanted a more effective method
5 Negative effects on your health or your day-to-day/secondary activities
6 Health reasons
7 Too far / not accessible
8 Too expensive
9 It was not practical to use
10 Only God knows / fatalist
11 Stopped having sex
12 Infrequent sexual relations/husband or partner was absent
13 Divorce/separation
14 Menopause/hysterectomy
15 No longer fertile/fruitful
98 Other reason (specify)
99 Does not know

209.2. Other reasons for stopping using the methods from *LIST 1*?

1 Got pregnant while using

2 I wanted to get pregnant
3 Husband/partner objected
4 I wanted a more effective method
5 Negative effects on your health or your day-to-day/secondary activities
6 Health reasons
7 Too far / not accessible
8 Too expensive
9 It was not practical to use
10 Only God knows / fatalist
11 Stopped having sex
12 Infrequent sexual relations/husband or partner was absent
13 Divorce/separation
14 Menopause/hysterectomy
15 No longer fertile/fruitful
98 Other reason (specify)
99 Does not know

Section 3: Probabilistic Beliefs

Now I'm going to ask you several questions about the possibility or probability of various events happening. There are 20 beans in the cup. I would like you to choose some beans from these 20 beans and put them on the board to express what you think about the chances of a specific event happening. One bean represents a one in 20 chance. If you don't put any beans on the board, it means you are certain that the event will NOT happen. As you add beans, this means that you think the chances of the event happening increase. For example, if you put out one or two beans, it means that you think the event is not likely to happen, but it is still possible. If you choose 10 beans, it means it is as likely to happen as it is not to happen ("50-50"). And if you pick 11 beans, that means you think the event is slightly more likely to happen than not to happen. If you put 20 beans on the board, it means you are sure the event will happen. There is no right or wrong answer, I just want to know what you think. Let me give you an example. Imagine that we are playing jacks, and I ask you what you think are the chances that you will win. If you put 14 beans on the board, it means you believe we would win 14 out of 20 games, on average, if we played for a long time.

301. Do you have any questions about how the game works before we start?
1 Yes
2 No

If 301 = 1, prompt interviewer with message 'INTERVIEWER, ANSWER ANY QUESTIONS THE RESPONDENT MIGHT HAVE.'

INTERVIEWER: FOR QUESTIONS 302 TO 307, RESPONDENTS CAN ANSWER 0 / 10 / 20 AT WILL, BUT IT IS IMPORTANT TO HELP THEM UNDERSTAND WHAT THEIR ANSWERS MEAN EXACTLY.

[Note: When the interviewer selects 0 beans from the list of possible answers, the code recorded is 1, the code is 2 for 1 bean, etc up to code 21 which corresponds to the selection of 20 beans option by the interviewer.]

Choose the number of beans that best reflects, in your opinion, the chances of it raining on any day chosen at random:

302. During the month of April 2018?
‘_____’
If 302 = 21, prompt interviewer with message 'DOES THIS MEAN THAT, FOR EXAMPLE, ON APRIL 15, 2018, YOU THINK IT WILL SURELY RAIN?'
If 302 = 11, prompt interviewer with message 'DOES THIS MEAN YOU THINK THAT BY PICKING AT RANDOM ANY DAY BETWEEN APRIL 1 AND 30, 2018, IT IS JUST AS POSSIBLE THAT IT WILL RAIN ON THAT DAY AS IT IS NOT?'
If 302 = 1, prompt interviewer with message 'DOES THIS MEAN THAT, FOR EXAMPLE, ON APRIL 15, 2018, YOU THINK THERE IS NO POSSIBILITY THAT IT WILL RAIN?'

303. During the month of July 2018?
‘_____’

304. During the month of October 2018?
‘_____’

305. During the month of January 2019?
‘_____’

Choose the number of beans that in your opinion best reflects your chances of going:
306. To the market at least once in the next two days?
‘_____’

[INTERVIEWER: LEAVE THE BEANS ON THE BOARD AFTER THE RESPONDENT ANSWERS QUESTION 306 IN SUCH A WAY THAT SHE CAN ADD/REMOVE BEANS]

307. To the market at least once in the next two weeks?

‘_____’

If 307 $<$ 306, prompt interviewee with message 'AS MORE TIME PASSES, YOU ARE ABLE TO FIND MORE TIME TO GO TO THE MARKET. SO I WAS EXPECTING YOU TO ADD TO THE NUMBER OF BEANS. WOULD YOU LIKE TO CHANGE YOUR ANSWER?'

[FOR THE REMAINING QUESTIONS, DO NOT ASK THE RESPONDENT ABOUT HER ANSWERS UNLESS THE INSTRUCTIONS SPECIFICALLY REQUIRE IT]

Choose the number of beans that in your opinion best reflects your likelihood of:

if 205= 2, then

308. Getting pregnant in the next 12 months (if you continue without using any contraceptive method)?

‘_____’

if 205≠2, then

308. Getting pregnant in the next 12 months if you continue using the same contraceptive method?

‘_____’

if 205= 2, then

309. Getting pregnant in the next 5 years (if you continue to not use any contraceptive method)?

‘_____’

if 205≠2, then

309. Getting pregnant in the next 5 years (if you continue using the same contraceptive method)

‘_____’

IF THE RESPONDENT ANSWERS A SMALLER NUMBER OF BEANS TO QUESTION 309 THAN TO QUESTION 308, EXPLAIN TO HER THAT IN FIVE YEARS SHE WILL HAVE THE NEXT 12 MONTHS PLUS FOUR YEARS TO GET PREGNANT AND THEREFORE YOU EXPECTED HER TO ANSWER A LARGER NUMBER OF BEANS. THEN ASK HER IF SHE WOULD LIKE TO CHANGE HER ANSWER, AND RECORD HER NEW ANSWER TO QUESTION 309 IN ANSWER TO QUESTION 310

310. Getting pregnant in the next 5 years (if you continue not using any contraceptive method)? *(SECOND ATTEMPT)*
‘_____’

Now I would like to ask you a few questions about your perceptions regarding various aspects of contraception. There is no right or wrong answer, I just want to know what you think, taking into account your own lifestyle.

Imagine that you are not using either your current method or any of the other contraception methods we talked about earlier. Choose the number of beans that in your opinion best reflects your chances of:

311. Getting pregnant in the next 12 months?
‘_____’

205b. Do you currently use any method to delay or avoid pregnancy? *[Check the preloaded answer and correct if necessary]*
1 Yes
2 No
If ‘205b’ = 2, go to 317 If 205 = 2 and 205b = 1, prompt interviewer with message 'Are you sure you are using a method to delay or avoid pregnancy? *[INTERVIEWER, IF YES GO BACK TO QUESTION 205 AND CORRECT THE ANSWER]* '

312. Imagining you are not using any method, choose the number of beans that best reflects, in your opinion, the chances of you gaining weight if you stop using your current method?
‘_____’

313. Imagining you are not using any method, choose the number of beans that best reflects, in your opinion, the chances of you losing weight due to no longer using your current method?

‘_____’

317. Imagining you are not using any method, choose the number of beans that best reflects, in your opinion, your chances of contracting a sexually transmitted disease (STD) during the next 12 months?

‘_____’

319. Imagining you are not using any method, choose the number of beans that in your opinion best reflects your chances of getting pregnant over the next 12 months, if you decide you want to get pregnant?

‘_____’

321. Choose the number of beans that in your opinion best reflects the chances that people from the same religion as you would approve of you not using any method?

‘_____’

322. Choose the number of beans that in your opinion best reflects the chances of you being able to not use any method without your husband/partner knowing, if for any reason you don’t want to tell him?

‘_____’

323. Choose the number of beans that in your opinion best reflects the chances of your husband or partner approving, if he knew, of your decision not to use any method?

‘_____’

324. Choose the number of beans that best reflects, in your opinion, the chances of your friends approving your decision not to use any method?

‘_____’

325. Choose the number of beans that best reflects, in your opinion, the chances of your parents approving of your decision not to use any method?

‘_____’

Suppose now that you decide to use (or continue with) one of the methods you know. Choose the number of beans that best reflects, in your opinion, your chances of:

326. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Getting pregnant during the next 12 months (assuming you use this method with all of your potential partners, if there is more than one)?**
‘_____’

327. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Gaining weight due to using this method instead of your current method or due to continuing this method?**
‘_____’

328. Method *LIST 1* *[Read each option in LIST 1 in turn]* **– …Losing weight due to using this method instead of your current method or due to continuing this method?**
‘_____’

329. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Feeling nauseous, vomiting or having headaches due to using this method?**
‘_____’

330. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Having menstrual irregularities/vaginal infections due to using this method?**
‘_____’

331. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Experiencing other negative effects in regards to your health or your daily activities due to using this method?**
‘_____’

332. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Contracting a sexually transmitted disease (STD) in the next 12 months?**
‘_____’

333. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Thinking that using this method interferes with your or your partner’s libido/sexual pleasure, or interferes with romance?**
‘_____’

334. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Being able to get pregnant for a period of 12 months after stopping using the method, if you decide you want to get pregnant?**
‘_____’

336. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Having approval from people of your religion in your decision to use this method?**
‘_____’

337. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Being able to use this method without your husband/partner knowing, if for some reason you don’t want to tell him?**
‘_____’

338. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Your husband approving, if he knew, of your decision to use this method?**
‘_____’

339. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Your friends approving of your decision to use this method?**
‘_____’

340. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Your parents approving of your decision to use this method?**
‘_____’

341. Method *LIST 1* *[Read each option in LIST 1 in turn]* **–…Being able to obtain this method when you need it?**
‘_____’

342a. Method *LIST 1* *[Read each option in LIST 1 in turn]* **– What do you think the monthly healthcare costs would be to obtain the method (including consultations, tests, prescriptions, surgery)?**
‘_____’

343b. Method *LIST 1* *[Read each option in LIST 1 in turn]* **– What do you think would be the other costs incurred to obtain the method each month (such as transportation costs)?**
‘_____’

343c. Method *Female Sterilization/Male Sterilization, in turn, if in LIST 1* – What do you think the initial (non-recurring) healthcare costs would be to obtain the method (including consultations, tests, prescriptions, surgery)?

'_____'

344. Method *LIST 1* *[Read each modern option in LIST 1 in turn])* **– How do you think the method is administered?**

1 It's not administered to women
2 Oral administration
3 Local administration by the woman
4 Injection
5 Local administration to women by a health professional
6 Doesn't know

345. Method *LIST 1* *[Read each modern option in LIST 1 in turn]* **– How long do you think it would be necessary to wait for the method to be administered, before undergoing surgery/being served (approximately)?**

1 Less than half an hour
2 Between half an hour and an hour
3 Between one and two hours
4 Between two and three hours
5 Between three and four hours
6 Between four and five hours
7 Between five and six hours
8 More than six hours
99 Doesn't know

Section 4: Additional Questions

401. How many times did you go to the market last month? *[Mark 999 if they don't know] [ENCOURAGE THE RESPONDENT TO GIVE AN APPROXIMATE ANSWER IF THEY ARE NOT SURE OF THE EXACT NUMBER]*

'_____'

402. [If 205='No'] Do you think you will use any method to delay or avoid pregnancy at some point in the future?

‘_____’

402. [If 205=‘Yes’] Do you plan to continue using some method to delay or avoid pregnancy?
1 Yes
2 No
99 Doesn’t know

Now I would like to ask your opinion regarding some situations that could occur:
Suppose there are only two family planning methods available on the market: the ”Zero Beans Method” and the ”Three Beans Method.” Both involve you taking a pill once a week. The two methods are completely identical in all aspects (availability, negative effects regarding your health or your day-to-day activities, return to fertility, protection against STDs, acceptability for you, your partner, family, etc.), except for its effectiveness in preventing pregnancy.

With the ”Zero Beans” method, it is impossible to get pregnant. In other words, if each of these 20 beans represented a woman identical to you but using this method, none of them would become pregnant in the next 12 months.

With the ”Three Beans” method, it is possible to become pregnant. More precisely, if each of these 20 beans represented a woman identical to you but using this method, three on average would become pregnant in the next 12 months.

403. How much would you be willing to pay in meticals each month to get the “Zero Beans” method instead of the “Three Beans” method? *[Mark 9999 if Doesn’t know]*
‘_____’

Suppose there are only two family planning methods available on the market: the ”Zero Beans Method” and the ”Three Beans Method.” The two methods are completely identical in all aspects (prevention of pregnancy, means of administration, availability, negative effects in relation to your health or your day to day activities, return to fertility, protection against STDs, acceptability to you, your partner, family, etc), except for the difficulty for the partner to know whether or not the woman uses a family planning method.

With the ”Zero Beans” method, a man cannot know that a woman uses the method unless she tells him. In other words, if each of these 20 beans represented a woman identical to you but using this method, none of their partners would be able to know that she uses the method if she didn’t want

to tell him.

With the ”Three Beans” method, it is possible for a man to know that the woman uses the method, even if the woman does not tell him. More precisely, if each of these 20 beans represented a woman just like you, when using this method, three of them on average would not be able to hide from their partner that they use this method.

404. How much would you be willing to pay in meticals each month to get The “Zero Beans method instead of the “Three Beans method? [Mark 9999 if Doesn’t know]
‘__________’

Suppose there are only two family planning methods available on the market: the ”Zero Beans Method” and the ”Three Beans Method.” Both involve you taking a pill once a week. The two methods are completely identical in all aspects (effectiveness in preventing pregnancy, availability, return to fertility, protection against STDs, acceptability for you, your partner, family, etc.), except for the possibility of experiencing negative effects in relation to your health or your day-to-day activities.

With the ”Zero Beans” method, there are no side effects at all. In other words, if each of these 20 beans represented a woman just like you but using this method, none of them would feel negative effects in relation to their health or their daily activities.

With the ”Three Beans” method, it is possible to experience negative effects in relation to your health or your daily activities. More precisely, if each of these 20 beans represented a woman just like you, when using this method, three on average would feel negative effects in relation to their health or their day-to-day activities.

405. How much would you be willing to pay in meticals each month to get the “Zero Beans” method instead of the “Three Beans” method? *[Mark 9999 if Doesn’t know]*
‘__________’

Suppose there are only two family planning methods available on the market: the ”Zero Beans Method” and the ”Three Beans Method.” Both involve you taking a pill once a week. The two methods are completely identical in all aspects (effectiveness in preventing pregnancy, availability, negative effects in relation to your health or your daily activities, protection against STDs, acceptability for you, your partner, family, etc.), except for the possibility of becoming pregnant

as soon as the woman stops using the method.

With the ”Zero Beans” method, the woman completely recovers her ability to get pregnant as soon as she stops taking it. In other words, if each of these 20 beans represented a woman just like you but using this method, none of them would be able to get pregnant during the 12 months after stopping using the method due to the method.

With the ”Three Beans” method, it is possible that some women's ability to get pregnant may be reduced for a time after they stop using this method. In other words, if each of these 20 beans represented a woman identical to you, when using this method, three of them on average would not be able to get pregnant during the 12 months after they stopped using the method because they had used it.

406. How much would you be willing to pay in meticals each month to get the “Zero Beans” method instead of the “Three Beans” method? *[Mark 9999 if Doesn’t know]*
‘__________’

Now I would like to ask you who you would trust most to give you specific information about fertility and contraception.
LIST 2: Potential sources of information about fertility and contraception.
From a public sector doctor
From a private sector doctor
From a public sector nurse or other similar healthcare professional
From a private sector nurse or other similar healthcare professional
From a pharmacist
From a teacher at school
From a friend/family member
From a popular radio or television program
From a text message sent by an international NGO
On an advertising poster
From a neighbor who received specific training to inform the community about family planning
From a hairdresser

407. How likely would you be to believe this to be true if you had heard the information from *LIST 2* *[Read each option in LIST 2 in turn]*:
1 Surely you would believe it’s true

2 You would be more likely to believe it is true than false
3 You would be just as likely to believe it is true as not true
4 You would be more likely to believe it is false than true
5 Surely you would believe it's not true

[Note: Random number drawn and, with probability 0.5, app skips to 408]
INTERVIEWER: the respondent was randomly selected to answer questions T1 to T3, read:

In fact, studies show that, on average, out of every 20 sexually active women of reproductive age who do not use any contraceptive method, 17 will get pregnant within the next 12 months.
T1. REGISTER THE RESPONDENT'S REACTION ***[SELECT ALL ANSWERS THAT APPLY]***
1 Surprised
2 Seems like she doubts it
3 Seems like she believes it
4 She already knew
98 Other

T2. [If 205='No] Do you think you will use any method to delay or avoid pregnancy at some point in the future?
'_____'

T2. [If 205='Yes] Do you plan to continue using some method to delay or avoid Pregnancy?
1 Yes
2 No
3 Doesn't know

T3. Suppose there are 20 women exactly like you right now. In other words, 20 women identical in all aspects, including the same lifestyle as you, each with a husband identical to your husband, etc... Choose the number of beans that in your opinion best reflects how many women among these 20 will become pregnant in the next 12 months, if they do not use any contraceptive method. *[Mark 99 if Doesn't know]*

‘_____’

T4. Choose the number of beans that best reflects, in your opinion, your chances of getting pregnant in the next 12 months, if you do not use any contraceptive method.

‘_____’

Suppose now, for example, that you heard that while using the pill, a woman’s chance of getting pregnant within 12 months is very low (on average, less than two in every 20 women).

408. How likely would you believe this to be true if you had heard this information from *LIST 2 [Read each option in LIST 2 in turn]*:

1 Surely you would believe it’s true

2 You would be more likely to believe it is true than false

3 You would be just as likely to believe it is true as not true

4 You would be more likely to believe it is false than true

5 Surely you would believe it’s not true

409. Now I would like to talk about other people with whom you may have talked about family planning. You may have had conversations with other women, friends, or relatives about children and ways to avoid having children. Some of these people may approve of family planning, and some may not approve of it. How many people (approximately) have you talked to about family planning methods? I mean people other than your husband or partner

‘_____’

If 409 $<$ 4, prompt interviewee with message 'ARE YOU SURE YOU DIDN’T TALK TO MORE PEOPLE?'

410. Have you become aware that the method in *LIST 1* existed through a friend or family member? *[Read each option in LIST 1 in turn]*

1 Yes

2 No

If Q4 = 1 and 205b = 2, ask 411a [Note: if Q4 = 1, respondents were only invited for full interview if they say they want to wait at least two years before having another child.]

If Q4 = 2 and 205b = 2, ask 411b

411a. You said you didn't want to have (another) child right away. Can you tell me why you are not using any method to avoid pregnancy? *[MAIN REASON – DO NOT show responses card]*

1 Not having sex
2 Infrequent sexual intercourse
3 Menopause/Hysterectomy
4 Infertile / Non-fertile
5 Has not had a period since last birth
6 Is breastfeeding
7 Up to God / Fatalist
8 Respondent opposed to using it
9 Husband/Partner objects
10 Others are opposed to it
11 Religion prohibits it
12 Doesn't know the methods
13 Doesn't know the sources
14 Fear of side effects
15 Too far / not accessible
16 Too expensive
17 Unavailable
18 No methods available
19 Inconvenient to use
20 Interfere with the normal functioning of the body
98 Other (specify)
99 Doesn't know

411a. Other reasons [SHOW RESPONSES CARD 411] [CHECK ALL REASONS MENTIONED]

1 Not having sex
2 Infrequent sexual intercourse
3 Menopause/Hysterectomy
4 Infertile / Non-fertile
5 Has not had a period since last birth
6 Is breastfeeding
7 Up to God / Fatalist
8 Respondent opposed to using it

9 Husband/Partner objects
10 Others are opposed to it
11 Religion prohibits it
12 Doesn't know the methods
13 Doesn't know the sources
14 Fear of side effects
15 Too far / not accessible
16 Too expensive
17 Unavailable
18 No methods available
19 Inconvenient to use
20 Interfere with the normal functioning of the body
98 Other (specify)
99 Doesn't know

411b. You said you didn't want to have any more children. Can you tell me why you are not using any method to avoid pregnancy? ***[MAIN REASON – DO NOT show responses card]***

1 Not having sex
2 Infrequent sexual intercourse
3 Menopause/Hysterectomy
4 Infertile / Non-fertile
5 Has not had a period since last birth
6 Is breastfeeding
7 Up to God knows / Fatalist
8 Respondent opposed to using it
9 Husband/Partner objects
10 Others are opposed to it
11 Religion prohibits it
12 Doesn't know the methods
13 Doesn't know the sources
14 Fear of collateral side effects
15 Too far / not accessible
16 Too expensive
17 Unavailable
18 No methods available
19 Inconvenient to use

20 Interfere with the normal functioning of the body
98 Other (specify)
99 Doesn't know

411b. Other reasons [SHOW RESPONSES CARD 411] [CHECK ALL REASONS MENTIONED]
1 Not having sex
2 Infrequent sexual intercourse
3 Menopause/Hysterectomy
4 Infertile / Non-fertile
5 Has not had a period since last birth
6 Is breastfeeding
7 Up to God / Fatalist
8 Respondent opposed to using it
9 Husband/Partner objects
10 Others are opposed to it
11 Religion prohibits it
12 Doesn't know the methods
13 Doesn't know the sources
14 Fear of collateral side effects
15 Too far / not accessible
16 Too expensive
17 Unavailable
18 No methods available
19 Inconvenient to use
20 Interfere with the normal functioning of the body
98 Other (specify)
99 Doesn't know

If Q4 = 2, ask 500b
If Q4 = 1, ask 500a [Note: if 'Q4' = 1, respondents were only invited for full interview if they say they want to wait at least two years before having another child.]

500a. You said you didn't want to have (another) child right away. Do you think your husband/partner would like to have another child sooner than you want to, or later than you want to?

1 Sooner
2 Later
3 At the same time
4 Never (husband/partner does not want to have more children)
5 Does not want to answer
6 Doesn't know

500b. You said you didn't want to have any more children. Do you think your husband/partner would like to have another child?
1 Yes
2 No
3 Does not want to answer
4 Doesn't know

Now I would like to ask you a question about your recent sexual activity to better understand how couples make decisions regarding fertility and contraception.

412a. Have you had sexual intercourse at least once in the last 4 weeks?
1 Yes
2 No
3 Does not want to answer

If = 1, do not ask 412b

412b. Have you had sexual intercourse at least once in the last 3 months?
1 Yes
2 No
3 Does not want to answer

413. How many minutes does it take to get to the nearest Public Hospital? *[Mark 999 if Doesn't know]*
'_____'

Type of public hospital?
1 Central Hospital
2 Provincial/General Hospital

3 Rural hospital
99 Doesn't know

By what means of transport?
1 On foot
2 Bicycle
3 Passenger transport / minibus
4 Car
5 Motorcycle
98 Other
99 Doesn't know how long it takes

413. How many minutes does it take to get to the nearest health center/health outpost?
'_____'

By what means of transport?
1 On foot
2 Bicycle
3 Passenger transport / minibus
4 Car
5 Motorcycle
98 Other
99 Doesn't know how long it takes

413. How many minutes does it take to get to the nearest pharmacy?
'_____'

Type of pharmacy?
1 Public sector
2 Private sector

By what means of transport?
1 On foot

2 Bicycle
3 Passenger transport / minibus
4 Car
5 Motorcycle
98 Other
99 Doesn't know how long it takes

END OF INTERVIEW
THANK THE RESPONDENT AND CONCLUDE THE INTERVIEW