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To invest or not to invest in sanitation: the role of intra-household gender differences in perceptions and bargaining power*

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Abstract

We exploit novel data collected within a randomized controlled trial of a sanitation microcredit intervention to study how intra-household gender differences in perceptions of costs and benefits of sanitation impact investment decisions. We show that — as long as the wife is involved in household decision-making — the intra-household differences in perceptions we document influence borrowing and investments: uptake of the sanitation loan is higher among households where the wife has higher benefit perception, whereas successful conversion to a toilet depends on differences in monetary cost perceptions. The estimated effects are consistent with the predictions of a model of intra-household decision-making.

JEL codes: O16, J16, D14, I12
Keywords: sanitation, perceptions, intra-household bargaining, microfinance, gender

1 Introduction

Several household investments (e.g. improved cookstoves, household toilets) confer higher benefits to women than men (Miller and Mobarak, 2013; Stopnitzky, 2017). Making these large investments usually requires cooperation from multiple household members, who each have their own perceptions of costs and benefits. However, in developing country settings, financial resources are often controlled by men. Providing women with access to financial tools is promoted as a means to increase these types of investments, since they not only alleviate liquidity constraints (Guiteras et al., 2015; Augsburg et al., 2022) but also place the funds in the hands of the women themselves.[1] However, simply providing women with financial tools will not impact outcomes if they are unable to exercise agency over how funds are used.

Differences in intra-household perceptions of the costs and benefits of the underlying investments, and the distribution of bargaining power, are both likely to influence investment decisions, and consequently the success of interventions seeking to increase targeted investments by alleviating liquidity constraints for women. Despite the importance of *perceptions* of costs and benefits in the investment process, little is known about these for investments such as household toilets, in general, or by gender.

In this paper, we use novel data on perceptions of the costs and benefits of a household toilet – an important investment that requires a significant upfront outlay – collected within a cluster randomized controlled trial (cRCT) of a sanitation microcredit intervention in rural India to answer two questions. First, to what extent do perceptions of costs and benefits of safe sanitation differ by gender, overall and within the household? Second, how do intra-household differences in perceptions influence the success of sanitation programs? How do they interact with the distribution of bargaining power within the household?

To shed light on the first question, we make use of unique, and to date unexplored, data on perceptions of several dimensions of costs and benefits of a standardized toilet, collected from over 1,000 couples prior to the roll-out of the sanitation microcredit intervention. We then combine these novel data with exogenous variation from the cRCT to test predictions from a theoretical model of intra-household decision-making in which a couple bargains over borrowing, investment and consumption choices to answer the second question.

The study context is rural Maharashtra, India, where a large microfinance institution (MFI) made a new sanitation loan product available to its exclusively female clients. Though safe sanitation is recognised as a key factor in primary health (e.g. Declaration

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[1]Such policies are motivated by evidence showing that providing women with control over resources or financial tools can, at times, improve outcomes such as female micro-enterprise investment (Riley, 2020), female labour supply (Field et al., 2021) and nutrition (Duflo, 2003; Armand et al., 2020).

of Alma-Ata), at the onset of the study in 2014 only 27% of client households had a toilet, with financial constraints cited as the major reason for not having one. The loan was intended to finance the construction of a new toilet, or the repair or upgrade of an existing one. While only women could access the loan, the MFI in principle required written consent from the client's spouse before disbursement. The loan was simply labelled for sanitation, and the MFI provided no guidance or advice on the toilet model or procurement of materials and labour.

Augsburg et al. (2022) draw on the cRCT, which made the sanitation loan available in 40 of 81 Gram Panchayats (GPs) where the partner MFI operated, to show that two-and-a-half years after the intervention roll-out, around 18% of clients took the loan. This resulted in a 9 percentage point increase in toilet ownership, with only a few loans used to repair or upgrade existing toilets. We build on that paper by studying the roles of intra-household differences in perceptions and bargaining power in driving these impacts.[2]

Constructing a toilet is costly and complex. The average cost of constructed toilets in our study setting accounts for around 50% of the average household's annual income. Such a significant outlay necessitates the use of financing instruments such as savings and loans. Once funds are secured, households need to choose a toilet model, identify skilled labour (mason, carpenter), procure materials and oversee the construction. Even when women have access to financing, prevailing strong gender norms necessitate the cooperation of a male household member to complete this process (Goetz and Sen Gupta, 1996; van Tassel, 2004).

Rural India is strongly patriarchal. Women move from their natal village to their husband's village on marriage, and their mobility outside the household is often severely restricted, especially for newly married brides (Kandpal and Baylis, 2019; Andrew et al., 2020; Anukriti et al., 2020). Even in the absence of strong mobility restrictions, rigid gender roles may discourage women from visiting markets or seeking out information on construction materials and home improvements. Moreover, women typically have very little agency in household investment and financial decisions within their marital households – which are often shared with extended family members such as parents-in-law and the siblings of her spouse and their families. In the case of large household investments, such as a toilet, men play a dominant role in making decisions (Routray et al., 2017).

We confirm the limited agency for women in household financial and investment decisions in our data: on average, women in our sample of microcredit client households report being involved in making large financial and investment decisions only two-thirds of the time. However, they rarely make any such decisions on their own: husbands or other household members (such as in-laws) are usually also involved. In almost one-third

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of households, women report rarely being involved in making these decisions.

Consequently, it is likely that cost and benefit perceptions of both female and male household members matter in the sanitation investment process, and that the differences in these perceptions will influence intervention impacts on take-up and conversion of the sanitation loan.

We start by documenting how perceptions of the costs and benefits of a safe toilet vary by gender and within households. The perceptions were elicited by showing the selected female and male adult survey respondents, typically spouses, the same picture of a standardized toilet and asking a series of questions related to the costs (monetary and non-monetary) and benefits of such a toilet.[3] We combine the responses to construct measures of perceptions of monetary costs, non-monetary costs and benefits of the toilet.

The literature indicates that the costs and benefits of a household toilet will vary by gender. On the one hand, women stand to benefit more since a private household toilet provides access to a safe and convenient place to relieve themselves, thereby eliminating the need to control bodily functions in a manner that worsens health, and reducing risk of sexual harassment or assault (Caruso et al., 2017; Saleem et al., 2019; Hossain et al., 2022). On the other hand, however, women – who do the housework – face additional burdens in fetching water and cleaning the toilet.

In line with this literature, we document that in the overall sample, women perceive higher benefits of the toilet than men. The distributions of non-monetary cost perceptions also vary by gender. However, that for women has a bimodal distribution, with a small proportion of women perceiving higher costs than men and a larger proportion perceiving lower costs. For monetary costs, women and men have similar average cost perceptions, though this masks variation across the distribution. Comparing the elicited costs with the actual costs incurred by households with toilets of a similar model (based on GP-level median costs), we document that a substantial fraction of both men and women (74% and 67% respectively) *overestimate* the cost of the toilet by more than INR 5,000 (perceived cost of INR 33,000 on average vs INR 20,000 average actual cost).

We also document significant variation in intra-household differences in perceptions *within* households. In a significant proportion (38%) of households, women perceive higher benefits of the toilet than men. However, there are large shares of households (32% and 30% respectively) where the woman and man have similar perceptions (within 0.3 standard deviations) or where men perceive higher benefits than women. We document similar variation in intra-household differences in perceptions of costs (monetary and non-monetary): in particular, in 34% (40%) of households, men (women) believe that a toilet is less costly than women (men) do. Thus, the distributions of perceptions of costs and benefits for men and women capture variation *across* and *within* households. In other

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[3]The toilet, a picture of which was shown to respondents, was a twin-pit toilet similar to that recommended by the Government of India (GoI), and desired by households in the context.

words, gender differences in perceptions documented in the sample as a whole need not generalize to differences within households.

To understand better how perceptions of costs and benefits of sanitation interact with decision-making power within the household and access to credit, we develop a theoretical model of intra-household decision making in which a couple bargains over borrowing, investment and consumption choices. Following the Collective Household Model (Chiappori, 1988; Browning and Chiappori, 1998), we assume that household decision-making is Pareto efficient but there is uncertainty regarding the cost of sanitation investments when the household decides whether to take a loan. Therefore, household bargaining about investments and consumption occurs under uncertainty, and a loan taken for the purpose of a sanitation investment may be diverted to other uses if the actual cost of building a toilet turns out to be prohibitively expensive. The exercise builds on previous models of intra-household bargaining that include borrowing and investment decisions (Ligon, 2002; van Tassel, 2004; Ngo and Wahhaj, 2012) as well as models of intra-household risk-sharing (Dercon and Krishnan, 2000; Duflo and Udry, 2004; Kazianga and Wahhaj, 2017).[4]

The model confirms the intuition that sanitation investments are more likely when the household member with greater decision-making power has the higher net perceived benefit from the investment. However, it also reveals that improved access to credit has a larger effect on loan uptake and investments when the household member with less decision-making power has the higher net perceived benefit. In a context such as the one we study, where women have lower decision-making power, the model would therefore support the strategy of making sanitation loans available to women, assuming that they indeed perceive higher returns from the investment than their spouses. The intuition behind this result is that improved credit access increases the surplus generated by borrowing and investment, and thus increases the scope for compensating the spouse with greater bargaining power when he also has the lower net perceived benefit from the investment.

Building on predictions from the theoretical framework, and exploiting the random allocation of the microcredit program to GPs, we then estimate how the documented intra-household differences in perceptions and bargaining power impact household decisions at the borrowing and construction stages of the sanitation investment process, and hence the success of the sanitation microcredit intervention. We document two core results.

First, we find that intra-household gender differences in benefit and cost perceptions matter for borrowing and sanitation investment decisions, but at different stages of the

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[4]Other studies, e.g. Anderson and Baland (2002) have considered intra-household bargaining models with *saving* and durable investment decisions. In that case, it is possible for one spouse to unilaterally save for the desired investment. By contrast, borrowing decisions may require cooperation from both spouses, due to lender conditions and the need to repay the loan.

process. Intra-household gender differences in benefit perceptions affect *demand for the sanitation loan*: in particular, households where the woman perceives a benefit of the toilet similar to or higher than the man's are around four times more likely to take a sanitation loan than households where she perceives a lower benefit. Intra-household differences in cost perceptions (either monetary or non-monetary), by contrast, do not yield any statistically significant differential impacts on sanitation loan take-up. Uptake of a toilet, on the other hand, is significantly influenced by intra-household differences in monetary cost perceptions. It is only in households where the woman has a lower cost perception than the man that the sanitation loan results in a new toilet. This is because these women were overestimating the toilet cost by a lower amount, leading to relatively more accurate cost perceptions. Put together, these findings highlight the importance of considering the influence of both benefit and cost perceptions in seeing an investment through.

Second, we find that the differences in intra-household perceptions of costs and benefits only affect loan take-up and toilet investment decisions in households where the woman has some minimum level of bargaining power (at least medium, as per our measure). These are households where the woman has some say in household decisions, usually with other household members. Interestingly, the distribution of female bargaining power does not, on its own, generate any differential impacts on sanitation loan or toilet take-up.

In line with the theoretical predictions, the effect of the intervention on sanitation loan take-up and sanitation investment is largest in households where the woman has relatively moderate bargaining power, and has relatively higher benefit perceptions (for sanitation loan take-up) and relatively lower monetary cost perceptions (for sanitation investments). These were the households that the model identified would be most affected by the sanitation microcredit intervention. Thus, our results show that intra-household differences in perceived costs and benefits interact with bargaining power to influence decisions to make large sanitation investments, and thereby affect the success of programs providing women with access to financial tools.

These findings shed new light on how intra-household factors influence borrowing decisions and how they interact with microfinance (Pitt and Khandker, 1998; Holvoet, 2005) and with the adoption of goods and practices for which women may have higher private returns than men, including cookstoves (Miller and Mobarak, 2013), contraceptives and reproductive health (Ashraf et al., 2014, 2020; Cassidy et al., 2021), and some preventive health investments (Meredith et al., 2013). We show that there is wide variation in intra-household perception differences across households, and that these differences in perceptions of costs and benefits interact with bargaining power to influence decisions at different stages of the investment process for another large, durable household investment – a household toilet.

Our paper also contribute new evidence to a growing literature in economics that seeks to understand the factors constraining adoption of safe sanitation investments and identify successful policy solutions. Financial constraints have been identified as a key constraint, with tools such as subsidies (Guiteras et al., 2015) and microcredit (BenYishay et al., 2017; Augsburg et al., 2022), identified as potential solutions. Several studies also highlight the importance of relaxing informational and behavioral constraints for encouraging sanitation take-up and usage. The popular Community Led Total Sanitation policy, which creates awareness about the negative consequences of open defecation and encourages collective action, has been shown to be effective in several, often relatively poor, contexts (Pickering et al., 2015; Abramovsky et al., 2020). In India, a social marketing program encouraging parents of brides to demand potential suitors' households to construct a toilet prior to marriage increased toilet construction by 21% (Stopnitzky, 2017). However, there is a concern that gender focused messages based on concerns of women's safety may backfire and reinforce restrictive gender norms. Our findings offer an alternative domain that information and marketing campaigns could focus on – correcting significant misperceptions in monetary costs – which could also make sanitation programs alleviating financial constraints more effective.

2 Context and Study Design

2.1 Context

Our study takes place in rural areas of Latur and Nanded districts in Maharashtra, India. Maharashtra, with its capital Mumbai, is one of the largest, and richest, Indian states. However, the incidence of poverty remains close to the national average, implying severe inequalities within the state (GoM, 2012). Latur and Nanded, where over 70% of the population engage primarily in agriculture (GoI, 2011a,b), are relatively disadvantaged districts in Maharashtra, ranking close to the bottom of the state in the 2011 Human Development Index (GoM, 2018). At the onset of the study in 2014, 73% of households did not use a toilet for defecating, joining the close to one billion people defecating in the open globally at the time.

Gender dynamics play an important role in sanitation investment decisions in this context. As with most of India, our study context is highly patriarchal. Women have limited decision-making power and face significant restrictions on their mobility and behaviour (Kandpal and Baylis, 2019; Anukriti et al., 2020; Andrew et al., 2020). Men are considered to be the main bread-winners, and control household resources. Recent experimental evidence also shows that Indian men place little weight on information held by their wives (Conlon et al., 2021). As we show in Section 3.4, decisions on making large household purchases are taken overwhelmingly by men (husbands, fathers-in-law). In

the case of sanitation, Routray et al. (2017) documents that beyond the decision to construct a toilet, women are rarely consulted or involved in construction activities, including decisions about where to place the toilet, or the procurement of materials and labour. Decisions to engage with sanitation construction programs are also usually deferred to men (Routray et al., 2017).

Moreover, returns and costs of having a household toilet are also likely to be different by gender. On the one hand, women stand to benefit more from a household toilet. They find it more challenging to find a safe and private place to relieve themselves, and are more subject to harassment and sexual assault (Saleem et al., 2019; Hossain et al., 2022). Internalising these costs, women take costly actions such as going out to defecate in the dark, and controlling their body functions to avoid having to relieve themselves during the day, leading to health problems (Caruso et al., 2017). Girls also benefit from sanitation investments in male-biased societies where they are disadvantaged in obtaining health care, since these can help reduce illnesses such as diarrhoea – a leading cause of infant mortality globally (Fischer Walker et al., 2013). On the other hand, women – who usually do the housework – also face the burdens of fetching water and cleaning toilets. We document the gender differences in perceived benefits and costs in detail in Section 3.3.

2.2   Intervention

We study how differences in intra-household bargaining power and perceptions of the costs and benefits of household toilets affected the effectiveness of a sanitation microcredit intervention. A large MFI active in five states in India made a new sanitation loan product available to its existing female clients.[5] The sanitation loan product could be used to finance construction of a new toilet or the repair or upgrade of an existing one. The loan was disbursed in cash terms with no information or assistance provided in choosing a toilet model, or acquiring the necessary materials and labour. Further, actual loan use was weakly monitored and not enforced or incentivized by the MFI. Following Augsburg et al. (2022), we refer to this loan product as a labelled loan.

Product details are listed in Table 1. The maximum loan amount was INR 15,000 (USD 225) with an average interest rate of 20% per annum over the study period at a declining balance with a two-year maturity. Although clients could choose between weekly or biweekly repayments, all chose the weekly option. The loans were collateral-free, but provided on a joint-liability basis within groups of 5-10 clients. Clients could take a sanitation loan only once, but could take it alongside other loans offered by the MFI (business, education, emergency), within borrowing caps set by the Reserve Bank

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[5]Only clients who had been been a member of the MFI for at least one year were eligible for a sanitation loan.

of India.[6]

Though the sanitation loan is offered to its female clients, the MFI requires agreement from her spouse before any loan application is processed. In practice, women usually do not take loan take-up decisions unilaterally: in our sample, 79% of women indicated that loan take-up decisions were made either by their husband solely or by both jointly (Appendix Figure A1).

Table 1: Sanitation loan characteristics

Amount:	Up to INR 15,000
Interest rate:	22% (later 18%) per annum on a declining balance
Loan maturity:	2 years
Payment frequency:	Weekly/Biweekly basis
Collateral:	None, but joint liability
Cost of the loan:	19.9-24.1% of the amount disbursed depending on interest rate
Other costs:	Processing fee of 1.1% of principal and INR 306 for life insurance premium

As appears in Augsburg et al. (2022).

2.3 Experimental Design

The sanitation loan product was rolled out in the study areas from February 2015, on a staggered basis across five participating branches of the MFI. In order to evaluate its effectiveness, 81 Gram Panchayats (GPs) where the MFI had existing operations were selected to be part of the study, 41 of which were randomly allocated to be part of a control group which continued to receive all other services from the MFI as usual. In these control GPs, the sanitation loan was introduced only after endline data were collected. The GP, the unit of randomization of the cRCT, is the smallest administrative unit in India and is charged with the implementation of numerous programs including the government's sanitation policy. The random allocation was stratified by the MFI branch and the size of the GP in order to boost power.

As described in Augsburg et al. (2022), care was taken to avoid contamination of control GPs. This was very successful, with only 21 loans given out in control areas early on in the intervention implementation, mainly due to clients asking for loans rather than loan officers (mistakenly) offering the new loan product.

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[6]Augsburg et al. (2022) report very high rates of repayment (virtually 100%) of this loan, suggesting that the loan's features (e.g. label) and the MFI's processes (e.g. women need to be a client for at least one year before they can take a sanitation loan; joint liability and provision of larger loans conditional on successful repayment of current loans) succeeded in ensuring that it was clients intending to make sanitation investments, and who could afford loan repayments, who took the loans.

3 Data

3.1 Study Sample

Our analysis draws on two rounds of survey data collected from a sample of households with clients of the MFI – a baseline survey with approximately 15 MFI client households per study GP in December 2014/January 2015, just before intervention roll-out, and an endline survey collected around 2.5 years later, in August and September 2017. We over-sampled client households with children aged less than 2 years, which we control for in the analysis. At endline, we successfully reinterviewed 94% of the baseline sample, balanced between treatment and control (panel A, Table 2).

Our analysis focuses on 1,134 client households interviewed in both survey rounds. For this sample, we have baseline information on perceptions of safe sanitation collected for an adult male and an adult female respondent, and on within-household decision-making power. These individual surveys were conducted by an interviewer of the same gender and took place in a private/secluded area. The female respondent was usually the mother of the youngest child in the household, or the spouse of the household head. The male respondent was typically the spouse of the female respondent, or the head of the household.[7] We also collected data on sanitation ownership and behaviour (baseline and endline). These survey data are combined with administrative data from the MFI, providing us with detailed information on borrowing from this lender.

Panel B of Table 2 provide descriptive statistics on general client household characteristics, and panel C on the household head's characteristics for this sample. On average, sampled households had 5.5 members, 71% of households primarily earned income from agriculture-related activities (22% as cultivators, 36% as agricultural wage laborers and 13% from allied agriculture); 71% of households were Hindu, with Islam the second most common religion (15%); 29% and 46% of households were from the Other Backwards Caste (OBC) and Scheduled Caste (SC) or Scheduled Tribe (ST) respectively; 24% of households owned a toilet at baseline, of which around 89% were functioning. Household heads were predominantly male (92%) with an average age of 43 years and with an average of 6 years of education.

Table 3 focuses on characteristics of the individual survey respondents – usually the mother of the youngest child aged under 6 years and her spouse. The average female

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[7]This choice of respondent (which was made to get child-level information) implies that we do not always interview the MFI client herself. If no child under the age of 6 years was present in the household, then the household head and his/her spouse were surveyed. In 12% of households, the female respondent was a widow or her spouse was not present in the household (e.g. due to temporary migration). In this case, another male adult household member was selected to respond to the survey (7.4% of sample). Since the majority (88%) of respondents were couples, we refer to the male and female respondents interchangeably as 'husband' and 'wife' in the text. As we show in Section 6.3, our results are robust to excluding the households with non-couple respondents.

Table 2: Descriptive statistics and treatment-control balance (household survey)

	All	Control group			SL-Control
	(1) N	(2) N	(3) Mean	(4) SD	(5) Difference
Panel A: Attrition					
Not interviewed at endline	1,208	621	0.05	0.22	0.02
Panel B: Household characteristics					
No. of HH members	1,134	589	5.49	2.11	-0.08
Extended household	1,134	589	0.49	0.50	-0.03
Primary activity: cultivator	1,134	589	0.22	0.42	0.01
Primary activity: agriculture wage labour	1,134	589	0.36	0.48	0.01
Primary activity: allied agriculture	1,134	589	0.13	0.34	0.00
Primary activity: waged employment	1,134	589	0.22	0.42	-0.02
Primary activity: self-employed	1,134	589	0.04	0.20	0.01
Primary activity: other	1,134	589	0.02	0.12	-0.00
Religion: Hindu	1,134	589	0.71	0.46	-0.04
Religion: Islam	1,134	589	0.15	0.36	0.04*
Religion: other	1,134	589	0.14	0.35	0.00
Caste: other backward caste (OBC)	1,132	588	0.29	0.45	-0.05*
Caste: scheduled caste (SC) or scheduled tribe (ST)	1,132	588	0.46	0.50	0.00
Caste: denotified tribe (DT) or nomadic tribe (NT)	1,132	588	0.07	0.26	0.02
Caste: forward caste	1,132	588	0.18	0.39	0.03
Household owns toilet	1,134	589	0.24	0.43	0.03
Household owns functioning toilet	1,134	589	0.21	0.41	0.03
Panel C: Household head characteristics					
Male	1,134	589	0.92	0.27	0.00
Age (years)	1,134	589	42.6	11.3	-0.09
Education (years)	1,071	560	6.13	4.58	0.15
Able to read & write	1,134	589	0.69	0.46	0.01

Note: *Source:* Household survey. Panel A includes all households interviewed at baseline. Panels B and C focus on those interviewed at endline. *Extended household* is a dummy variable =1 if the household roster includes any other relative than a couple and their dependent children. The treatment indicator (SL) =1 if a household is located within a GP that was selected to receive the sanitation loan product. Column 1 reports the total number of observations per variable. Columns 2-4 report the number of observations, mean and standard deviation specific to the control group for each variable. Column 5 displays the difference in mean values between the SL treatment group and the control group. Stars signify the level of statistical significance of this difference. Standard errors are clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

respondent was 31 years old with just over 5.5 years of education; 34% contributed to household income in the week prior to the survey. 68% of women were married to the household head and they had been married for an average of 13 years. 39% were living with their mother-in-law and 22% were part of a loan group. While 84% of female respondents could visit a neighbour on their own, mobility to go to local markets or to visit friends outside the village on their own was much more limited, with only around 50% reporting being able to do so.

The average male respondent (panel B, Table 3) was older, at 36 years old, and had just over 7.5 years of education. 86% of men contributed to household income in the week prior to the survey, a much higher percentage than for women. 73% were the household head.

The sample is well balanced between treatment and control communities, with a small imbalance detected (at the 10% level) on three variables only: whether the household is from an other backward caste, whether the household is muslim, and whether the male respondent had contributed to household income in the week prior to the survey.

3.2 Outcomes

Our analysis focuses on two core outcomes: whether a household took a sanitation loan over the course of the study, and whether or not it owned a toilet or had one under construction at endline.[8] We measure sanitation loan uptake from administrative data from the MFI, as they provide objective and complete information on study households' borrowing behaviour with the MFI over the course of the study (February 2015 to September 2017). Toilet uptake is measured through a detailed sanitation module collected at baseline and endline, including information on toilet ownership, the type, functionality and construction costs. If a household reported having a toilet, the interviewer asked to observe it. We use this interviewer-observed measure of toilet ownership as our measure of sanitation investment.

3.3 Measures of Cost and Benefit Perceptions

We collected novel data on perceptions of costs and benefits of sanitation from both a male and a female household member during the baseline survey. We collected information on three dimensions of costs and benefits: (i) monetary cost expectations for three standardized toilet models; and (ii) non-monetary costs (e.g. time burdens for cleaning toilets) and (iii) benefits (e.g. safety of female household members, improved household status) of one of two standardized toilet models.

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[8]In principle, the sanitation loan could have been used to repair or upgrade an existing toilet. In practice, Augsburg et al. (2022) find that loans were primarily used to fund new toilet construction, with only a small proportion of loans used for repairs or upgrades. Thus, we focus on toilet ownership as our main measure of sanitation investments.

Table 3: Descriptive statistics and treatment-control balance (individual surveys)

	All	Control group			SL-Control
	(1)	(2)	(3)	(4)	(5)
	N	N	Mean	SD	Difference
Panel A: Women's characteristics					
Age (years)	1,133	589	30.6	9.35	0.01
Education (years)	1,079	567	5.65	4.04	0.08
Years of marriage	1,105	576	12.9	9.76	-0.09
Is married to household head	1,134	589	0.68	0.47	0.02
Lives with her mother-in-law	1,134	589	0.39	0.49	-0.01
Member of loan group	1,134	589	0.22	0.41	-0.00
Contributed to HH income last week	1,132	588	0.34	0.47	-0.02
Bargaining power score	931	496	6.83	4.53	-0.03
Can go to local market alone	1,108	577	0.51	0.50	-0.02
Can visit neighbour alone	1,124	583	0.84	0.37	-0.03
Can visit friend outside village alone	1,117	580	0.50	0.50	0.01
Panel B: Men's characteristics					
Age (years)	1,074	553	35.9	10.1	-0.00
Education (years)	1,041	539	7.53	4.11	0.02
Is household head	1,074	553	0.73	0.44	0.01
Contributed to HH income last week	1,074	553	0.86	0.35	0.04*

Note: The treatment indicator (SL) =1 if a household is located within a GP that was selected to receive the sanitation loan product. Column 1 reports the total number of observations per variable. Columns 2-4 report the number of observations, mean and standard deviation specific to the control group for each variable. Column 5 displays the difference in mean values between the SL treatment group and the control group. Stars signify the level of statistical significance of this difference. Standard errors are clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

A challenge in collecting data on perceptions of costs and benefits of an investment is that respondents might have in mind different types of toilets with varying qualities. Thus, variation in reported perceptions would also include variation in (unobserved to the researcher) toilet quality, which would confound comparisons of these perceptions within the household and across the sample as a whole. To overcome this challenge, we asked respondents to indicate their perceptions of costs and benefits for images of the same toilets (Figure 1), varying in quality and cost.

The toilet types were described as follows:

- Toilet type 1 is the simplest toilet with an unlined dug pit and a basic (kutcha) structure.

- Toilet type 2 is a toilet with a lined single pit and a simple structure (with roof)

Figure 1: Toilet types
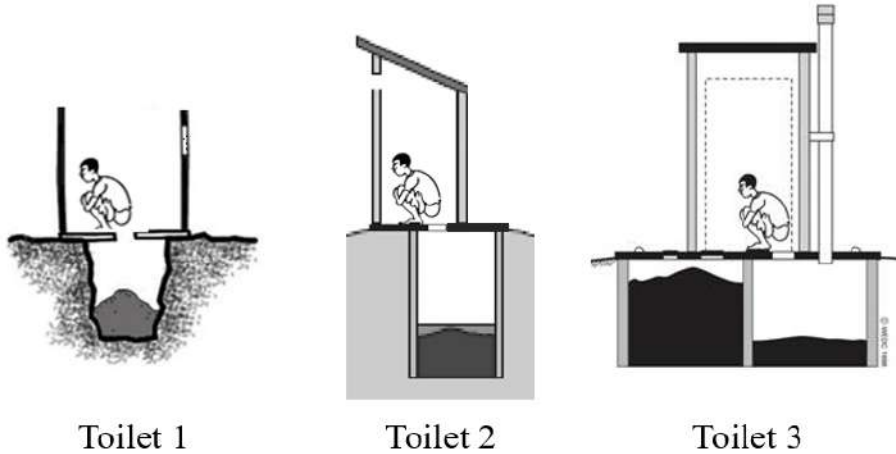
that protects from rain and provides privacy. This toilet is the one most similar in standard to that recommended (and built) by the GoI.

- Toilet type 3 is a dual-pit toilet with a septic tank and a strong (pucca) superstructure, fitted with a lock for privacy and a pipe for ventilation.

Monetary cost perceptions: We elicited respondents' costs expectations by asking respondents to provide their estimate of the minimum and maximum cost (in INR) for all three types of toilets. We calculate the expected cost as the mid-point between the minimum and maximum costs reported by the respondent. For toilet types 2 and 3, we are able to map expected costs to what we refer to as 'actual costs'. To construct these 'actual costs', we take construction costs reported by households with a specific toilet type and deflate them to 2010 INR terms. Next, we calculate (in line with Attanasio et al. (2013)) a median cost for that model at the GP level so as to average out any quality-related contributions to the reported cost. For GPs where there were insufficient numbers of households with these toilet models, we calculate the median at a more geographically aggregated level (usually, at the block (or sub-district) level).

Non-monetary cost and benefit perceptions: We elicited non-monetary cost and benefit perceptions by showing respondents the picture of one toilet type and asking them to (i) imagine a fictitious household in their village had constructed the toilet type and (ii) indicate the extent to which they agreed (on a five-point Likert scale) with a series of statements (reproduced in full in Appendix B) relating to costs and benefits identified in the academic and policy literature as being important in affecting adoption decisions. These capture perceptions of benefits such as improved health and resulting increases in labour supply, increased safety for women and children, improved statusand

overall improved happiness and well-being. On the non-monetary cost side, they collect perceptions such as stinky toilets being unhealthy and leading to worse health, reduced opportunities for social interactions and increase time investment to fetch water. To avoid survey fatigue, respondents were shown the picture of one toilet type only, which was randomised to be either type 1 or type 3. For the analysis, responses were recoded so that a higher value indicated more agreement with the statement. We then created two indices using polychoric principal component analysis (PCA), one for non-monetary costs and one for non-monetary benefits, with factor loadings as in Appendix C.[9] Responses from the male and female respondents were pooled when conducting the polychoric PCA to ensure that the same loadings are attached to each of the variables underlying the indices. This allows us to make comparisons across genders (and within household) and to interpret differences in the indices as differences in perceptions.

We focus our analysis on the perceptions pertaining to toilet type 3, the twin-pit toilet with a septic tank and a strong superstructure. The first reason for doing so is practical: our data on perceived benefits and non-monetary costs only cover toilet types 1 and 3. The second reason is that toilet type 1 is extremely uncommon in our study setting, whereas toilet type 3 is the one that households in our context, and in fact in India more broadly, most aspire to (Coffey and Spears, 2017). However, we use the perceptions elicited for the other two toilet types for validation purposes. These validation exercises (reported in Appendix D) show that respondents, both males and females, correctly perceive that the basic toilet (type 1) is cheaper than the intermediate model (type 2), which in turn is identified as being cheaper than the twin-pit septic tank model (Toilet 3). The medians and distributions are different across these toilet models. Moreover, respondents also perceive lower non-monetary benefits and higher non-monetary costs for toilet type 1 than for toilet type 3.[10]

3.3.1 Gender Differences

The data reveal some novel insights into gender differences in perceptions of costs and benefits of household toilets, and on intra-household gender differences in these perceptions. We describe these in turn.

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[9]As an alternative, one could redefine the statements for non-monetary costs in terms of non-monetary benefits and conduct a PCA on all statements in view of creating one single index representing net non-monetary benefits. As we discuss in more detail in Section 6.3, the approach leads to two components. The first is similar to a measure of net non-monetary benefits, while the second is less readily interpreted. Reassuringly, results obtained using the first component are in line with those obtained with separate indices for non-monetary benefits and costs. The single index also masks insights we gain from using separate indices for cost and benefit perceptions.

[10]In a robustness check, we estimate the main equations including interviewer fixed effects to control for differences arising from some interviewers being particularly effective in eliciting these perceptions. We obtain very similar findings, as shown in Appendix H.7

Benefit perceptions: Panel A of Figure 2 displays the distributions of perceived benefits scores for male and female respondents in our sample. A higher score indicates higher perceived benefits. The figure shows that most male and female respondents perceive high benefits associated with this toilet, though women perceive higher benefits than men. The two distributions are statistically significantly different from one another, as shown by the rejection of a Kolmogorov-Smirnov test of equality of distributions (test statistic 0.18, p-value = 0.00). On average, as also shown in Table 4, women perceive higher benefits from the toilet than do men, which is consistent with the literature.

Figure 2: Sanitation perceptions distributions
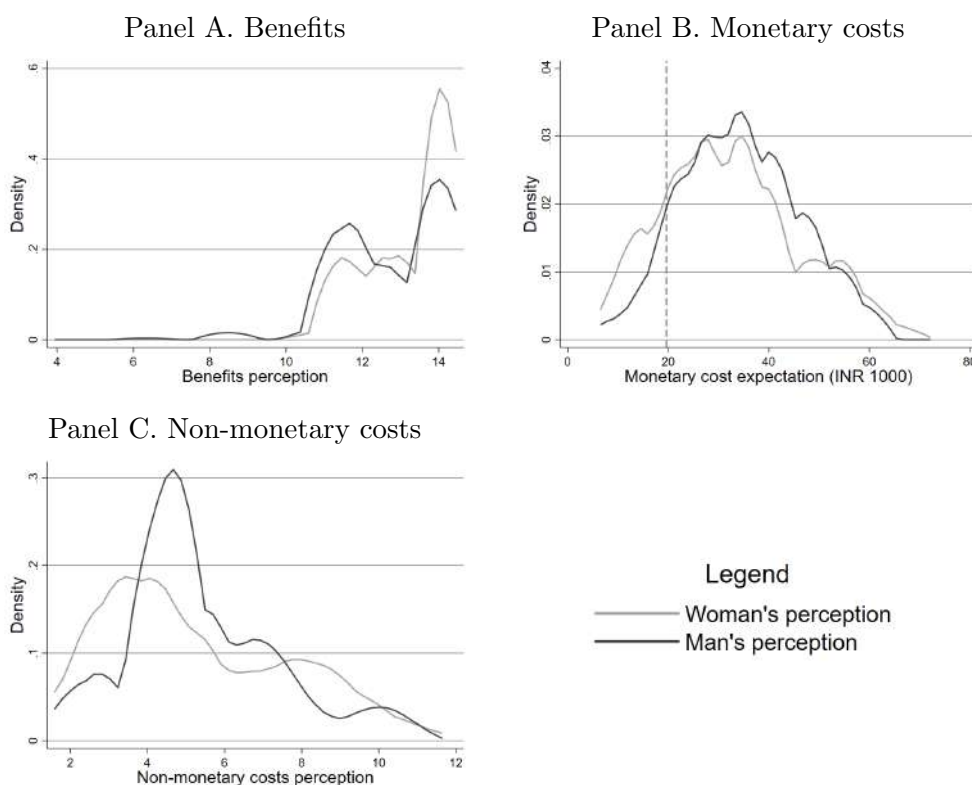
Note: Non-parametric distributions (estimated using an Epanechnikov kernel function) of the individual perception responses, corresponding to benefits (panel A), monetary costs (panel B) and non-monetary costs (panel C). Distributions are displayed separately for men and women. Results from the Kolmogorov-Smirnov test reject the null (that male and female distributions are equal) with p-value < 0.01 for all three panels. Distributions displayed in panel B are adjusted to remove the top and bottom 1% of responses to improve visibility. The dashed line indicates the mean 'true' cost (in INR 1000, index 100=2010) paid for this toilet type (3). Additional details about the variables are presented in Appendix D.

Monetary costs: Panel B of Figure 2 plots the distributions of the average expected monetary cost for toilet type 3 by gender. Overall, the figure indicates wide variation, with men generally reporting a higher cost than women, except at the right tail where more women report very high cost expectations. The two distributions are statistically different from one another, as evidenced by the rejection of the null hypothesis of equality of distributions by the Kolmogorov-Smirnov test (test statistic = 0.22; p-value = 0.00).

While the two distributions are different from one another, the average expected monetary costs reported by women and men are very similar at just over INR 33,000 (Table 4). This is significantly higher than the maximum sanitation loan provided by the MFI and the actual median costs paid by households with a similar toilet type in our sample (INR 20,000), indicated by the dashed vertical line in panel B of Figure 2. We measure accuracy of the cost perception as the absolute difference between the average cost expectation and the GP median costs of constructed toilets. On average, we find that average cost expectations are inaccurate by just over INR 13,000 (USD 195) for both male and female respondents.

The range between the maximum and minimum cost reported by each respondent provides a measure of the respondent's cost uncertainty: on average, respondents report a range close to INR 6,500, around 20% of the average expected cost. The range is very similar by gender with no statistically significant differences detected (Table 4).

Table 4: Sanitation perceptions and accuracy by gender

| | Mean and SD | | Difference | |
	(1) Women	(2) Men	(3) Women-Men	(4) N
Benefits perception	13.2 (1.27)	12.7 (1.38)	0.47***	545
Non-monetary costs perception	5.51 (2.40)	5.33 (1.92)	0.18	545
Monetary cost perception (INR 1000)	33.7 (23.5)	33.3 (12.2)	0.37	1,131
Accuracy of monetary cost perception (INR 1000)	13.8 (23.7)	13.4 (13.0)	0.39	1,131
Range of monetary cost perception (INR 1000)	6.49 (5.42)	6.63 (4.12)	-0.14	1,131

Note: Columns 1 and 2 show the mean and standard deviation (in parentheses) of male and female sanitation perceptions, cost accuracy and range. *Accuracy* is calculated as an individual's average expected monetary cost minus the GP median cost. Column 3 displays the difference as calculated by the woman's average response minus her spouse's; stars signify statistical significance of this difference. Sample size is reduced due to missing values which are imputed, as per Appendix E, in our main analysis. Standard errors are clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Non-monetary costs: The distributions of perceived non-monetary cost scores are shown in panel C of Figure 2. A higher value implies higher perceived non-monetary costs. The figure indicates stark differences in the distributions of perceived non-monetary costs by gender. In particular, the distribution for females is bimodal, with a large group of women perceiving low costs of having a twin-pit toilet, and a significant minority perceiving high costs. By contrast, the distribution for men is unimodal, with the modal response indicating low, though not zero, costs of owning this toilet type. Interestingly,

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while on average the perceived non-monetary costs for women and men are similar to one another (Table 4), the distributions themselves are statistically significantly different, as indicated by the Kolmogorov-Smirnov test statistic = 0.10 and p-value = 0.00.

3.3.2 Intra-Household Differences in Perceptions

Overall, the data indicate significant variation and some differences in perceived costs and benefits between men and women in our sample. However, as the theoretical model will show, it is *intra*-household differences in perceptions of costs and benefits that influence household decisions to take sanitation microcredit and make sanitation investments. Having observations of these perceptions from a male and a female member of the same household allows us to confirm this empirically.

We document significant variation in intra-household gender differences in these perceptions, displayed in Figure 3. Panel A focuses on benefit perceptions, showing that while in a significant proportion (38%) of households women have higher benefit perceptions than men, there are also large proportions of households where either the benefit perceptions of the male and female respondent are similar (32%), or the man has *higher* benefit perceptions than the woman (30%). This suggests significant variation in the extent to which household members internalize (higher) private returns of toilet ownership accruing to other household members.

By contrast, the distribution of intra-household monetary cost differences (panel B) is not skewed towards one gender: it is centred on 0 (suggesting similar cost expectations for both the male and female respondents), with similar proportions of households where either the man holds a higher cost perception than the woman or vice versa. Slightly more skewness (although not as much as for benefit perceptions) is seen for intra-household differences in perceived non-monetary costs (panel C), with somewhat larger proportions of households where women perceive higher non-monetary costs than men. This is in line with the fact that women face the bulk of the cost of day-to-day cleaning of the toilet.

Importantly, the distributions of intra-household differences show that the variation in perceptions of costs and benefits by gender documented in Figure 3 and Table 4 is a result of variation both *across* and *within* households. Thus, they show we cannot generalize that gender differences in perceptions within our sample as a whole will hold in a similar fashion within *all* households.

3.4 Measuring Bargaining Power

Our measure of bargaining power is based on a widely used series of questions on household decision making (Cassidy et al., 2021; Jayachandran et al., 2021). Specifically, we ask female respondents who in the household has the final say on: (i) whether or not to buy a large household item, such as a bicycle or TV or land; (ii) whether or not she (the

Figure 3: Intra-household perceptions differences

Panel A. Benefits

Panel B. Monetary costs

Panel C. Non-monetary costs
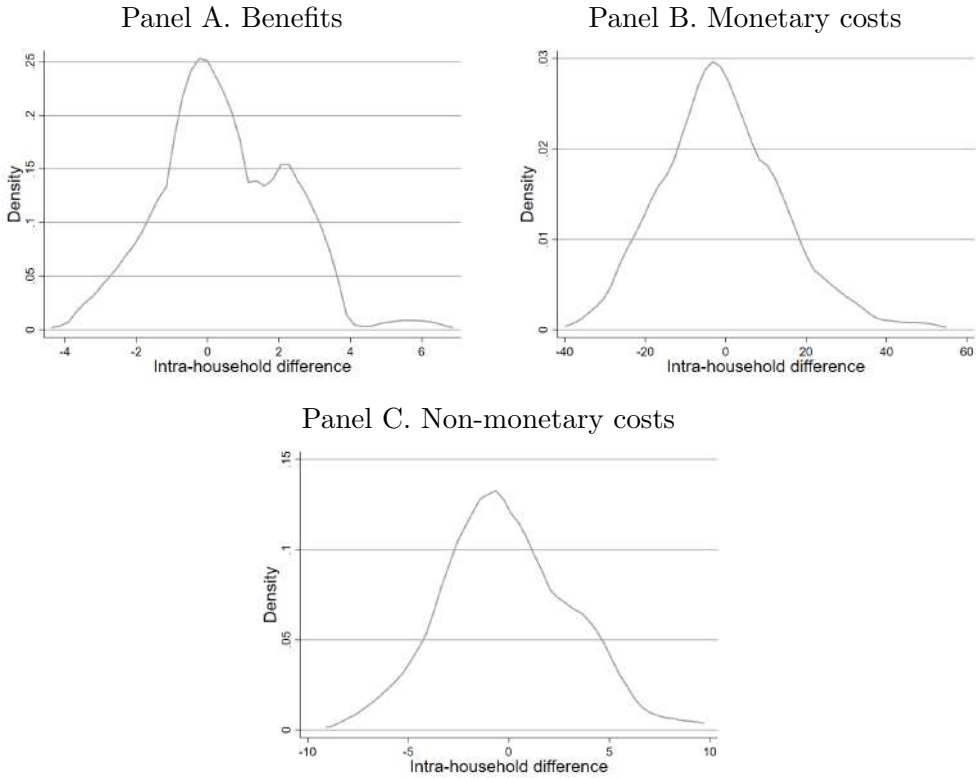
Note: Non-parametric distribution (estimated using an Epanechnikov kernel function) of the difference in intra-household perceptions for: benefits (panel A), monetary costs (panel B) and non-monetary costs (panel C). These differences are calculated as the wife's response minus her spouse's. Distributions displayed in panel B are adjusted to remove the top and bottom 1% of responses to improve visibility.

wife) should work to earn money; (iii) how money she (the wife) earns will be used; and (iv) what to do with extra money she (the wife) may receive, such as a prize or gift (see Appendix B for exact wording). By selecting the questions that focus on financial and expenditure decisions, we are able to create a bargaining power measure that is specialized and closely related to the outcomes of interest. This is motivated by recent studies (e.g. Peterman et al. (2021)) that show that women's autonomy within the household varies with the decision being made. Furthermore, we focus on decisions that men are known to make as the primary decision-maker, or are involved in making, and thus where women's involvement would likely capture their own decision-making power.

We generate a bargaining power score by first re-coding the responses to each of the decisions to range from 0 (woman reports not to be involved in any of the decisions) to 6 (woman takes all decisions by herself only).[11] Intermediate values capture decision-making by multiple household members (e.g. her spouse and/or in-laws), in-

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[11]The precise response options were: 1 I decide, 2 my husband, 3 me and my husband together, 4 my mother in-law, 5 my father in-law, 6 my mother, 7 my father, 8 any other family member, 9 other, 10 not applicable. Multiple answers were possible. When the response 'not applicable' was chosen, we set the score to 0. This happens, for example, when the woman does not earn money herself, and hence cannot make decisions about it. We account for this choice in our analysis.

cluding potentially the woman herself.[12] Thereafter, we combine these decisions into a bargaining power score using polychoric PCA of these base variables, with resulting factor loadings shown in Appendix Table C1.

Figure 4: Bargaining power distribution
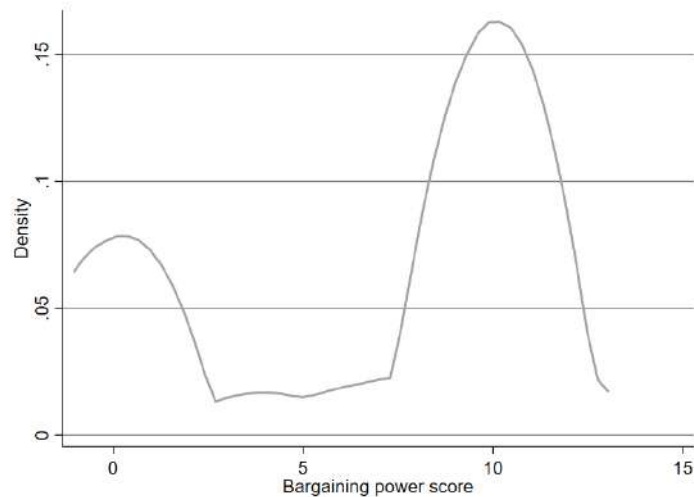
Note: Distribution is estimated non-parametrically using an Epanechnikov kernel function. A higher bargaining power score reflects both (i) a higher rate of involvement in decision making and (ii) fewer decision makers (conditional on involvement).

The resulting distribution is bimodal (Figure 4): a significant share of women have very little bargaining power and another – larger – share of women have relatively high bargaining power. There is also a non-negligible share of women with relatively moderate bargaining power. In our analysis, we therefore split the sample into three categories: those with a relatively high female bargaining power score (high bargaining power, or High BP), those with medium scores (mid bargaining power, or Mid BP) and those with low female bargaining power (low bargaining power, or Low BP).[13] Women from households in the High BP group report being involved in all decisions (Table 5), but usually alongside their partner or another household member (1.84 household members participate on average). They do not often make these decisions unilaterally. Women in the Mid BP group are involved in most (but not all) decisions, though always with other household members. By contrast, women in the Low BP group are not involved in making decisions on any of the four domains considered. Decisions are primarily taken by their husbands or other household members.[14]

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[12]We explore the robustness of the findings to an alternative way of coding these decisions which assigns a value of 1 if a woman has any involvement in a decision and 0 if not (see Section 6.3).

[13]A further motivation for having at least three bargaining power groups is that the theoretical framework presented in Section 4 predicts that the effects of the intervention will be non-monotonic in bargaining power.

[14]Furthermore, Appendix A1 describes how loan uptake decisions are made by bargaining power groups. It demonstrates that husbands are involved in the majority of loan decisions across all bargaining

We assess the validity and relevance of this proxy of bargaining power by first exploring its correlation with a range of female characteristics linked with agency in the literature (e.g. Calvi, 2020, Peterman et al., 2021). We find sensible correlations (Appendix Table F1). For example, bargaining power is positively correlated with whether a woman contributed to household income in the last six months, with whether she has her own bank account and with her reported ability to visit the market and neighbours alone. Conversely, bargaining power scores are negatively correlated with living with the woman's mother-in-law, having children under the age of 2 in the household and the number of male household members. Second, we show that conclusions from our main analysis are robust to using an alternative measure of bargaining power that includes children-related decisions (Appendix H.5).

Table 5: Bargaining power breakdown

	Proportion of involvement of:				No. of decision-makers	N
	Wife	Husband	Other males	Other members		
Low BP	0.01	0.77	0.27	0.16	1.21	290
Mid BP	0.73	0.88	0.14	0.17	1.92	218
High BP	1.00	0.84	0.00	0.01	1.84	511
Total	0.66	0.83	0.11	0.09	1.68	1,019

Note: Table shows proportion of involvement in the four household decisions used to calculate bargaining power and the average number of decision-makers by the wife's bargaining power group. Sample size is reduced due to missing values which are imputed, as per Appendix E, in our main analysis.

4 Theoretical Framework

In this section, we develop a theoretical framework to understand how intra-household differences in bargaining power and sanitation preferences affect borrowing and sanitation investment behavior, and derive testable predictions regarding the effects of the sanitation loan intervention. We model sanitation investments as an investment in a durable household public good. Households have the option of taking a loan to meet the cost of the sanitation investments. Household members have potentially heterogeneous preferences and different levels of bargaining power within the household. Following the Collective Household Model (Chiappori, 1988; Browning and Chiappori, 1998), we assume that household decision-making is Pareto efficient and use the household members' Pareto weights in the household welfare function to represent the bargaining power of individual members. In our initial set-up, we assume that all households have access to

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power groups. In the Low BP group (panel A) the husband primarily makes the decision alone whereas in the High BP group (panel C) the decision is mostly made jointly.

loans (whether from formal or informal sources). In Section 4.5, we investigate how access to loans on more attractive terms (accessible to households in the treatment arm in our study context) affect the uptake of sanitation loans and investment behaviour. Proofs of propositions are provided in Appendix G.

4.1 Model Set-Up

We consider a two-person household with members m (male) and f (female) that makes consumption decisions over two periods. In each period, household member $i \in \{m, f\}$ obtains utility $u(x_i) + I\theta_i$, where x_i is private consumption by i, $I \in \{0, 1\}$ indicates whether or not the household has made a sanitation investment, and $\theta_i > 0$ represents i's preference (perceived benefits net of perceived non-monetary costs) for the sanitation investment of household member i.[15] We define $\theta = \theta_m + \theta_f$ and call θ the household's 'overall preference for sanitation investment'. We assume that the function $u(.)$ takes CRRA form:

$$u(x) = \begin{cases} \frac{x^{1-\eta}}{1-\eta}, \; \eta \geq 0, \eta \neq 1 \\ \log x, \; \eta = 1 \end{cases} \tag{1}$$

Utility in the second period is discounted by $\beta \in (0, 1)$. The household can save in period 1 at gross interest rate $R_k > 1$. For simplicity, we assume that $\beta R_k = 1$ (which implies that, if possible, households will save to smooth consumption perfectly across time periods). In each period, the household has income y. In the population, y is distributed according to the c.d.f. $H(.)$. Bargaining power of household member i is represented by her/his Pareto weight λ_i. We assume $\lambda_f + \lambda_m = 1$ and define $\lambda = \lambda_f = 1 - \lambda_m$.

There are different states of the world represented by $S = \{1, 2, ..., n\}$. The probability of state s occurring is π_s. Each state $s \in S$ is associated with a cost of sanitation c_s. We represent the c.d.f. of the cost of sanitation by $F(c) = \sum_{s \in S} \pi_s \mathbf{1}(c_s \leq c)$ (where $\mathbf{1}(.)$ is the indicator function). We introduce these different states to capture uncertainty about the monetary cost of sanitation investment at the time that the loan is taken.

A loan of size L is available in period 1. It requires repayment in period 2 at the gross interest rate $R_l > R_k$. We assume that the household does not own a toilet at the beginning of period 1 and that households cannot afford to make a sanitation investment without a loan.[16]

The timeline of events and household decisions is depicted in Table 6. In Step 1, the household decides whether or not to take a loan and agrees to a state-contingent plan for consumption, investment and savings. These decisions are made before the actual cost of

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[15]Although our data are based on statements about both benefits and (non-monetary) costs of sanitation, as described in Section 3.3, we do not make a conceptual distinction between them in the theoretical model.

[16]Thus, we do not consider households that have sufficient income to build a toilet without a loan. While it is likely that such households exist within the study population, we abstract away from them as their behaviour would not be affected by access to the sanitation loan.

sanitation is known to the couple. The actual cost is revealed (i.e. the state s is realised) in Step 2. Consumption and investment decisions take place in Step 3 which is divided into period 1 and period 2. The loan, if any, is received in period 1. Then the household makes its consumption, savings and investment decisions. In period 2, the household consumes again and, if it has borrowed, repays the loan. Note that we assume that the household can commit to a state-contingent agreement when deciding whether to borrow. Thus, the household's decisions are ex-ante efficient, but a loan may be inefficient ex-post if they choose not to invest in sanitation.[17]

Table 6: Timeline in the theoretical model

Step 1	Step 2	Step 3: period 1	Step 3: period 2
Borrowing decision Household agreement	c_s revealed	Loan received . Investment decision Consumption/Savings	Consumption Loan repayment

4.2   Sanitation Investment

We analyse the household's decision-making using backward induction. In this subsection, we analyze the household's sanitation investment decision assuming that a loan has been taken. Using the optimal investment decision, in Section 4.3 we characterize the conditions under which the household would choose to borrow.

Once a loan has been taken, the household solves the following optimization problem:

$$
\max_{\{\mu_{1s}, \mu_{2s}, k_s, I_s\}} \lambda_m \sum_{s \in S} \pi_s \left\{ u \left(\mu_{1ms} \left(y + L - k_s - I_s c_s \right) \right) + \beta u \left(\mu_{2ms} \left(y + R_k k_s - R_l L \right) \right) + I_s \left(1 + \beta \right) \theta_m \right\}
$$
$$
+ \lambda_f \sum_{s \in S} \pi_s \left\{ u \left(\mu_{1fs} \left(y + L - k_s - I_s c_s \right) \right) + \beta u \left(\mu_{2fs} \left(y + R_k k_s - R_l L \right) \right) + I_s \left(1 + \beta \right) \theta_f \right\}
$$
$$
\tag{2}
$$

where k_s is savings in period 1 following the realisation of state s, and $\mu_{tfs} = 1 - \mu_{tms} = \mu_{ts}$ for $t = 1, 2$. Note that although the investment choice is made after the cost of sanitation is known, the household solves the optimization problem ex-ante to allow risk-sharing between the household members. From the first-order conditions of the optimization

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[17]An alternative approach would be to assume that there is limited commitment within the household regarding future state-contingent decisions (Ligon, 2002, Mazzocco, 2007). Limited commitment could reduce risk-sharing within the household but would not fundamentally change our analysis. We assume full commitment instead to simplify the exposition.

problem in (2), we obtain

$$\frac{u'\left(\mu_{1s}\left(y+L-k_s-I_sc_s\right)\right)}{u'\left((1-\mu_{1s})\left(y+L-k_s-I_sc_s\right)\right)} = \frac{u'\left(\mu_{2s}\left(y+R_kk_s-R_lL\right)\right)}{u'\left((1-\mu_{2s})\left(y+R_kk_s-R_lL\right)\right)} = \frac{\lambda_m}{\lambda_f} \quad (3)$$

According to (3), the ratio of marginal utilities of the household members will be the same across different states and both time periods as in a perfect risk-sharing arrangement (Townsend, 1994). Because of our assumption of CRRA utility, from (3) we obtain budget shares that are solely determined by the Pareto weights, and are independent of the sanitation investment decision, the cost of sanitation and the time period:

$$\mu_{tf} = 1 - \mu_{tm} = \mu = \left\{ 1 + \left(\frac{\lambda_m}{\lambda_f}\right)^{1/\eta} \right\}^{-1} \quad \text{for } t = 1,2 \quad (4)$$

Equation (4) implies, as we would expect, that the budget share of the female (male) household member increases monotonically in her (his) relative bargaining power. Given that $\beta R_k = 1$, the household will save to smooth consumption perfectly across the two periods by setting[18]

$$k_s = \frac{L\left(1+R_l\right) - I_sc_s}{1+R_k} \quad (5)$$

Given k_s, disposable income in any period and state depends only on whether sanitation investment occurs and the cost of the investment and, therefore, can be written as $y_d\left(I_sc_s\right) = y + L - k_s - I_sc_s$. Substituting for k_s in this last expression and rearranging, we obtain

$$y_d\left(I_sc_s\right) = y + \frac{\{L\left(R_k-R_l\right) - I_sc_sR_k\}}{1+R_k} \quad (6)$$

Then, given the sharing rule μ and disposable income $y_d\left(I_sc_s\right)$, we can write the condition under which sanitation investment occurs in some state s as follows:

$$\sum_{i\in\{m,f\}} \lambda_i \{u\left(\mu_i y_d\left(c_s\right)\right) + \theta_i\} \geq \sum_{i\in\{m,f\}} \lambda_i \{u\left(\mu_i y_d\left(0\right)\right)\} \quad (7)$$

where, for ease of notation, we let $\mu_f = 1 - \mu_m = \mu$. Using (7), it is straightforward to establish the following results.

Proposition 1 *Given a household with income y and sanitation preferences $\{\theta_m, \theta_f\}$ and a loan contract $\{L, R_l\}$, there exists a threshold cost $\underline{c}\left(y, \theta_m, \theta_f, \lambda\right)$ such that it makes the sanitation investment in state s if and only if $c_s \leq \underline{c}$.*

---

[18]For simplicity, we assume that the savings decision always has an interior solution. This requires that the interest rate on loans is sufficiently large in all states:

$$R_l > \max_{s\in S}\left\{\frac{c_s}{L}-1\right\}$$

Proposition 2 *Conditional on taking a loan, there is a household income level $\underline{y}_s (\theta_f, \theta_m, \lambda)$ for each state s and cost realisation c_s, such that a household invests in sanitation if and only if $y \geq \underline{y}_s (\theta_f, \theta_m, \lambda)$.*

Next, we can consider how the probability of sanitation investment is affected by the relative preferences (θ_f and θ_m) and bargaining power (λ) of the household members.

Proposition 3 *Holding fixed a household's overall preference for sanitation ($\theta = \theta_f + \theta_m$), conditional on loan uptake, a stronger preference for sanitation investment by one spouse weakly increases (decreases) the proportion of households that undertake sanitation investment in each state s if that spouse has greater (weaker) bargaining power than the other.*

We can summarise the result in Proposition 3 as follows. Ceteris paribus, households in which bargaining power and preference for sanitation are more 'aligned' – i.e. the spouse with more bargaining power also has the stronger preference for sanitation investment – have a higher probability of investing in sanitation. The intuition for this household behaviour is simple: if the spouse with more say in household decision-making cares less about sanitation, it is unlikely that the household will make the investment, and vice versa.

4.3 Loan Uptake

Next, we consider the household's decision whether or not to take a loan. If it decides not to borrow then, by assumption, it cannot invest in sanitation. Therefore, the household solves the following optimization problem:

$$\max_{\{\mu_{1s}, \mu_{2s}, k_s\}} \sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s \{u (\mu_{1is} (y - k_s)) + \beta u (\mu_{2is} (y + R_k k_s))\} \qquad (8)$$

Because of the assumption $\beta R_k = 1$, we can show that the household will not save in the first period, i.e. $k_s = 0$. As in the previous case, the household will divide disposable income between the spouses to ensure that the ratio of their marginal utilities is the inverse of the ratio of their Pareto weights. The sharing rule is independent of disposable income and identical to the case in which a loan is taken, μ, as defined in (4). Using the solutions to the optimization problems in (2) and (8), we can write the condition under which the household takes up the loan as follows:

$$\sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s \{u (\mu_i y_d (I_s c_s)) + I_s \theta_i\} \geq \sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s u (\mu_i y) \qquad (9)$$

Using (9), we can establish the equivalent of Proposition 2 for borrowing behaviour:

Proposition 4 *There is a household income level $\underline{y}(\theta_f, \theta_m, \lambda)$ such that a household takes a loan if and only if $y \geq \underline{y}(\theta_f, \theta_m, \lambda)$.*

Next, we investigate how shifts in bargaining power and preferences for sanitation investment affect the loan uptake decision. Changes in θ_f and θ_m do not affect the expression on the right-hand side of (9), while the effect on the left-hand side is simply the aggregate of the effects we deduced in the previous subsection. So, we obtain results akin to Proposition 3 for the loan uptake decision:

Proposition 5 *Holding fixed a household's overall preference for sanitation ($\theta = \theta_f + \theta_m$), a stronger preference for sanitation investment by one spouse weakly increases (decreases) the probability of loan uptake by the household if that spouse has greater (weaker) bargaining power than the other.*

Figure 5: Expected surplus from borrowing
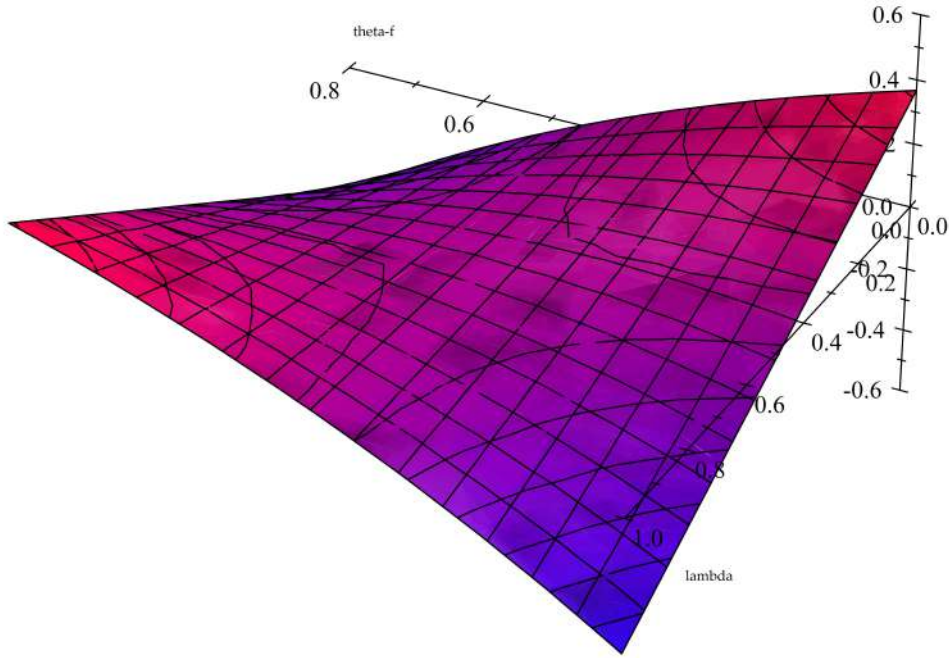
In Figure 5, we illustrate the result described in Proposition 5. The vertical axis in the figure represents the expected surplus generated by loan uptake for households with the same overall sanitation preferences (θ) and income level (y), but different compositions of bargaining power and relative preferences. The two horizontal axes represent different values of λ and θ_f (and $\theta_m = \theta - \theta_f$). It is evident from the figure that the expected surplus from borrowing is highest if the household member with higher net perceived

benefits from sanitation investments also has higher bargaining power and lowest when one spouse has strong net perceived benefits but bargaining power is concentrated in the other spouse. The household would borrow if and only if the surplus is positive. As households vary in terms of their income level – which in turn affects the expected surplus from borrowing – we obtain the probabilistic result described in Proposition 5.

4.4 Heterogeneous Beliefs

So far, we have assumed that the two spouses have identical ex-ante beliefs about the cost of sanitation investment, described by the c.d.f. $F(c)$. However, we observe in the data that the husband and the wife typically have different beliefs about the cost of constructing a toilet (see Figure 3 and the related discussion in Section 3.3.2). Therefore, in this subsection, we allow individual cost perceptions to differ from each other.

We represent the cumulative distribution function of the cost of sanitation for spouse i by

$$F_i(c) = \sum_{s \in S} \pi_s^i \mathbf{1}(c_s \leq c) \tag{10}$$

We denote by $\mathbf{E}_i u(x)$ the expected utility of consumption based on beliefs represented by $F_i(c)$. We define c_i^e implicitly using the following equation:

$$\mathbf{E}_i u(\mu_i y_d(I_s c_s)) = u(\mu_i y_d(c_i^e)) \tag{11}$$

In words, c_i^e is the certainty equivalent of spouse i's perceived cost. Greater uncertainty – more precisely, a mean preserving spread of the distribution $F_i(.)$ – will translate into a higher certainty equivalent cost c_i^e. The latter will serve as a sufficient statistic for our subsequent analysis. Thus, we can rewrite the condition in (9) as follows:

$$\sum_{i \in \{m,f\}} \lambda_i \{u(\mu_i y_d(c_i^e)) + \theta_i\} \geq \sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s u(\mu_i y) \tag{12}$$

Let $\bar{c} = \frac{1}{2}(c_f^e + c_m^e)$, i.e. $\bar{c}$ is the average of the certainty equivalent perceived sanitation costs of the two spouses. We consider how increased heterogeneity in beliefs about sanitation costs, holding $\bar{c}$ constant, affects the loan uptake decision:

Proposition 6 *Without loss of generality, suppose spouse m has greater bargaining power, i.e. $\lambda_m > \lambda_f$. Let $\bar{c}$ be the average of the couple's certainty equivalent perceived cost of sanitation investment (i.e. $\bar{c} = \frac{1}{2}(c_f^e + c_m^e)$). Then, holding fixed $\bar{c}$, an increase in the certainty equivalent cost of sanitation by spouse f*

(i) increases the probability of loan uptake if η is sufficiently close to zero (i.e. close to risk neutrality);

(ii) lowers the probability of loan uptake if $c_m^e < c_f^e$ and η is sufficiently large (i.e. high relative risk aversion).

Proposition 6 implies that, unlike the case of benefit perceptions, how perceptions about the cost of sanitation investments interact with bargaining power within the household to affect loan uptake is ambiguous. The reason is that a household member with more bargaining power has more say in the household's borrowing and investment decisions, but also higher consumption – and, therefore, experiences less marginal utility from lower perceived cost of sanitation investment. If η is small, the first effect dominates the second and so the probability of loan uptake is higher when the household member with greater bargaining power has a lower cost perception. If η is large, the second effect can dominate such that the probability of loan uptake is lower when the household member with greater bargaining power (and consumption) has a lower cost perception.

4.5 Loan Access at a Lower Interest Rate

Next we consider how lowering the interest rate would interact with bargaining power and preferences within the household to affect loan uptake and sanitation investment.

From the definition of $y_d(.)$ in (6) and the expression for the surplus generated by the loan in (26) in Appendix G, it is evident that lowering the interest rate R_l increases the surplus from the loan. Consequently, when a loan becomes available at a lower interest rate, it pushes down the threshold income level at which a household is indifferent between taking and not taking a loan. We denote by R_c the interest rate at which loans are available (whether from informal or formal sources) in the control group and by R_t the rate at which loans become available in the treatment group. Then, the increase in loan uptake due to the availability of sanitation loans is given by

$$H\left(\underline{y}\left(\theta_f, \theta_m, \lambda; R_c\right)\right) - H\left(\underline{y}\left(\theta_f, \theta_m, \lambda; R_t\right)\right) \tag{13}$$

If the threshold income level is already low, then it will be relatively unresponsive to the availability of low-interest loans as forgoing consumption for the purpose of investment causes more disutility at lower income levels (given that the utility function is concave). Thus, the expression in (13) will be small. According to Proposition 5, households in which bargaining power and sanitation preferences are more 'aligned' (i.e. the spouse with more bargaining power has stronger preference for sanitation) have a lower income threshold for taking the loan. Thus the income threshold will fall by less compared with households in which bargaining power and sanitation preferences are less 'aligned'. Therefore, we have the following prediction:[19]

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[19]Note that, in making this prediction, we implicitly assume that the density of households at the relevant income thresholds are similar. If the proportion of households at the lower income threshold is substantially higher, then we would obtain the opposite prediction.

Prediction 1 *Holding fixed average net perceived benefits of sanitation investments, households in which bargaining power and sanitation preferences are less 'aligned' – i.e. the spouse with weaker bargaining power has the stronger net perceived benefit of sanitation investment – will be more responsive in terms of loan uptake to the availability of sanitation loans.*

In a similar way, we can reason how a decline in the interest rate affects sanitation investments. By assumption, the cost of sanitation investment is state-contingent. If the cost of sanitation c_s in some state s is very small, then the income threshold for sanitation investments is smaller than that for loan uptake, i.e. $\underline{y}_s(\theta_f, \theta_m, \lambda) < \underline{y}(\theta_f, \theta_m, \lambda)$. Then all households that borrow will invest in state s. Therefore, the increase in sanitation investment due to the availability of sanitation loans will be given by (13), with the implication that households in which bargaining power and sanitation preferences are less 'aligned' will be more responsive. On the other hand, if c_s is large, then the income threshold for sanitation investments will be larger than that for loan uptake and only a fraction of households that borrow will invest in state s. Then the increase in sanitation investment due to the availability of sanitation loans will be given by

$$H\left(\underline{y}_s(\theta_f, \theta_m, \lambda; R_c)\right) - H\left(\underline{y}_s(\theta_f, \theta_m, \lambda; R_t)\right) \tag{14}$$

According to Proposition 3, households in which bargaining power and sanitation preferences are more 'aligned' have a lower income threshold for sanitation investment. But if the sanitation cost c_s is high, this income threshold is likely to be in the higher tail of the income distribution, i.e. the investment is beyond the reach of most households. Then, we can make the following prediction:

Prediction 2 *Holding fixed average net perceived benefits within the household, if the realised cost of sanitation is high, then households that are more or less 'aligned' in terms of bargaining power and sanitation preferences will be equally unresponsive to the availability of sanitation loans in their sanitation investment decisions.*

Next, we consider how lowering the interest rate would interact with cost perceptions to affect loan uptake and sanitation investments. According to Proposition 6, if relative risk aversion of the household members is sufficiently small, then the income threshold (for taking the loan and investing in sanitation) will be lower for more 'aligned' households. As per the reasoning above, if most of these households are willing to borrow even when the interest rate is high (i.e. the income threshold is in the lower tail of the income distribution), then the less 'aligned' households will be more responsive – in terms of loan uptake and sanitation investment – to a fall in the interest rate. However, it is worth noting that this prediction depends on the relative risk aversion. In other words,

there is some ambiguity regarding whether households that are more or less 'aligned' (in terms of cost perceptions) are more responsive in taking up the sanitation loan.

We can make a clearer prediction about how the conversion rate – of loans into sanitation investment – varies across different types of households under different cost scenarios. Sanitation investment ultimately depends on the actual cost of sanitation. If the realised cost is low, then the conversion rate will be high across all types of households. If the realised cost is high, then the conversion rate will be low among households that had a higher ex-ante probability of a low cost as they had taken the loan based on the belief that investing in sanitation would be cheap. On the other hand, the conversion rate will be higher among households that had a higher ex-ante probability of a high cost, as they had taken the loan (with the intention to invest) in spite of the belief that investing in sanitation would be costly. Based on this reasoning, we have the following prediction:

Prediction 3 *Holding fixed average cost perceptions in the household, if the realised cost of sanitation is high, the conversion rate of sanitation loans into investments will be higher in households where the spouse with greater bargaining power has a higher ex-ante perceived cost of sanitation.*

5   Empirical Approach

We estimate three specifications to test the predictions of the model. First, we analyse how intra-household differences in benefit and cost perceptions affect the demand for the sanitation loan, and its conversion to new toilets. To this end, we estimate the following equation:

$$Y_{iv} = \alpha_0 + \alpha_1 SL_v * W_{iv}^{lower} + \alpha_2 SL_v * W_{iv}^{similar} + \alpha_3 SL_v * W_{iv}^{higher}$$
$$+ \alpha_4 W_{iv}^{similar} + \alpha_5 W_{iv}^{higher} + \nu P_i + \lambda X_{iv} + \omega_v + \epsilon_{iv}$$
(15)

where Y_{iv} is the outcome – either sanitation loan take-up or toilet ownership at endline – for household i in GP v. SL_v takes the value 1 if the household lives in GP v that was randomly assigned to the SL (sanitation loan) treatment group, and 0 otherwise. W_{iv}^{lower}, $W_{iv}^{similar}$ and W_{iv}^{higher} are binary variables that indicate, respectively, whether in household i the wife had a lower, similar or higher cost or benefit perception than the husband at baseline. Perceptions are defined to be similar if they are within a range of 0.3SD around 0.[20] In line with the theoretical model, we control for the average cost or benefit perception of the husband and wife (P_i) across households. This allows us to isolate the effect of intra-household differences in perceptions from cross-household variation in 'levels' of perceptions. We also include a vector of baseline household-level

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[20]In doing so, we allow for small differences that may be non-zero due to measurement error. We consider the robustness of our findings to alternative ranges in Section 6.3.

controls, X_{iv}, and randomization strata fixed effects, ω_v. The coefficients of interest are α_1, α_2 and α_3 which identify the treatment effects within each of the sub-groups relative to the same sub-groups in control GPs. Standard errors are clustered at the GP level.

Second, to gain a first understanding of the role of female bargaining power in influencing intervention impacts on sanitation loan take-up and toilet take-up, we use the following equation:

$$
\begin{aligned}
Y_{iv} = \beta_0 + &\beta_1 SL_v * Low_{iv} + \beta_2 SL_v * Mid_{iv} + \beta_3 SL_v * High_{iv} \\
&+ \beta_4 Mid_{iv} + \beta_5 High_{iv} + \lambda X_{iv} + \omega_v + \epsilon_{iv}
\end{aligned}
\tag{16}
$$

where Low_{iv}, Mid_{iv} and $High_{iv}$ indicate whether the wife in household i in GP v has relatively low, mid or high decision-making power. The remaining variables are as defined before.[21]

Finally, we assess the influence of the interaction between perceptions and bargaining power – which is predicted by the model to matter – by estimating the following equation:

$$
\begin{aligned}
Y_{iv} = \gamma_0 &+ \gamma_1 SL_v * Low_{iv} * W_{iv}^{lower} + \gamma_2 SL_v * Low_{iv} * W_{iv}^{sim/high} \\
&+ \gamma_3 SL_v * Mid_{iv} * W_{iv}^{lower} + \gamma_4 SL_v * Mid_{iv} * W_{iv}^{sim/high} \\
&+ \gamma_5 SL_v * High_{iv} * W_{iv}^{lower} + \gamma_6 SL_v * High_{iv} * W_{iv}^{sim/high} \\
&+ \mathbf{K}\rho + \nu P_i + \mu X_{iv} + \omega_v + \varepsilon_{iv}
\end{aligned}
\tag{17}
$$

where SL_v, P_i, X_{iv} and ω_v, Low_{iv}, Mid_{iv}, $High_{iv}$ and W_{iv}^{lower} are as outlined above and $\mathbf{K}$ is a vector of additional interaction terms such that

$$
\mathbf{K} = \begin{bmatrix}
Low_{iv} * W_{iv}^{sim/high} \\
Mid_{iv} * W_{iv}^{lower} \\
Mid_{iv} * W_{iv}^{sim/high} \\
High_{iv} * W_{iv}^{lower} \\
High_{iv} * W_{iv}^{sim/high}
\end{bmatrix}
$$

To improve readability of tables, we combine the similar and higher levels of intra-household differences in perceptions and expectations whereby $W_{iv}^{sim/high}$ indicates a household that belongs to the level where the wife has a similar perception to her husband or a higher one. In Appendix I, we show the results with the three different levels of intra-household differences in perceptions, finding consistent results.

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[21]Our analysis controls for baseline household consumption in order to account for a potentially confounding correlation between bargaining power and wealth in this context. The results are robust to the exclusion of this control variable.

6   Results

Our first set of results, presented in Section 6.1, sheds light on the role played by intra-household differences in benefit and cost perceptions in sanitation loan uptake and investment decisions. Section 6.2 turns to the role of female bargaining power.

6.1   The Role of Perceptions in Borrowing and Investment Decisions

Table 7 reports differential intervention impacts of the sanitation microcredit program on sanitation loan take-up and investment decisions by intra-household differences in sanitation cost and benefit perceptions, following equation (15).[22] Columns 1-3 focus on sanitation loan uptake and columns 4-6 on toilet ownership. The first three rows show our key parameters of interest, α_1, α_2 and α_3, estimated based on equation (15). The bottom panel of the table reports p-values for tests of equality of pairs of the coefficients α_1, α_2 and α_3.

We find that, conditional on average household benefit perceptions, households where the wife had a similar or higher benefit perception of the toilet compared with the husband at baseline are around 20 percentage points more likely to take a sanitation loan than households where the woman has lower benefit perception than the man (column 1). These differences are statistically significant at the 1% level. On the other hand, intra-household differences in cost perceptions – whether non-monetary or monetary (columns 2 and 3) – have no differential impacts of the intervention on loan uptake.

Given that women generally have weaker bargaining power than the spouse or household head in our study context, households in which women have similar or higher benefit perception compared with the husband are 'less aligned' – in terms of bargaining power and sanitation preferences – than those in which women have a lower benefit perception. Based on the theoretical model, we predicted that access to sanitation loans would have a bigger effect on loan uptake for households that are less aligned (Prediction 1), which is consistent with the estimates for benefit perceptions (column 1). In the case of cost perceptions (columns 2 and 3), the point estimates have a roughly similar pattern but the differences are not statistically significant. In the case of monetary cost perceptions, the model is ambiguous about the effect of intra-household differences on loan uptake (discussed in Section 4.5), which may explain the absence of clear heterogeneous effects across more and less aligned households.

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[22]Though the theoretical model does not distinguish between non-monetary costs and benefits, we consider these as distinct factors in the empirical analysis. This is because, as we discuss in Section 6.3, constructing a net non-monetary benefits index by conducting PCA on the benefits statements and costs statements (recoded to be in terms of benefits) yielded two indices that were not readily interpreted.

For ownership of toilets, we find that intra-household differences in benefit perceptions have no differential impacts on toilet construction (column 4). While the estimated coefficient on toilet ownership is statistically significantly different from zero when the wife has higher benefit perceptions than the husband, and the coefficient is larger than when benefit perceptions are the same or lower, the differences are not statistically significant. A similar pattern holds for non-monetary cost perceptions (column 5). Given that intra-household differences in benefit perceptions do affect loan uptake, at least some of the sample households took these loans for sanitation investments but the estimated effects of toilet ownership suggest that, for some reason, they were unable to execute their plans.[23]

This pattern can be rationalised within our theoretical model. Recall that the borrowing decision is based on beliefs regarding the cost of building a toilet, while the investment decision is made when the actual cost becomes known. If the actual cost of sanitation investment turned out to be very high then sanitation investment will be low across all types of households, as stated in Prediction 2. In our context, there were significant delays (unexpected at the time of loan take-up) in many study GPs in receiving a post-construction government subsidy for building toilets that households would have known about when taking a loan (Augsburg et al., 2022), thus increasing the effective cost of building a toilet. This may have caused households that had taken a loan with the intention of building a toilet to abandon their plans subsequently.

By contrast, the degree to which the husband and wife differ in terms of their monetary cost (i.e. price) perceptions has a significant impact on the conversion of the loan to a new toilet. The coefficients reported in column 6 indicate that increases in toilet ownership are concentrated among households where the wife has a lower price expectation than the husband. Moreover, this coefficient is statistically significantly different (at the 1% level) from the coefficient for the sub-group where the wife has a higher price expectation than the husband.

This finding is consistent with our theoretical prediction that if the actual cost of sanitation turns out to be high, then (holding fixed the household's average ex-ante perception of monetary cost perceptions) the conversion rate of loans to toilets will be highest among households in which the spouse with greater bargaining power (i.e. the husband) had a higher perceived monetary cost (Prediction 3). The intuition for this

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[23]Augsburg et al. (2022) provide three explanations why households may not have been able to convert the sanitation loan to sanitation investments. First, a lack of other funding sources (e.g. savings) to supplement the loan (which did not cover the full cost of toilet models households wanted) undermined some households' abilities to see through the sanitation investment. Second, in many study GPs, there were significant delays in obtaining a post-construction subsidy available through the Swachh Bharat Mission scheme, which was implemented around the same time. Households planning to use the subsidy funds to repay the loan may have abandoned their sanitation investment plans when the delays – which were not predictable when loans were taken – became apparent. Finally, since the loan was only labeled for sanitation and carried a lower interest rate than other loans offered by the MFI, it is likely that some households who were not sufficiently sensitive to loan labels took the loan for a non-sanitation purpose.

behaviour is that these households had opted to borrow in spite of the husband's more pessimistic beliefs about the actual cost of building a toilet. Thus, they would be more willing to go ahead with the sanitation investment in spite of the delay, discussed above, in a government subsidy for building toilets.

Moreover, as we saw in Section 3, on average, both wives and husbands *over-*estimated the costs of the toilet. Thus, women with lower cost perception than their spouse's might also have more accurate perceptions (in that these are closer to actual costs), which could make it easier to convince her spouse to make the investment. Table 8 displays how intervention impacts vary with the relative accuracy of both spouses' cost perceptions. We measure accuracy as the absolute difference between each spouse's cost expectation and the median GP costs, and designate that wife (husband) as having relatively more accurate cost perception if the difference for her (his) estimate is closer to 0. While the relative accuracy of the wife's cost perception does not differentially affect sanitation loan uptake, the intervention increases toilet take-up only among households where the wife's cost perception is relatively more accurate than her husband's, which is in line with this intuition.

The heterogeneous effects on toilet ownership by accuracy of monetary cost perceptions are also consistent with the third prediction from the model: that if the spouse with more bargaining power has higher perceived cost, then improved loan access has a larger effect on households with a larger differential in perceived costs.

Thus, the overarching conclusion from these estimates is that intra-household differences in both benefit and cost perceptions matter for borrowing and investment decisions, but at different stages of the process. Differences in benefit perceptions have an important and statistically significant influence on sanitation loan uptake decisions, while differences in monetary cost perceptions are influential in households' ability to see through the conversion of the loan to a sanitation investment.

Table 7: Effect of sanitation loan availability by differences in intra-household perceptions

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Wife's perception lower x SL	0.06 (0.04)	0.22*** (0.06)	0.21*** (0.05)	0.07 (0.07)	0.06 (0.08)	0.16*** (0.05)
Wife's perception similar x SL	0.23*** (0.05)	0.19*** (0.06)	0.14*** (0.05)	0.04 (0.07)	0.09 (0.10)	0.07 (0.07)
Wife's perception higher x SL	0.27*** (0.06)	0.18*** (0.05)	0.15*** (0.03)	0.13* (0.08)	0.11* (0.06)	-0.01 (0.05)
HH average perception x SL	-0.03 (0.03)	-0.01 (0.02)	-0.07* (0.03)	-0.00 (0.04)	-0.03 (0.04)	0.02 (0.03)
HH average perception	0.00 (0.01)	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.03)	0.01 (0.03)	0.01 (0.01)
Wife's perception similar	-0.04 (0.03)	0.01 (0.04)	0.03 (0.02)	-0.03 (0.07)	0.00 (0.08)	0.04 (0.06)
Wife's perception higher	-0.03 (0.03)	0.00 (0.03)	0.03* (0.02)	-0.06 (0.07)	-0.06 (0.06)	0.08* (0.04)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.04	0.02	0.01	0.40	0.45	0.39
Control DV mean (similar)	0.00	0.04	0.03	0.37	0.41	0.44
Control DV mean (higher)	0.02	0.01	0.02	0.44	0.34	0.48
No. of HHs	556	556	1,134	556	556	1,134
p-value: lower=similar	0.01	0.63	0.19	0.76	0.76	0.21
p-value: lower=higher	0.00	0.61	0.24	0.49	0.56	0.01
p-value: similar=higher	0.56	0.96	0.77	0.38	0.84	0.30

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table 8: Effect of sanitation loan availability by differences in intra-household accuracy

	(1) Loan uptake	(2) Toilet ownership
Wife more accurate x SL	0.19***	0.17***
	(0.05)	(0.05)
Wife and husband similarly (in)accurate x SL	0.17***	0.04
	(0.05)	(0.05)
Wife less accurate x SL	0.17***	0.02
	(0.04)	(0.06)
Household average accuracy x SL	-0.07**	0.01
	(0.03)	(0.03)
Household average accuracy	0.01	0.01
	(0.01)	(0.01)
Wife and husband similarly (in)accurate	0.02	0.05
	(0.02)	(0.05)
Wife less accurate	0.03*	0.09**
	(0.02)	(0.04)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (more)	0.02	0.39
Control DV mean (similar)	0.02	0.43
Control DV mean (less)	0.01	0.48
No. of HHs	1,134	1,134
p-value: more=similar	0.84	0.07
p-value: more=less	0.68	0.03
p-value: similar=less	0.85	0.80

Note: Accuracy (of monetary costs) is calculated as an individual's average expected monetary cost minus the GP median cost. Intra-household accuracy differences are grouped into households where the wife is more, similarly and less accurate compared with her husband. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by accuracy group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

6.2 The Role of Bargaining Power in Borrowing and Investment Decisions

We next turn to analyze the role of female bargaining power in these borrowing and investment decisions. Table 9 shows that female bargaining power does not, in itself, differentially affect intervention impacts on sanitation loan uptake or sanitation investments. Across both outcomes – loan uptake (column 1) and toilet ownership (column 2) – we find no evidence of a statistically significant difference between the treatment effect coefficients by level of female bargaining power: households where women have low

bargaining power are just as likely to take a sanitation loan (and convert it into a toilet) as those where women have higher bargaining power.[24]

Table 9: Effect of sanitation loan availability by wife's bargaining power

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.14***	0.07
	(0.03)	(0.06)
Mid BP x SL	0.21***	0.12**
	(0.06)	(0.06)
High BP x SL	0.19***	0.06
	(0.04)	(0.05)
Mid BP	-0.05**	-0.08
	(0.02)	(0.05)
High BP	-0.03	-0.05
	(0.02)	(0.05)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.43
Control DV mean (Mid BP)	0.04	0.41
Control DV mean (High BP)	0.01	0.44
No. of HHs	1,134	1,134
p-value: LowBP=MidBP	0.16	0.49
p-value: LowBP=HighBP	0.18	0.99
p-value: MidBP=HighBP	0.75	0.44

Note: A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

However, the model predicts that bargaining power and intra-household differences will both matter, and thus interact, in influencing loan uptake and investment decisions. In particular, following the reasoning behind Prediction 1, households in which the woman has a stronger net perceived benefit of sanitation investment will be more responsive in terms of loan uptake, and this effect will be larger in households in which she has less

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[24]Providing female clients with access to sanitation labelled microcredit could potentially influence sanitation investments through altering female bargaining power. We believe this is unlikely to be an important driver of our findings since we study households with women who had already been clients of the partner MFI for, on average, 34 months at baseline, and who had access to microcredit. As we show in Appendix Table A1, at baseline, they had higher bargaining power than women from households in the study communities without a client of the partner MFI. Existing studies provide mixed evidence on the impacts of microcredit access on women's empowerment: Angelucci et al. (2015) find small effects in Mexico while other studies, such as Banerjee et al. (2015) find no effects in India. Thus, it is unlikely that providing access to an additional loan product will further increase women's bargaining power.

bargaining power. We analyze this through the triple-interaction specification. Results are shown in Table 10. To ease readability of the table, we pool together households where the wife had similar or higher perceptions compared with the husband and contrast these to the case where the wife had lower perceptions.

We can see that loan uptake differs significantly by benefit perceptions in the Mid BP and High BP groups of households (column 1). When the woman has lower benefit perceptions than the man and is in the Mid BP sub-group, the intervention does not result in any loan take-up on average. By contrast, having similar or higher benefit perceptions results in a loan uptake of 32 percentage points in the Mid BP sub-group. The difference is statistically significant at the 1% level. A similar pattern is seen for the High BP group (significant at the 7% level).

Lower perceptions of non-monetary costs of the toilet also spur higher loan uptake among the households in the Mid BP group (loan uptake of 41% compared with 17%, significant at the 5% level), but not among the other bargaining power groups. Differences in monetary cost perceptions do not affect loan uptake differentially across all bargaining power groups.

For toilet ownership, we find that differential impacts of monetary cost perceptions are concentrated primarily in the Mid BP group, with a large impact on toilet ownership for households where the woman has a lower cost expectation than the man. A similar pattern also holds for non-monetary cost expectations in this Mid BP group, though this difference is significant at the 14% level only. By contrast, bargaining power does not differentially impact the intervention effects on toilet ownership by perceptions of benefits.

Interestingly, the differential impacts of intra-household differences in perceptions of monetary cost on toilet uptake in the Mid BP group are driven by households where the wife's cost perception is more accurate than her husband's (Table 11).

Overall, these results show that the intra-household differences in perceptions influence borrowing and investment decisions only in the Mid BP and High BP group of households. Within these households, women are highly likely to be involved in decision-making (73% and 100% of decisions considered, as shown in Section 3). Thus, our findings show that intra-household differences in perceptions influence choices only when the woman has some agency.

Table 10: Effect sanitation loan availability by differences in intra-household perceptions and wife's bargaining power

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.08 (0.07)	0.13* (0.07)	0.21*** (0.05)	-0.03 (0.13)	-0.04 (0.13)	0.12 (0.10)
Low BP x Wife's perception higher x SL	0.21*** (0.06)	0.20*** (0.06)	0.10** (0.04)	-0.01 (0.10)	0.04 (0.09)	0.03 (0.07)
Mid BP x Wife's perception lower x SL	-0.00 (0.09)	0.41*** (0.12)	0.24*** (0.08)	0.06 (0.14)	0.29* (0.15)	0.29*** (0.08)
Mid BP x Wife's perception higher x SL	0.32*** (0.08)	0.17** (0.07)	0.16*** (0.05)	0.13 (0.10)	0.04 (0.10)	-0.06 (0.07)
High BP x Wife's perception lower x SL	0.08 (0.07)	0.19*** (0.07)	0.20*** (0.05)	0.13 (0.12)	0.04 (0.10)	0.10 (0.06)
High BP x Wife's perception higher x SL	0.24*** (0.05)	0.20*** (0.07)	0.18*** (0.05)	0.12 (0.08)	0.19** (0.08)	0.04 (0.06)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.04	0.05	0.00	0.50	0.54	0.39
Control DV mean (LowBP*higher)	0.02	0.00	0.02	0.43	0.37	0.46
Control DV mean (MidBP*lower)	0.10	0.00	0.04	0.38	0.35	0.28
Control DV mean (MidBP*higher)	0.02	0.06	0.03	0.39	0.41	0.56
Control DV mean (HighBP*lower)	0.02	0.00	0.01	0.36	0.43	0.45
Control DV mean (HighBP*higher)	0.00	0.01	0.01	0.41	0.35	0.42
No. of HHs	556	556	1,134	556	556	1,134
LowBP*lower=LowBP*higher	0.14	0.43	0.10	0.91	0.62	0.42
MidBP*lower=MidBP*higher	0.00	0.04	0.42	0.67	0.14	0.00
HighBP*lower=HighBP*higher	0.07	0.96	0.81	0.96	0.18	0.46
joint equality (lower)	0.71	0.11	0.88	0.69	0.22	0.14
joint equality (higher)	0.48	0.94	0.22	0.51	0.30	0.53

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception compared with her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table 11: Effect of sanitation loan availability by intra-household monetary cost accuracy differences and wife's bargaining power

	(1) Loan uptake	(2) Toilet ownership
Low BP x Wife more accurate x SL	0.16**	0.16
	(0.06)	(0.11)
Low BP x Wife less accurate x SL	0.13***	0.03
	(0.05)	(0.07)
Mid BP x Wife more accurate x SL	0.24***	0.30***
	(0.09)	(0.09)
Mid BP x Wife less accurate x SL	0.17***	-0.03
	(0.05)	(0.07)
High BP x Wife more accurate x SL	0.16***	0.08
	(0.04)	(0.07)
High BP x Wife less accurate x SL	0.21***	0.06
	(0.05)	(0.06)
Strata FE	Yes	Yes
Covariates	Yes	Yes
Control DV mean (LowBP*more)	0.00	0.38
Control DV mean (LowBP*less)	0.02	0.46
Control DV mean (MidBP*more)	0.05	0.29
Control DV mean (MidBP*less)	0.01	0.54
Control DV mean (HighBP*more)	0.01	0.47
Control DV mean (HighBP*less)	0.01	0.42
No. of HHs	1,134	1,134
LowBP*more=LowBP*less	0.71	0.28
MidBP*more=MidBP*less	0.37	0.00
HighBP*more=HighBP*less	0.38	0.80
joint equality (more)	0.52	0.12
joint equality (less)	0.37	0.62

Note: Accuracy (of monetary costs) is calculated as an individual's average expected monetary cost minus the GP median cost. Intra-household accuracy differences are grouped into households where the wife is more or similar/less accurate compared with her husband. A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by accuracy and wife's bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

The result that differences in perceptions matter for loan uptake and sanitation investments primarily in the Mid BP group is, in part, at odds with the theoretical prediction that 'less aligned' households will be more responsive in terms of loan uptake to the availability of sanitation loans (Prediction 1). But the empirical estimates can be reconciled with the model if Low BP women have no say at all in sanitation investment decisions. This is plausible as, empirically, the category includes only women who are not

involved in making decisions in any of the four domains considered. As such, households in which the woman has the stronger preference for sanitation investments may choose not to borrow when a sanitation loan becomes available because she has no say in these matters, while households in which the husband has the stronger preference are likely to have invested in sanitation even before the loan became available. Thus, the Low BP group would be relatively unresponsive to the availability of sanitation loans and differences in perceptions would matter less for this group than for the Mid BP group. The empirical finding that differences in perceptions matter more for the Mid BP group than for the High BP group is in line with Prediction 1.

6.3   Robustness Checks

We conduct several checks to assess the robustness of our findings. We describe these in turn.

First, we assess robustness to different sample definitions. We restrict the sample to households where the respondents of the individual surveys were couples, and re-estimate specifications (15), (16) and (17) respectively. The results, presented in Appendix H.1, are very similar. We then consider whether findings change when we restrict the sample to nuclear households only, representing 52% of the sample. We obtain qualitatively very similar findings (see Appendix H.2), though they are less precise given the smaller sample size.

Second, rather than creating separate indices capturing non-monetary costs and benefits, we create an index of net non-monetary benefits by redefining the statements related to non-monetary costs in terms of non-monetary benefits (e.g. *agreement* with the statement that having the pictured toilet will lead to one's family getting sick more easily was recoded as *disagreement* that the toilet will not lead to one's family getting sick more easily). We then estimated the polychoric PCA on the combined 13 statements. This generates two indices (shown in Appendix H.3). The first index or component aligns with a measure of net non-monetary benefits, while the second is less readily interpreted. Reassuringly, analysis with the first index yields findings which are in line with those reported in Sections 6.1 and 6.2. These are reported in Appendix H.3.

Third, we assess the robustness of our results to alternative definitions of bargaining power. We find that the results are qualitatively similar when we use an alternative method of coding women's involvement in decisions. In particular, we create dummy variables taking a value of 1 if the woman is involved in any way in making the decision, and use these dummy variables to create the bargaining power score. The results with this alternative scoring method are in Appendix H.4. We also consider a bargaining power measure that includes decisions related to children in the score calculation (Appendix H.5), and find qualitatively similar results.

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Fourth, we relax the definition of the 'similar perceptions' category. Our main analysis considers spouses to have a similar perception if their perception scores are within 0.3SD of each other (within 0.15SD for monetary costs). We find that results remain qualitatively similar when we expand this range to 0.5SD (see Appendix H.6).

Fifth, we include interviewer fixed effects in the main estimation to assess whether results are driven by differences in measured perceptions arising from some interviewers being especially effective in eliciting these. We find that the results, reported in Appendix H.7, are robust to their inclusion.

Finally, we assess robustness of the findings to other confounding factors that may also influence the response of households with varying bargaining power and intra-household differences in perceptions to the intervention. This is because our measures of intra-household bargaining power and intra-household differences in perceptions do not contain any experimentally generated variation. The estimates presented thus far controlled for baseline household consumption, to capture confounds due to differing household resources. As a robustness check, we also verify the sensitivity of the estimates to the inclusion of control variables (including interactions with the treatment dummy) to capture confounding factors such as (i) household characteristics: religion, caste, average yearly consumption, dwelling ownership status, composition (number of members, number of women, presence of children under 2/5), (ii) household head information: age, gender and education level, and (iii) individual responses: social norms regarding open defecation (e.g. whether the husband/wife agrees that it is acceptable to defecate in the open). Results, shown in Appendix H.8. Reassuringly, we obtain similar estimates for the differential impacts by intra-household bargaining power, and differences in intra-household perceptions.

7 Conclusion

This paper exploits novel data on perceptions of costs and benefits of a standardized toilet, collected from both men and women (typically spouses) from the same household within a randomised controlled trial of a sanitation loan intervention to (i) document the extent to which perceptions of costs and benefits vary by gender and within household and (ii) assess how intra-household differences in perceptions, and bargaining power affect take-up of the sanitation loan and sanitation investments, and hence success of the sanitation loan program.

The analysis yields a number of novel insights. We document that while women, on average, perceive higher benefits of the standardized toilet, there is significant variation in intra-household differences in benefit perceptions. In a significant share of households (30%), men perceive a higher benefit of the toilet – which is a model desired by households in this context – than women. We also document similar variation in intra-household

perceptions of monetary and non-monetary costs. Interestingly, we find that over 70% of women and men over-estimate the monetary cost of the toilet, and that this over-estimation is large in magnitude.

We incorporate differences in net perceived benefits into an intra-household decision-making model in order to theoretically analyze the roles of the differences in perceptions and intra-household bargaining power, and of the new sanitation loan in investment decisions. Comparative statics from the model show that the introduction of the sanitation loan will increase investments most among households where the partner with the lower bargaining power has higher relative net perceived benefit. The more favorable sanitation loan increases the bargaining surplus, allowing the partner with the higher net perceived benefit to compensate the other partner to make the investment. By contrast, households where the partner with higher bargaining power also has a higher net perceived benefit would have made the sanitation investment without requiring this compensation.

We exploit the random allocation of the intervention to Gram Panchayats to test the resulting theoretical predictions. We find that these intra-household differences in perceptions influence the take-up of sanitation loans and sanitation investments, but at different steps of the investment process. Intra-household differences in perceptions of benefits influence the take-up of sanitation loans, with households where the woman perceives a lower benefit to sanitation than the man being almost four times less likely to take the loan. However, when it comes to sanitation investments, it is the intra-household differences in perceptions of costs, and in particular monetary costs, which influence whether a loan is successfully converted to a new toilet. Households where the woman had a lower monetary cost perception were more likely to invest in a toilet relative to those where she had a similar or higher perception compared with her husband. Since most men and women over-estimated the cost of the toilet, a lower cost perception implied a more accurate cost perception, thereby facilitating investments.

Moreover, we show that intra-household differences in perceptions only influence borrowing and investment behaviour in households where the woman has some involvement – even if with other household members – in making financial and investment decisions. In households where she is not involved in decision-making, the intra-household differences in perceptions do not influence intervention impacts on loan uptake or sanitation investments. Thus, it is only when the woman is likely to be involved in the decision that her perceptions and expectations can enter discussions, and potentially also influence those of her spouse or other household members.

Our findings provide novel insights into households' decision-making processes in making lumpy, complex and costly investments in low-income settings. Targeting sanitation microcredit to women can be effective in spurring sanitation investments, especially in households where women have relatively moderate bargaining power and higher net perceived benefits than their spouses. However, women in households with existing mi-

crocredit clients (our study sample) may be more empowered than those in households without microcredit clients. Offering sanitation microcredit to households where women are less empowered, and not included in decision-making, may not be effective in generating sanitation investments, as indicated by our results.

Nonetheless, the findings also suggest that effective policies should seek to engage specifically with men, while also seeking to encourage the involvement of women in decision-making processes. They also highlight the importance of disseminating information not just on benefits of an investment, but also on costs. Information campaigns undertaken by the first phase of India's Swacch Bharat Mission policy mainly highlighted the benefits of toilets. However, our results suggest that there are significant misperceptions about monetary costs, and that these have an especially important influence in ensuring that financial resources earmarked for sanitation investments result in these.

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Appendix

A   Additional descriptives

A.1   Clients and non-clients

Table A1: Client - nonclient bargaining power difference

	All	Clients			Nonclients-Clients
	N	N	Mean	SD	Difference
Bargaining power score (financial)	1,846	931	6.81	4.54	-0.71***
Bargaining power score (all)	1,362	670	10.5	5.93	-0.77**

Note: Average bargaining power difference between clients and non-clients. Standard errors are clustered at the GP level. Sample size is reduced due to missing responses which are imputed in our main analysis as per Appendix E. Stars signify the level of statistical significance of the difference between clients and non-clients. $*p < 0.10, **p < 0.05, ***p < 0.01$.

A.2   Loan uptake decisions

Figure A1: Loan uptake decisions
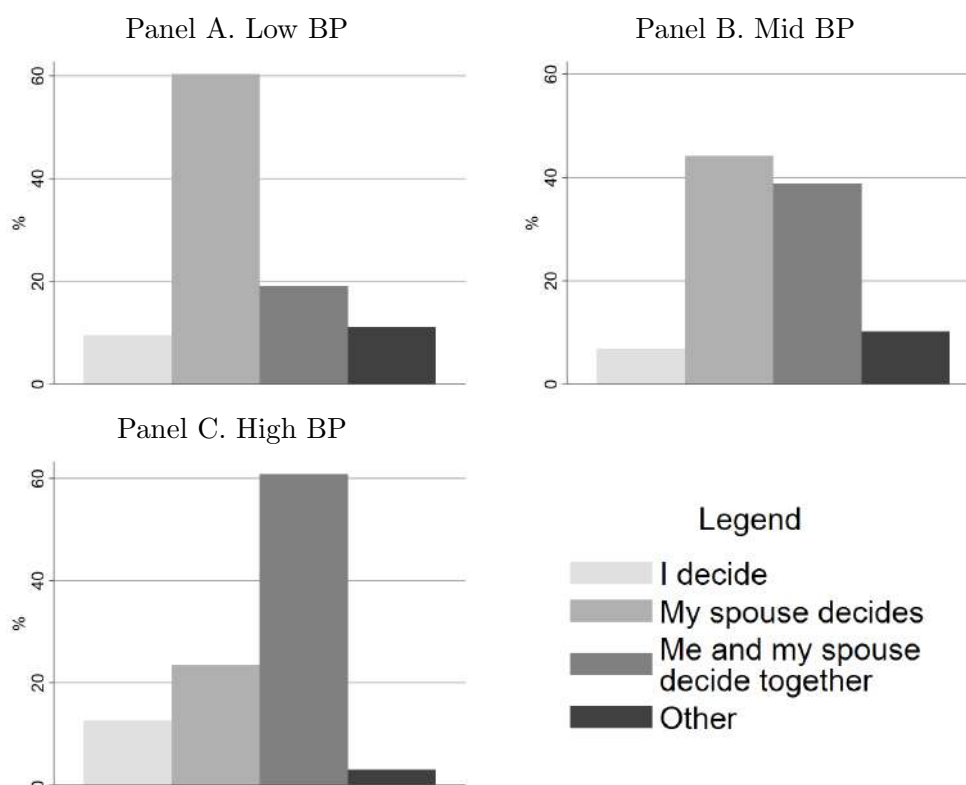
Note: Distribution of responses to the survey question: "Who in your household would take the decision of whether or not to take a loan from the savings and lending group?". For each of the three bargaining power groups Low BP (Panel A), Mid BP (Panel B), and High BP (Panel C).

B Relevant survey questions

Table B1: Household decision making

Who in your family usually has the final say on the following decisions:
Multiple answers possible.

1. Whether or not you should work to earn money

2. Whether or not to buy a large household item, such as a bicycle or TV or land

3. Whether or not to buy an item such as a cooking stove or refrigerator

4. How the money you earn will be used

5. What to do with extra money you may receive (e.g. a gift, price)

6. About schooling or children aged under 18

7. Whether to take a child to the doctor when he/she is sick

8. What to feed the child and whether to give them special snacks

9. Whether and how to discipline a child

10. Whether to have another child

a. I decide

b. My husband

c. Me and my husband

d. My mother-in-law

e. My father-in-law

f. My mother

g. My father

h. Any other family member

Table B2: Cost and duration expectations
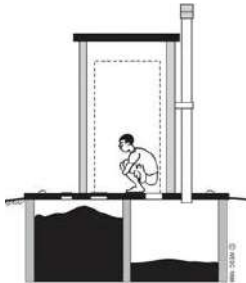
How much do you think it would cost you to build a toilet as shown in the next three pictures? And, how long do you think your household would be able to use this toilet without any hassle (e.g. having to repair it or having the pit(s) fill up?)

Toilet description	Picture	Expected monetary cost
A simple toilet, with simple hole dug out to be a pit (no lining) and a simple structure that ensures that one can't be seen by others when using it. This structure could be made of plastic sheets, palm leaves, other locally available materials.		• Minimum cost (Rs): • Maximum cost (Rs):
A toilet with a lined single pit and structure that ensures privacy and protects from the elements (such as rain).		• Minimum cost (Rs): • Maximum cost (Rs):
A toilet with a septic tank, a pucca super-structure (i.e. walls, roof, door) that ensures privacy, can be locked and has a vent-pipe for aeration.		• Minimum cost (Rs): • Maximum cost (Rs):

Table B3: Benefit and cost perceptions

Imagine a family in your community that had no toilet previously, constructed recently a toilet, similar to the one shown in this picture (respondent shown toilet 1 or 3). Do you think the following statements hold for this family?	

Perceived benefits		
	1. Because of the toilet, the family will be happier.	O Strongly agree
	2. Because of the toilet, the family will be healthier.	O Agree
	3. The household members of the family will be able to work more because of this toilet.	O No opinion
	4. The family will be less embarrassed when family and friends come around to visit them.	O Disagree
	5. The family will be less embarrassed when guests from the outside visit them.	O Strongly disagree
	6. This toilet will increase the family's status in the society.	
	7. Women in the family will now be safer with this toilet.	
	8. The family will save time because they now have this toilet.	
Perceived costs		
	9. Toilets are unhealthy because they stink.	O Strongly agree
	10. Family members will get less exercise due to the toilet.	O Agree
	11. Family members will miss out on spending time with others because of this toilet.	O No opinion
	12. Family members might get sick more easily when using this toilet.	O Disagree
	13. The family will have to spend more time fetching water because of the toilet.	O Strongly disagree

C PCA factor loading tables

Table C1: Bargaining power

	Bargaining power score
Whether you should work for money	.500
Whether to buy a large household item	.498
How the money you earn will be used	.512
What to do with extra money you may receive	.490

Table C2: Benefits perceptions

	Benefits perception score
Because of the toilet my family will...	
Be happier	.361
Be healthier	.366
Be able to do more work	.359
Be less embarrassed when family visit	.368
Be less embarrassed when guests visit	.365
Gain a higher status	.322
Be safer	.348
Save time	.336

Table C3: Non-monetary cost perceptions

	Non-monetary costs perception score
Toilets are unhealthy because they stink	.438
Because of the toilet my family will...	
Get less exercise	.493
Miss out on spending time with others	.503
Might get sick more easily	.468
Have to spend more time fetching water	.305

D   Validation graphs

The following graphs are used to validate that individual perceptions are in-line with the expected hierarchy by toilet type. Recall from section 3.3 that the different toilet types can be categorised into:

- Toilet 1: a basic unlined pit latrine without a sturdy superstructure

- Toilet 2: a standard lined pit latrine with basic superstructure (including roof)

- Toilet 3: a more sophisticated toilet with twin-pit septic tanks and a sturdy (pucca) superstructure with roof and lock

Figure D1 displays the distribution of average perceived monetary cost for each of the three toilet types. As expected, the Figure shows that both male and female individuals correctly perceive toilet 1 to be cheaper than toilet 2 and toilet 2 to be cheaper than toilet 3. Figure D2 repeats this exercise for benefit perception scores and reports that both genders perceive higher benefits from toilet 3 compared to toilet 1, this difference is particularly clear for female perceptions. Finally, Figure D3 displays the distributions in non-monetary cost by toilet type. While, for women, the perceived non-monetary cost of toilet 1 is higher than for toilet 3, this difference is not so clear for the male sample.

Figure D1: Monetary cost perception data validation

Kolmogorov-Smirnov test: we reject the null hypothesis (equality of distributions) for all, p-value < 0.01
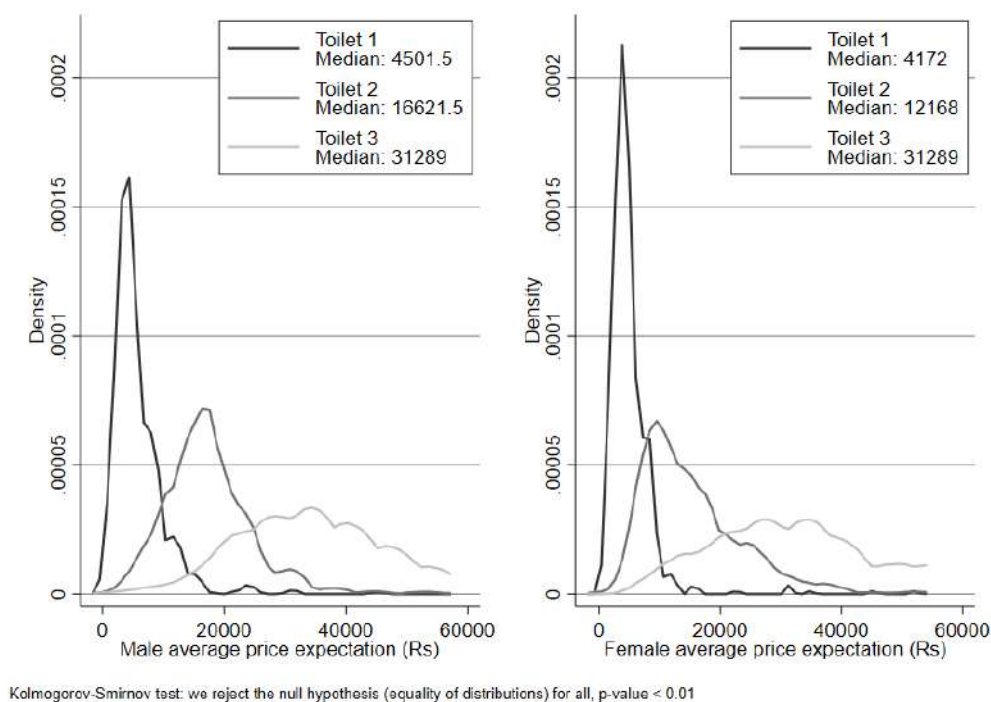
Figure D2: Benefit perception score validation
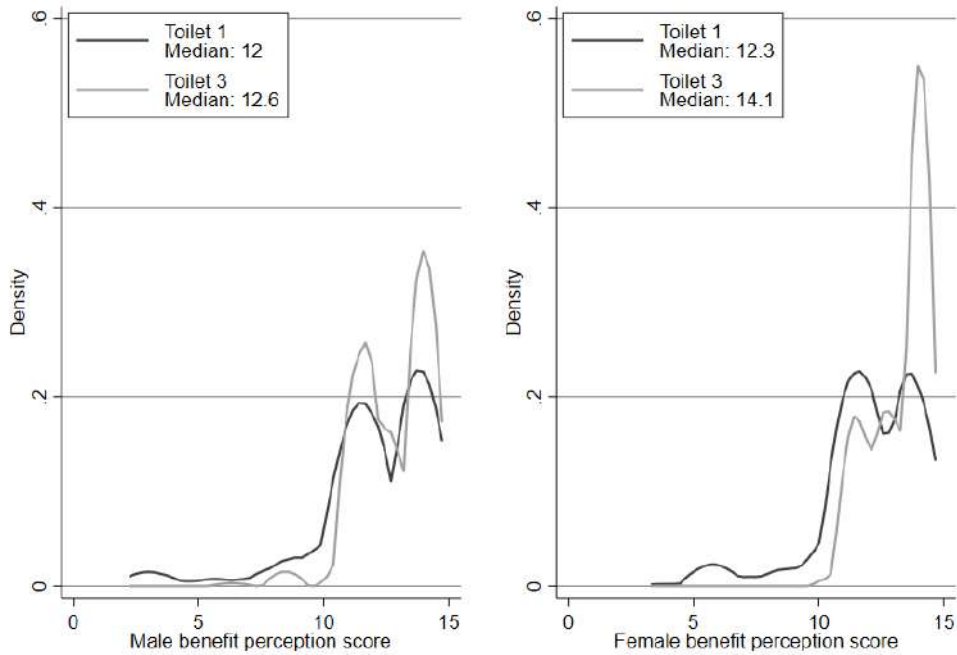
Kolmogorov-Smirnov test: we reject the null hypothesis (equality of distributions) for all, p-value < 0.01

Figure D3: Non-monetary cost perception score validation
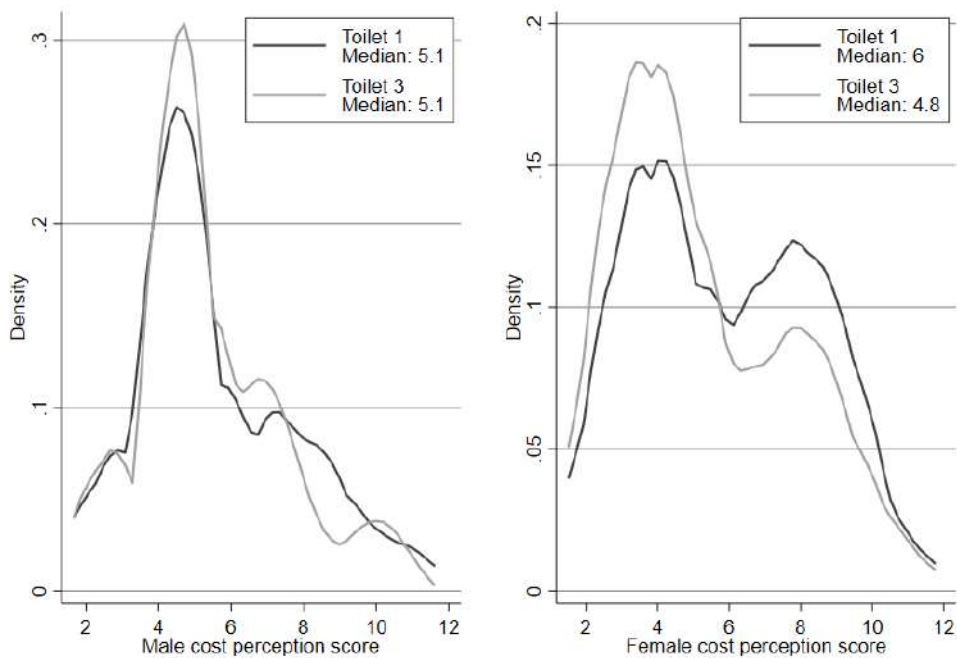
Kolmogorov-Smirnov test: we reject the null hypothesis (equality of distributions) for all, p-value < 0.01

E   Imputations

Imputation is used when missing values occur in our individual perceptions and bargaining power score generation. For the imputation of benefit and cost perceptions, we replace missing values with the sample mean. To control for imputation we include a dummy indicator variable in the relevant analysis.

Missing decision making responses are replaced with zero if the response is "Not applicable". The following table provides details on the number of imputed observations for each key variable.

Key variable	Achieved	Imputed
Husband's benefit perception	519	556
Wife's benefit perception	545	556
Husband's non-monetary cost perception	519	556
Wife's non-monetary cost perception	545	556
Husband's monetary cost perception	1,074	1,135
Wife's monetary cost perception	1,132	1,135
Wife's bargaining power	932	1,135

F   Determinants of bargaining power

Table F1: Determinants of bargaining power

	(1) Unimputed BP	(2) Imputed BP
Age (f)	0.10	0.11
	(0.11)	(0.10)
Years of education (f)	0.10	0.07
	(0.11)	(0.10)
Woman has bank account	0.88**	0.72**
	(0.36)	(0.31)
Contributed to HH income in last 6 months (f)	0.49*	0.61**
	(0.30)	(0.28)
Woman is member of loan group	0.39	0.32
	(0.34)	(0.28)
Can go to local market alone	1.80***	1.71***
	(0.56)	(0.46)
Can visit neighbour alone	1.76**	1.39**
	(0.69)	(0.58)
Can visit friend outside village alone	-0.12	-0.16
	(0.46)	(0.38)
Age (m)	0.08	0.09
	(0.12)	(0.10)
Years of education (m)	-0.01	0.03
	(0.11)	(0.10)
No. of male HH members	-0.34***	-0.28***
	(0.11)	(0.09)
No. of female HH members	-0.06	-0.10
	(0.10)	(0.08)
Live with husband's mother	-0.63*	-0.66**
	(0.36)	(0.32)
Child(ren) less than 2 at BL	-1.21***	-0.89***
	(0.36)	(0.30)
Constant	2.12	1.94
	(2.36)	(1.85)
Mean of BP	6.82	6.20
SD of BP	4.54	4.48
Adjusted R^2	0.27	0.32
No. of HHs	931	1,134

Note: Correlation between the constructed bargaining power variable and correlates associated with female empowerment. Outcome variable is the bargaining power (BP) PCA score generated from household decision making information. Standard errors are reported in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

G   Theoretical Appendix

Proof. of Proposition 1: Consider the optimisation problem

$$V\left(\lambda, \theta_m, \theta_f, c\right) = \max_{\{\mu_1, \mu_2, k\}} \sum_{i \in \{m,f\}} \lambda_i \left\{u\left(\mu_{1i}\left(y - k - c\right)\right) + \beta u\left(\mu_{2i}\left(y + R_k k\right)\right) + \left(1 + \beta\right)\theta_i\right\} \tag{18}$$

From the first order conditions for the optimisation problem we obtain:

$$\frac{u'\left(\mu_1\left(y - k - c\right)\right)}{u'\left(\left(1 - \mu_1\right)\left(y - k - c\right)\right)} = \frac{u'\left(\mu_2\left(y + R_k K\right)\right)}{u'\left(\left(1 - \mu_2\right)\left(y + R_k K\right)\right)} = \frac{\lambda_m}{\lambda_f} \tag{19}$$

$$\sum_{i \in \{m,f\}} \lambda_i \mu_{1i} u'\left(\mu_{1i}\left(y - k - c\right)\right) = \sum_{i \in \{m,f\}} \lambda_i \mu_{2i} \beta R_k u'\left(\mu_{2i}\left(y + R_k k_s\right)\right) \tag{20}$$

By inspection, these conditions are identical to those in (3) for $I_s = 1, c_s = c$. Therefore, if $I_s = 1$ in the solution to the original problem, then the solution to (18) matches the solution to (2). And the expression on the left-hand side of (7) is equal to $V\left(\lambda, \theta_m, \theta_f, c_s\right)$.

Using the Envelope Theorem, we obtain

$$\frac{\partial V}{\partial c} = -\left\{\lambda_m \mu_{1m} u'\left(\mu_{1m}\left(y - k - c\right)\right) + \lambda_f \mu_{1f} u'\left(\mu_{1f}\left(y - k - c\right)\right)\right\} < 0 \tag{21}$$

Thus, the household utility (i.e. the weighted sum of utilities of the household members) is monotonically decreasing in the cost of sanitation investments. It follows that the expression on the left-hand side of (7) is monotonically decreasing in c_s. On the other hand, the expression on the right-hand side of (7) is constant in c_s. Therefore, there exists some $\underline{c}$ such that the condition in (7) is satisfied with equality for $c_s = \underline{c}$. Thus, the household makes a sanitation investment in state s if and only if $c_s \leq \underline{c}$. ∎

Proof. of Proposition 2: Using (7) we can write the net surplus to the household from making the sanitation investment in state s as follows:

$$\sum_{i \in \{m,f\}} \lambda_i \left\{u\left(\mu_i\left(y - c_s\right)\right) - u\left(\mu_i y\right) + \left(1 + \beta\right)\theta_i\right\} \tag{22}$$

Since $u\left(.\right)$ is concave and $c_s > 0$, the expression in (22) is increasing in y. Therefore, conditional on the cost realisation c_s, there exists a threshold $\underline{y}_s\left(\theta_f, \theta_m, \lambda\right)$ such that the expression in (22) is equal to zero, and a household invests in sanitation if and only if $y \geq \underline{y}_s\left(\theta_f, \theta_m, \lambda\right)$. ∎

Proof. of Proposition 3: Let $\theta = \theta_f + \theta_m$. Without loss of generality, we consider the effect of increasing the preference for sanitation investment by spouse f (while decreasing that of m so that θ remains constant). We define $V\left(\lambda, \theta_m, \theta_f, c\right)$ as in (18). Using the

Envelope Theorem, we obtain

$$\frac{\partial V\left(\lambda, \theta - \theta_f, \theta_f, c\right)}{\partial \theta_f} = \left(-\lambda_m + \lambda_f\right)\left(1 + \beta\right) \tag{23}$$

Therefore,

$$\lambda_m < \lambda_f \iff \frac{\partial V}{\partial \theta_f} > 0 \tag{24}$$

$$\lambda_m > \lambda_f \iff \frac{\partial V}{\partial \theta_f} < 0 \tag{25}$$

Recall that the expression on the left-hand side of (7) is equal to $V\left(\lambda, \theta_m, \theta_f, c\right)$. And the right-hand side of (7) is independent of θ_f and θ_m. Therefore, if $\lambda_f > \lambda_m$ ($\lambda_m < \lambda_f$) the threshold $\underline{c}$ at which the condition in (7) holds with equality is decreasing (increasing) in θ_f. Following the reasoning of Proposition 1, the probability of sanitation investment equals $F\left(\underline{c}\right)$. Therefore, if $\lambda_f > \lambda_m$ ($\lambda_m < \lambda_f$), the propability of sanitation investment is weakly increasing (decreasing) in θ_f.

Using (6), $y_d\left(c_s\right) < y_d\left(0\right)$. Therefore, the expression in (22) is increasing in y. Therefore, conditional on the cost realisation c_s, there exists a threshold $\underline{y}_s\left(\theta_f, \theta_m, \lambda\right)$ such that a household invests in sanitation if and only if $y \geq \underline{y}_s\left(\theta_f, \theta_m, \lambda\right)$. Following the reasoning above, if $\lambda_f > \lambda_m$ ($\lambda_m < \lambda_f$) then the threshold $\underline{y}_s\left(\theta_f, \theta_m, \lambda\right)$ is decreasing (increasing) in θ_f and thus the proportion of households that invest in sanitation (given by $1 - H\left(\underline{y}_s\left(\theta_f, \theta_m, \lambda\right)\right)$) is increasing (decreasing) in θ_f. ∎

Proof. of Proposition 4: Using (9), the 'surplus' from taking a loan can be written as

$$\sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s \left\{u\left(\mu_i y_d\left(I_s c_s\right)\right) - u\left(\mu_i y\right) + I_s \theta_i\right\} \tag{26}$$

Differentiating throughout (26) w.r.t. y, we obtain

$$\sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s \mu_i \left\{u'\left(\mu_i y_d\left(I_s c_s\right)\right) - u'\left(\mu_i y\right)\right\} \tag{27}$$

From (6), it is evident that $y_d\left(I_s c_s\right) < y$ (since $R_k < R_l$), i.e. disposable income in every state is lower if a loan is taken, regardless of whether or not sanitation investment takes place. Therefore, as the utility function is concave, we have $u'\left(\mu_i y_d\left(I_s c_s\right)\right) > u'\left(\mu_i y\right)$. Thus, the expression in (27) is positive, i.e. the gain from taking the loan is increasing in y. Let $\underline{y}\left(\theta_f, \theta_m, \lambda\right)$ be the income level at which, for given sanitation preferences, the household is indifferent between taking and not taking the loan. Then, the household takes up the loan if and only if $y \geq \underline{y}\left(\theta_f, \theta_m, \lambda\right)$. ∎

Proof. of Proposition 5: Using the condition in (9) and the definition of $V\left(\lambda, \theta_m, \theta_f, c\right)$

in (18), the condition under which the household takes a loan can be written as follows:

$$\sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s V\left(\lambda, \theta - \theta_f, \theta_f, c\right) \geq \sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s u\left(\mu_i y\right) \tag{28}$$

In the proof of Proposition 3, we show that, if $\lambda_m < \lambda_f$, then $\frac{\partial V\left(\lambda, \theta - \theta_f, \theta_f, c\right)}{\partial \theta_f} > 0$, i.e. (conditional on having taken a loan), the household's utility from sanitation investment is increasing in θ_f. Therefore, holding θ constant, the household's expected utility from taking the loan is increasing in θ_f. Therefore, $\underline{y}\left(\theta_f, \theta - \theta_f\right)$ is decreasing in θ_f. Therefore, the probability of loan uptake (which equals $1 - H\left(\underline{y}\left(\theta_f, \theta - \theta_f\right)\right)$) is increasing in θ_f. Similarly, if $\lambda_m > \lambda_f$, then $\frac{\partial V\left(\lambda, \theta - \theta_f, \theta_f, c\right)}{\partial \theta_f} < 0$. Then, the household's expected utility from taking the loan – and the probability of loan uptake – are decreasing in θ_f. ∎

Proof. of Proposition 6: Consider the expected utility from loan uptake under heterogeneous beliefs:

$$\lambda_m u\left(\mu_m y_d\left(2\overline{c} - c_f^e\right)\right) + \lambda_f u\left(\mu_f y_d\left(c_f^e\right)\right) \geq \sum_{i \in \{m,f\}} \sum_{s \in S} \lambda_i \pi_s u\left(\mu_i y\right) \tag{29}$$

Let us denote by $\underline{y}\left(c_f^e, \overline{c} - c_f^e\right)$ the threshold income value at which (29) is satisfied with equality. Differentiating throughout the left-hand side of (29) w.r.t. c_f^e, we obtain

$$\left\{\lambda_m u'\left(\mu_m y_d\left(2\overline{c} - c_f^e\right)\right) \mu_m - \lambda_f u'\left(\mu_f y_d\left(c_f^e\right)\right) \mu_f\right\} \frac{R_k}{1 + R_k} \tag{30}$$

Using the definition of $u\left(.\right)$ in (1), we obtain

$$\left[\frac{\lambda_m \mu_m}{\left\{\mu_m y_d\left(c_m^e\right)\right\}^{\eta}} - \frac{\lambda_f \mu_f}{\left\{\mu_f y_d\left(c_f^e\right)\right\}^{\eta}}\right] \frac{R_k}{1 + R_k} \tag{31}$$

If $\lambda_m > \lambda_f$ then, using (4), we obtain $\mu_m > \mu_f$. Then

(i) as $\eta \longrightarrow 0$, we have $\left\{\mu_m y_d\left(c_m^e\right)\right\}^{\eta} \longrightarrow 1$ and $\mu_f y_d\left(c_f^e\right)^{\eta} \longrightarrow 1$. Then $\lambda_m \mu_m > \lambda_f \mu_f$. Therefore, the expression in (31) is positive. Thus, increasing c_f^e (while holding $\overline{c}$ fixed) increases the household's expected utility from loan uptake. We have previously shown that the gain from taking the loan is increasing in y (see Section 4.3). Therefore, $\underline{y}\left(c_f^e, \overline{c} - c_f^e\right)$ is decreasing in c_f^e. Therefore, the probability of loan uptake (which equals $1 - H\left(\underline{y}\left(c_f^e, \overline{c} - c_f^e\right)\right)$) is increasing in c_f^e.

(ii) if $c_m^e < c_f^e$, we can show that $\mu_m y_d\left(c_m^e\right) > \mu_f y_d\left(c_f^e\right)$ (intuitively, spouse m receives a greater share of disposable income and also believes that disposable income following sanitation investment is higher). Therefore, $\left\{\mu_m y_d\left(c_m^e\right)\right\}^{\eta} > \left\{\mu_f y_d\left(c_f^e\right)\right\}^{\eta}$ for $\eta > 0$. Then, for η sufficiently large, the expression in (31) is negative. Therefore, following the reasoning in part (i) of the proof, the probability of loan uptake is decreasing in c_f^e. ∎

H Robustness checks

H.1 Effect of sanitation loan for couples

Table H1: Effect of sanitation loan by wife's bargaining power (couples only)

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.15***	0.05
	(0.04)	(0.06)
Mid BP x SL	0.22***	0.15**
	(0.06)	(0.06)
High BP x SL	0.20***	0.06
	(0.04)	(0.05)
Mid BP	-0.05*	-0.08
	(0.03)	(0.06)
High BP	-0.03	-0.05
	(0.02)	(0.05)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.44
Control DV mean (Mid BP)	0.04	0.41
Control DV mean (High BP)	0.01	0.44
No. of HHs	1,000	1,000
p-value: LowBP=MidBP	0.25	0.28
p-value: LowBP=HighBP	0.24	0.95
p-value: MidBP=HighBP	0.82	0.27

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H2: Effect of sanitation loan availability by differences in intra-household perceptions (couples only)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Wife's perception lower x SL	0.08	0.23***	0.23***	0.01	0.07	0.17***
	(0.05)	(0.06)	(0.05)	(0.09)	(0.08)	(0.05)
Wife's perception similar x SL	0.23***	0.19***	0.14**	0.02	0.04	0.10
	(0.06)	(0.06)	(0.06)	(0.08)	(0.10)	(0.07)
Wife's perception higher x SL	0.27***	0.19***	0.17***	0.14*	0.09	-0.04
	(0.06)	(0.05)	(0.04)	(0.08)	(0.06)	(0.05)
HH average perception x SL	-0.04	-0.01	-0.07*	-0.01	-0.06	0.04
	(0.03)	(0.03)	(0.04)	(0.05)	(0.04)	(0.04)
HH average perception	0.00	-0.00	0.02	0.00	0.03	0.00
	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.03)
Wife's perception similar	-0.04	0.01	0.03	-0.08	0.02	0.02
	(0.03)	(0.04)	(0.03)	(0.08)	(0.08)	(0.06)
Wife's perception higher	-0.03	0.01	0.03	-0.13*	-0.08	0.09**
	(0.04)	(0.03)	(0.02)	(0.07)	(0.06)	(0.05)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.05	0.02	0.02	0.47	0.46	0.40
Control DV mean (similar)	0.00	0.05	0.03	0.39	0.42	0.42
Control DV mean (higher)	0.02	0.01	0.02	0.43	0.38	0.49
No. of HHs	492	492	1,000	492	492	1,000
p-value: lower=similar	0.02	0.60	0.18	0.93	0.83	0.34
p-value: lower=higher	0.01	0.60	0.31	0.22	0.79	0.00
p-value: similar=higher	0.60	0.97	0.57	0.29	0.62	0.11

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H3: Effect of SL availability by differences in intra-household perceptions and wife's bargaining power (couples only)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.11 (0.08)	0.15* (0.09)	0.22*** (0.06)	-0.17 (0.15)	-0.01 (0.13)	0.14 (0.11)
Low BP x Wife's perception higher x SL	0.22*** (0.07)	0.21*** (0.06)	0.11** (0.05)	0.00 (0.10)	-0.03 (0.11)	-0.00 (0.07)
Mid BP x Wife's perception lower x SL	-0.02 (0.11)	0.41*** (0.13)	0.24*** (0.09)	0.13 (0.15)	0.28 (0.18)	0.33*** (0.08)
Mid BP x Wife's perception higher x SL	0.30*** (0.07)	0.16** (0.08)	0.18*** (0.06)	0.09 (0.11)	0.05 (0.10)	-0.03 (0.08)
High BP x Wife's perception lower x SL	0.10 (0.09)	0.20** (0.08)	0.22*** (0.06)	0.06 (0.15)	0.04 (0.11)	0.09 (0.07)
High BP x Wife's perception higher x SL	0.25*** (0.05)	0.21*** (0.07)	0.19*** (0.05)	0.13* (0.08)	0.14 (0.09)	0.03 (0.07)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.05	0.06	0.00	0.60	0.54	0.38
Control DV mean (LowBP*higher)	0.02	0.00	0.02	0.40	0.38	0.48
Control DV mean (MidBP*lower)	0.12	0.00	0.04	0.47	0.37	0.29
Control DV mean (MidBP*higher)	0.02	0.07	0.04	0.41	0.45	0.57
Control DV mean (HighBP*lower)	0.03	0.00	0.01	0.40	0.44	0.47
Control DV mean (HighBP*higher)	0.00	0.02	0.02	0.42	0.38	0.42
No. of HHs	492	492	1,000	492	492	1,000
LowBP*lower=LowBP*higher	0.24	0.52	0.12	0.39	0.90	0.26
MidBP*lower=MidBP*higher	0.01	0.07	0.54	0.81	0.22	0.00
HighBP*lower=HighBP*higher	0.14	0.97	0.65	0.65	0.45	0.44
joint equality (lower)	0.58	0.20	0.96	0.32	0.41	0.07
joint equality (higher)	0.65	0.88	0.33	0.55	0.36	0.83

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.2 Effect of sanitation loan for nuclear families

Table H4: Effect of sanitation loan availability by wife's bargaining power (nuclear households)

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.22***	0.19*
	(0.06)	(0.10)
Mid BP x SL	0.18**	0.11
	(0.07)	(0.10)
High BP x SL	0.18***	0.06
	(0.04)	(0.05)
Mid BP	-0.02	-0.02
	(0.04)	(0.10)
High BP	-0.01	-0.00
	(0.02)	(0.07)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.00	0.36
Control DV mean (Mid BP)	0.07	0.41
Control DV mean (High BP)	0.01	0.42
No. of HHs	594	594
p-value: LowBP=MidBP	0.62	0.58
p-value: LowBP=HighBP	0.53	0.19
p-value: MidBP=HighBP	0.99	0.68

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H5: Effect of sanitation loan availability by differences in intra-household perceptions (nuclear households)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Wife's perception lower x SL	0.08 (0.06)	0.25*** (0.07)	0.22*** (0.06)	0.10 (0.11)	0.11 (0.09)	0.20*** (0.06)
Wife's perception similar x SL	0.23*** (0.07)	0.21*** (0.07)	0.17*** (0.06)	0.10 (0.10)	0.14 (0.13)	0.10 (0.09)
Wife's perception higher x SL	0.27*** (0.07)	0.17*** (0.05)	0.15*** (0.04)	0.15 (0.10)	0.11 (0.09)	-0.04 (0.07)
HH average perception x SL	-0.01 (0.03)	-0.04 (0.04)	-0.05 (0.05)	-0.07 (0.06)	0.03 (0.07)	0.01 (0.06)
HH average perception	0.01 (0.02)	0.00 (0.01)	0.01 (0.02)	0.03 (0.04)	0.02 (0.04)	-0.01 (0.05)
Wife's perception similar	-0.02 (0.04)	-0.02 (0.04)	0.01 (0.04)	-0.12 (0.11)	0.01 (0.09)	0.01 (0.08)
Wife's perception higher	0.01 (0.05)	0.02 (0.04)	0.02 (0.02)	-0.11 (0.09)	-0.04 (0.09)	0.13** (0.06)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.02	0.00	0.02	0.43	0.39	0.36
Control DV mean (similar)	0.00	0.03	0.02	0.36	0.44	0.38
Control DV mean (higher)	0.02	0.02	0.02	0.37	0.33	0.49
No. of HHs	288	288	594	288	288	594
p-value: lower=similar	0.11	0.65	0.62	0.99	0.81	0.33
p-value: lower=higher	0.04	0.34	0.36	0.75	0.97	0.01
p-value: similar=higher	0.65	0.58	0.79	0.77	0.86	0.23

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H6: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power (nuclear households)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.12 (0.10)	0.29* (0.15)	0.34*** (0.10)	0.12 (0.26)	0.03 (0.29)	0.24 (0.15)
Low BP x Wife's perception higher x SL	0.31** (0.12)	0.28*** (0.09)	0.14* (0.07)	0.19 (0.19)	0.23 (0.17)	0.16 (0.12)
Mid BP x Wife's perception lower x SL	-0.03 (0.12)	0.42*** (0.13)	0.20* (0.11)	0.17 (0.23)	0.35* (0.19)	0.38*** (0.13)
Mid BP x Wife's perception higher x SL	0.29** (0.13)	0.15 (0.11)	0.13 (0.10)	0.10 (0.17)	0.07 (0.15)	-0.19 (0.13)
High BP x Wife's perception lower x SL	0.08 (0.07)	0.19** (0.08)	0.18*** (0.06)	0.06 (0.15)	0.06 (0.11)	0.11 (0.07)
High BP x Wife's perception higher x SL	0.22*** (0.05)	0.17*** (0.05)	0.18*** (0.04)	0.12 (0.09)	0.13 (0.10)	0.02 (0.08)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.00	0.00	0.00	0.33	0.56	0.35
Control DV mean (LowBP*higher)	0.00	0.00	0.00	0.29	0.14	0.37
Control DV mean (MidBP*lower)	0.08	0.00	0.06	0.50	0.29	0.23
Control DV mean (MidBP*higher)	0.05	0.08	0.09	0.37	0.46	0.65
Control DV mean (HighBP*lower)	0.00	0.00	0.01	0.42	0.38	0.41
Control DV mean (HighBP*higher)	0.00	0.00	0.01	0.38	0.41	0.42
No. of HHs	288	288	594	288	288	594
LowBP*lower=LowBP*higher	0.25	0.94	0.07	0.83	0.57	0.68
MidBP*lower=MidBP*higher	0.10	0.07	0.62	0.82	0.19	0.00
HighBP*lower=HighBP*higher	0.17	0.84	0.95	0.74	0.65	0.36
joint equality (lower)	0.62	0.38	0.21	0.92	0.43	0.18
joint equality (higher)	0.63	0.47	0.86	0.93	0.76	0.16

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.3 Effect of sanitation loan by intra-household differences in net benefit perceptions

Table H7: Net benefits perception - Factor loading table (PCA)

	Net benefits perception score	
	Comp1	Comp2
Be happier	.3192107	-.1927446
Be healthier	.3265587	-.1764252
Be able to do more work	.3188095	-.1744097
Be less embarrassed when family visit	.3385291	-.1073898
Be less embarrassed when guests visit	.3331618	-.1211016
Gain a higher status	.2957929	-.0859806
Safer (women)	.3112787	-.17368
Save time	.3039243	-.1503188
Toilets are unhealthy because they stink	.2174037	.3405736
Get less exercise	.2056419	.451109
Miss out on spending time with others	.2114171	.4580316
Get sick more easily	.2174537	.3901905
Spend more time fetching water	.0770162	.3652703

Table H8: Effect of sanitation loan availability by differences in intra-household net benefit perceptions

	(1) Loan uptake	(2) Toilet ownership
Wife's net benefit lower x SL	0.13***	0.09
	(0.04)	(0.06)
Wife's net benefit similar x SL	0.17***	0.01
	(0.06)	(0.08)
Wife's net benefit higher x SL	0.29***	0.14*
	(0.07)	(0.08)
HH average net benefit x SL	-0.00	0.02
	(0.02)	(0.04)
HH average net benefit	-0.00	-0.01
	(0.01)	(0.02)
Wife's net benefit similar	0.03	0.03
	(0.03)	(0.06)
Wife's net benefit higher	0.00	0.01
	(0.02)	(0.07)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (lower)	0.01	0.35
Control DV mean (similar)	0.04	0.41
Control DV mean (higher)	0.02	0.45
No. of HHs	556	556
p-value: lower=similar	0.55	0.44
p-value: lower=higher	0.03	0.61
p-value: similar=higher	0.15	0.20

Note: Intra-household differences in the net benefit perception of toilet ownership are grouped into households where the wife has a lower, similar or higher net benefit perception than her husband. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H9: Effect of sanitation loan availability by differences in intra-household net benefits perceptions and wife's bargaining power

	(1) Loan uptake	(2) Toilet ownership
Low BP x Wife's net benefit lower x SL	0.12**	0.03
	(0.06)	(0.12)
Low BP x Wife's net benefit higher x SL	0.20***	-0.02
	(0.07)	(0.10)
Mid BP x Wife's net benefit lower x SL	0.09	0.02
	(0.10)	(0.11)
Mid BP x Wife's net benefit higher x SL	0.30***	0.16
	(0.08)	(0.11)
High BP x Wife's net benefit lower x SL	0.17**	0.17*
	(0.08)	(0.10)
High BP x Wife's net benefit higher x SL	0.21***	0.09
	(0.05)	(0.09)
Strata FE	Yes	Yes
Covariates	Yes	Yes
Control DV mean (LowBP*lower)	0.00	0.37
Control DV mean (LowBP*higher)	0.04	0.49
Control DV mean (MidBP*lower)	0.05	0.41
Control DV mean (MidBP*higher)	0.04	0.38
Control DV mean (HighBP*lower)	0.00	0.32
Control DV mean (HighBP*higher)	0.01	0.43
No. of HHs	556	556
LowBP*lower=LowBP*higher	0.32	0.75
MidBP*lower=MidBP*higher	0.05	0.36
HighBP*lower=HighBP*higher	0.68	0.56
joint equality (lower)	0.80	0.56
joint equality (higher)	0.52	0.49

Note: Intra-household differences in net benefit perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by net benefit and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.4 Alternative bargaining power measures: Binary base variables

Table H10: Effect of sanitation loan availability by wife's bargaining power (binary base BP)

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.13***	0.08
	(0.03)	(0.06)
Mid BP x SL	0.22***	0.16**
	(0.06)	(0.07)
High BP x SL	0.19***	0.04
	(0.04)	(0.05)
Mid BP	-0.06**	-0.12**
	(0.03)	(0.06)
High BP	-0.03	-0.04
	(0.02)	(0.05)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.43
Control DV mean (Mid BP)	0.04	0.37
Control DV mean (High BP)	0.01	0.45
No. of HHs	1,134	1,134
p-value: LowBP=MidBP	0.13	0.34
p-value: LowBP=HighBP	0.12	0.60
p-value: MidBP=HighBP	0.61	0.14

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. This alternative bargaining power score is generated from binary base variables (=1 if wife is involved in that decision). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H11: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power (binary base BP)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.08 (0.07)	0.13 (0.08)	0.20*** (0.05)	0.02 (0.13)	-0.02 (0.14)	0.11 (0.10)
Low BP x Wife's perception higher x SL	0.18*** (0.06)	0.17*** (0.05)	0.09** (0.04)	-0.01 (0.10)	0.04 (0.10)	0.06 (0.07)
Mid BP x Wife's perception lower x SL	0.01 (0.10)	0.42*** (0.12)	0.26*** (0.10)	0.13 (0.15)	0.34** (0.15)	0.39*** (0.08)
Mid BP x Wife's perception higher x SL	0.32*** (0.08)	0.17* (0.09)	0.17*** (0.06)	0.22** (0.11)	0.16 (0.11)	-0.04 (0.09)
High BP x Wife's perception lower x SL	0.07 (0.07)	0.22*** (0.07)	0.19*** (0.05)	0.07 (0.11)	0.03 (0.10)	0.08 (0.06)
High BP x Wife's perception higher x SL	0.24*** (0.05)	0.18*** (0.06)	0.18*** (0.04)	0.07 (0.07)	0.10 (0.08)	0.02 (0.06)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
DV mean (LowBP*lower)	0.05	0.06	0.00	0.45	0.54	0.41
DV mean (LowBP*higher)	0.02	0.00	0.02	0.44	0.37	0.45
DV mean (MidBP*lower)	0.10	0.00	0.04	0.43	0.32	0.25
DV mean (MidBP*higher)	0.02	0.07	0.04	0.32	0.37	0.51
DV mean (HighBP*lower)	0.02	0.00	0.01	0.37	0.45	0.45
DV mean (HighBP*higher)	0.00	0.01	0.01	0.44	0.38	0.45
No. of HHs	556	556	1,134	556	556	1,134
LowBP*lower=LowBP*higher	0.25	0.61	0.07	0.84	0.75	0.66
MidBP*lower=MidBP*higher	0.00	0.05	0.34	0.60	0.26	0.00
HighBP*lower=HighBP*higher	0.03	0.62	0.90	0.98	0.56	0.48

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. This alternative bargaining power score is generated from binary base variables (=1 if wife is involved in that decision). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by perception and bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.5 Alternative bargaining power measures: Including child-related decisions

Table H12: Effect of sanitation loan availability by wife's bargaining power (alternative BP)

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.15***	0.06
	(0.03)	(0.06)
Mid BP x SL	0.22***	0.14**
	(0.06)	(0.07)
High BP x SL	0.19***	0.06
	(0.04)	(0.05)
Mid BP	-0.02	-0.07
	(0.02)	(0.06)
High BP	-0.02	-0.04
	(0.02)	(0.05)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.44
Control DV mean (Mid BP)	0.04	0.41
Control DV mean (High BP)	0.01	0.43
No. of HHs	1,134	1,134
p-value: LowBP=MidBP	0.25	0.43
p-value: LowBP=HighBP	0.34	0.98
p-value: MidBP=HighBP	0.64	0.37

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. This alternative bargaining power measure takes into account all previously included decisions with the addition of decisions relating to child rearing. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H13: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power (alternative BP)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.05 (0.06)	0.19** (0.08)	0.22*** (0.05)	-0.03 (0.12)	0.03 (0.13)	0.17** (0.08)
Low BP x Wife's perception higher x SL	0.22*** (0.06)	0.16*** (0.05)	0.10** (0.04)	0.02 (0.10)	0.03 (0.09)	-0.02 (0.07)
Mid BP x Wife's perception lower x SL	0.03 (0.09)	0.38*** (0.13)	0.22** (0.09)	0.06 (0.14)	0.29* (0.17)	0.29*** (0.09)
Mid BP x Wife's perception higher x SL	0.34*** (0.08)	0.21*** (0.08)	0.19*** (0.06)	0.10 (0.11)	0.03 (0.11)	0.02 (0.08)
High BP x Wife's perception lower x SL	0.09 (0.08)	0.21*** (0.08)	0.20*** (0.05)	0.14 (0.13)	0.03 (0.10)	0.10 (0.06)
High BP x Wife's perception higher x SL	0.23*** (0.05)	0.17** (0.07)	0.17*** (0.05)	0.12 (0.08)	0.19** (0.08)	0.04 (0.07)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.04	0.04	0.00	0.54	0.51	0.35
Control DV mean (LowBP*higher)	0.02	0.00	0.02	0.42	0.40	0.50
Control DV mean (MidBP*lower)	0.10	0.00	0.05	0.33	0.37	0.33
Control DV mean (MidBP*higher)	0.02	0.06	0.03	0.41	0.40	0.49
Control DV mean (HighBP*lower)	0.02	0.00	0.01	0.36	0.43	0.44
Control DV mean (HighBP*higher)	0.00	0.01	0.01	0.40	0.34	0.42
No. of HHs	556	556	1,134	556	556	1,134
LowBP*lower=LowBP*higher	0.06	0.71	0.04	0.77	0.98	0.05
MidBP*lower=MidBP*higher	0.00	0.17	0.71	0.78	0.16	0.03
HighBP*lower=HighBP*higher	0.10	0.70	0.69	0.89	0.18	0.48

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. This alternative bargaining power measure takes into account all previously included decisions with the addition of decisions relating to child rearing. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcome (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.6 Alternative intra-household perception boundaries

Table H14: Effect of sanitation loan availability by differences in intra-household perceptions (larger similar boundary)

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Wife's perception lower x SL	0.06 (0.04)	0.22*** (0.06)	0.21*** (0.05)	0.07 (0.07)	0.06 (0.08)	0.16*** (0.05)
Wife's perception similar x SL	0.22*** (0.05)	0.19*** (0.06)	0.14*** (0.05)	0.04 (0.07)	0.09 (0.10)	0.07 (0.07)
Wife's perception higher x SL	0.27*** (0.06)	0.19*** (0.05)	0.16*** (0.03)	0.13 (0.08)	0.11* (0.06)	-0.01 (0.05)
HH average perception x SL	-0.03 (0.03)	-0.01 (0.02)	-0.07** (0.03)	-0.00 (0.04)	-0.03 (0.04)	0.02 (0.03)
HH average perception	0.00 (0.01)	-0.00 (0.01)	0.01 (0.01)	-0.01 (0.03)	0.01 (0.03)	0.01 (0.01)
Wife's perception similar	-0.04 (0.03)	0.01 (0.04)	0.03 (0.02)	-0.04 (0.07)	0.01 (0.08)	0.04 (0.06)
Wife's perception higher	-0.03 (0.03)	-0.00 (0.03)	0.03* (0.02)	-0.06 (0.07)	-0.06 (0.07)	0.08* (0.04)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.04	0.02	0.01	0.40	0.45	0.39
Control DV mean (similar)	0.00	0.04	0.03	0.37	0.41	0.44
Control DV mean (higher)	0.02	0.01	0.02	0.44	0.34	0.48
No. of HHs	556	556	1,134	556	556	1,134
p-value: lower=similar	0.01	0.63	0.19	0.78	0.75	0.21
p-value: lower=higher	0.00	0.62	0.24	0.51	0.57	0.01
p-value: similar=higher	0.54	0.97	0.75	0.40	0.85	0.31

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H15: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power (larger similar boundary)

	Loan uptake		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs
Low BP x Wife's perception lower x SL	0.08 (0.07)	0.16* (0.09)	0.22** (0.09)
Low BP x Wife's perception higher x SL	0.20*** (0.06)	0.17*** (0.05)	0.12*** (0.04)
Mid BP x Wife's perception lower x SL	-0.03 (0.10)	0.36*** (0.12)	0.34*** (0.12)
Mid BP x Wife's perception higher x SL	0.31*** (0.08)	0.20** (0.08)	0.16*** (0.05)
High BP x Wife's perception lower x SL	0.14* (0.08)	0.19** (0.09)	0.24*** (0.07)
High BP x Wife's perception higher x SL	0.21*** (0.05)	0.20*** (0.06)	0.17*** (0.04)
Strata FE	Yes	Yes	Yes
Covariates	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.05	0.03	0.00
Control DV mean (LowBP*higher)	0.02	0.02	0.01
Control DV mean (MidBP*lower)	0.13	0.00	0.02
Control DV mean (MidBP*higher)	0.02	0.06	0.04
Control DV mean (HighBP*lower)	0.00	0.00	0.01
Control DV mean (HighBP*higher)	0.01	0.01	0.01
No. of HHs	556	556	1,134
LowBP*lower=LowBP*higher	0.17	0.89	0.31
MidBP*lower=MidBP*higher	0.00	0.19	0.11
HighBP*lower=HighBP*higher	0.41	0.98	0.34
joint equality (lower)	0.44	0.39	0.67
joint equality (higher)	0.48	0.91	0.47

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H16: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power (larger similar boundary)

	Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs
Low BP x Wife's perception lower x SL	-0.10 (0.14)	0.01 (0.15)	0.13 (0.14)
Low BP x Wife's perception higher x SL	0.02 (0.10)	-0.00 (0.09)	0.05 (0.07)
Mid BP x Wife's perception lower x SL	0.12 (0.14)	0.28* (0.16)	0.39*** (0.11)
Mid BP x Wife's perception higher x SL	0.11 (0.11)	0.06 (0.10)	0.03 (0.06)
High BP x Wife's perception lower x SL	0.14 (0.12)	0.08 (0.10)	0.09 (0.07)
High BP x Wife's perception higher x SL	0.12 (0.07)	0.13 (0.08)	0.06 (0.06)
Strata FE	Yes	Yes	Yes
Covariates	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.55	0.50	0.50
Control DV mean (LowBP*higher)	0.42	0.42	0.42
Control DV mean (MidBP*lower)	0.38	0.35	0.28
Control DV mean (MidBP*higher)	0.39	0.40	0.46
Control DV mean (HighBP*lower)	0.38	0.39	0.47
Control DV mean (HighBP*higher)	0.40	0.40	0.43
No. of HHs	556	556	1,134
LowBP*lower=LowBP*higher	0.54	0.96	0.59
MidBP*lower=MidBP*higher	0.92	0.19	0.00
HighBP*lower=HighBP*higher	0.86	0.65	0.78
joint equality (lower)	0.40	0.40	0.05
joint equality (higher)	0.68	0.47	0.94

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.7 Effect of SL with interviewer fixed effects

Table H17: Effect of sanitation loan availability by wife's bargaining power with interviewer FE

	(1) Loan uptake	(2) Toilet ownership
Low BP x SL	0.13***	0.05
	(0.04)	(0.07)
Mid BP x SL	0.20***	0.09
	(0.06)	(0.06)
High BP x SL	0.17***	0.09
	(0.04)	(0.05)
Mid BP	-0.03	-0.04
	(0.03)	(0.06)
High BP	-0.02	-0.07
	(0.02)	(0.05)
Strata FE	Yes	Yes
Interviewer FEs	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.48
Control DV mean (Mid BP)	0.04	0.51
Control DV mean (High BP)	0.01	0.46
No. of HHs	1,124	1,124
p-value: LowBP=MidBP	0.23	0.62
p-value: LowBP=HighBP	0.34	0.62
p-value: MidBP=HighBP	0.63	0.96

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We display average control group outcome (control DV mean) by bargaining power group. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H18: Effect of sanitation loan availability by differences in intra-household perceptions with interviewer FE

	Loan uptake			Toilet ownership		
	(1)	(2)	(3)	(4)	(5)	(6)
	Benefits	Non-monetary costs	Monetary costs	Benefits	Non-monetary costs	Monetary costs
Wife's perception lower x SL	0.04	0.21***	0.19***	0.08	0.02	0.17***
	(0.05)	(0.06)	(0.05)	(0.08)	(0.08)	(0.05)
Wife's perception similar x SL	0.23***	0.16***	0.14**	0.06	0.07	0.05
	(0.06)	(0.06)	(0.06)	(0.10)	(0.11)	(0.07)
Wife's perception higher x SL	0.25***	0.17***	0.17***	0.12	0.18**	-0.03
	(0.06)	(0.06)	(0.04)	(0.08)	(0.07)	(0.06)
HH average perception x SL	-0.01	-0.01	-0.05*	0.05	-0.10**	0.07*
	(0.03)	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)
HH average perception	-0.01	-0.00	0.01	-0.01	0.05	0.00
	(0.02)	(0.02)	(0.01)	(0.04)	(0.04)	(0.02)
Wife's perception similar	-0.06	0.00	0.02	-0.09	-0.00	0.04
	(0.04)	(0.05)	(0.03)	(0.08)	(0.08)	(0.06)
Wife's perception higher	-0.04	0.02	0.02	-0.12	-0.11	0.04
	(0.05)	(0.05)	(0.02)	(0.08)	(0.09)	(0.05)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.05	0.02	0.01	0.41	0.44	0.39
Control DV mean (similar)	0.00	0.04	0.03	0.36	0.40	0.44
Control DV mean (higher)	0.02	0.01	0.02	0.44	0.36	0.48
No. of HHs	543	543	1,124	543	543	1,124
p-value: lower=similar	0.00	0.48	0.40	0.90	0.70	0.10
p-value: lower=higher	0.01	0.70	0.73	0.72	0.15	0.00
p-value: similar=higher	0.78	0.81	0.54	0.69	0.35	0.36

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H19: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power with interviewer FE

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
Low BP x Wife's perception lower x SL	0.10 (0.08)	0.11 (0.07)	0.16** (0.06)	0.06 (0.15)	-0.02 (0.13)	0.10 (0.09)
Low BP x Wife's perception higher x SL	0.18*** (0.06)	0.18*** (0.06)	0.12*** (0.05)	-0.09 (0.11)	-0.03 (0.12)	0.01 (0.09)
Mid BP x Wife's perception lower x SL	0.01 (0.09)	0.43*** (0.15)	0.23** (0.09)	-0.00 (0.15)	0.18 (0.16)	0.20** (0.09)
Mid BP x Wife's perception higher x SL	0.35*** (0.09)	0.18** (0.08)	0.17*** (0.06)	0.12 (0.10)	0.07 (0.10)	-0.15** (0.07)
High BP x Wife's perception lower x SL	0.03 (0.07)	0.16* (0.09)	0.17*** (0.04)	0.21* (0.11)	0.02 (0.11)	0.17*** (0.06)
High BP x Wife's perception higher x SL	0.19*** (0.06)	0.14** (0.07)	0.19*** (0.05)	0.14 (0.08)	0.24*** (0.08)	0.07 (0.07)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Interviewer FE	Yes	Yes	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.05	0.05	0.00	0.55	0.59	0.42
Control DV mean (LowBP*higher)	0.02	0.00	0.02	0.48	0.41	0.52
Control DV mean (MidBP*lower)	0.10	0.00	0.04	0.45	0.33	0.39
Control DV mean (MidBP*higher)	0.02	0.06	0.03	0.49	0.54	0.66
Control DV mean (HighBP*lower)	0.02	0.00	0.01	0.35	0.46	0.47
Control DV mean (HighBP*higher)	0.00	0.01	0.01	0.44	0.36	0.44
No. of HHs	543	543	1,124	543	543	1,124
LowBP*lower=LowBP*higher	0.37	0.36	0.56	0.31	0.95	0.43
MidBP*lower=MidBP*higher	0.00	0.09	0.52	0.50	0.57	0.00
HighBP*lower=HighBP*higher	0.08	0.87	0.67	0.60	0.10	0.23
joint equality (lower)	0.70	0.14	0.71	0.47	0.61	0.68
joint equality (higher)	0.23	0.85	0.40	0.18	0.06	0.06

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

H.8 Household controls

This subsection presents results including controls interacted with the treatment dummy. Results are displayed in an alternative way for ease of interpretation, e.g. the coefficient on Mid BP x SL can be read as the difference between the treatment effect for Low BP households and Mid BP households. For the triple-interaction results, we show robustness of the differential treatments impacts by differences in perceptions within bargaining power groups.

Table H20: Effect of sanitation loan availability by wife's bargaining power with additional household covariates

	(1) Loan uptake	(2) Toilet ownership
SL	-0.08	0.30
	(0.12)	(0.21)
Mid × SL	0.10**	0.08
	(0.04)	(0.08)
High × SL	0.05	0.02
	(0.04)	(0.07)
Mid	-0.04**	-0.07
	(0.02)	(0.05)
High	-0.02	-0.08
	(0.02)	(0.05)
Strata FE	Yes	Yes
Household covariates	Yes	Yes
Control DV mean (Low BP)	0.01	0.43
Control DV mean (Mid BP)	0.04	0.41
Control DV mean (High BP)	0.01	0.44
No. of HHs	1,134	1,134

Note: A wife's bargaining power (BP) is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include caste dummies, open defecation social norm dummies (e.g. a dummy =1 if the man/wife agrees that it is acceptable to defecate in the open), and household controls (log household consumption per capita, religion dummies, dummy =1 if a household member owns the dwelling, number of household members, number of female household members, the gender, age and education level of the household head, a dummy =1 if the household has a child under the age of 2/5 at baseline, a dummy =1 if the household owns a toilet at baseline). We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. p-values in square brackets. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H21: Effect of sanitation loan availability by intra-household perception differences with additional household covariates

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
SL	-0.27 (0.21)	-0.16 (0.20)	0.10 (0.14)	-0.36 (0.34)	-0.36 (0.33)	0.41* (0.22)
Wife's perception similar × SL	0.17*** (0.06)	-0.04 (0.07)	-0.06 (0.06)	-0.02 (0.11)	0.03 (0.12)	-0.10 (0.07)
Wife's perception higher × SL	0.22*** (0.07)	-0.04 (0.07)	-0.05 (0.05)	0.09 (0.09)	0.02 (0.10)	-0.17*** (0.06)
Wife's perception similar	-0.05* (0.02)	0.01 (0.04)	0.01 (0.02)	-0.05 (0.07)	0.00 (0.08)	0.04 (0.05)
Wife's perception higher	-0.04 (0.04)	0.01 (0.02)	0.03* (0.02)	-0.08 (0.07)	-0.04 (0.06)	0.08* (0.04)
HH average perception	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)	0.00 (0.03)	0.01 (0.03)	0.00 (0.01)
SL × HH average perception	-0.04 (0.02)	-0.02 (0.02)	-0.07** (0.03)	-0.01 (0.04)	-0.04 (0.04)	0.02 (0.03)
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
Control DV mean (lower)	0.04	0.02	0.01	0.04	0.02	0.01
Control DV mean (similar)	0.00	0.04	0.03	0.00	0.04	0.03
Control DV mean (higher)	0.02	0.01	0.02	0.02	0.01	0.02
No. of HHs	556	556	1,134	556	556	1,134

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include caste dummies, open defecation social norm dummies (e.g. a dummy =1 if the man/wife agrees that it is acceptable to defecate in the open), and household controls (log household consumption per capita, religion dummies, dummy =1 if a household member owns the dwelling, number of household members, number of female household members, the gender, age and education level of the household head, a dummy =1 if the household has a child under the age of 2/5 at baseline, a dummy =1 if the household owns a toilet at baseline). We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. p-values in square brackets. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table H22: Effect of sanitation loan availability by intra-household perception differences and wife's bargaining power with additional household covariates

	Loan uptake			Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs	(4) Benefits	(5) Non-monetary costs	(6) Monetary costs
$LowBP \times higher - LowBP \times lower$	0.15	0.05	-0.11	0.02	0.03	-0.08
	(0.10)	(0.09)	(0.06)	(0.15)	(0.17)	(0.11)
	[0.14]	[0.56]	[0.07]	[0.89]	[0.87]	[0.44]
$MidBP \times higher - MidBP \times lower$	0.30	-0.24	-0.05	0.12	-0.25	-0.34
	(0.10)	(0.11)	(0.09)	(0.17)	(0.17)	(0.11)
	[0.00]	[0.03]	[0.58]	[0.48]	[0.14]	[0.00]
$HighBP \times higher - HighBP \times lower$	0.18	-0.01	-0.01	0.02	0.13	-0.07
	(0.09)	(0.10)	(0.06)	(0.14)	(0.11)	(0.08)
	[0.06]	[0.90]	[0.92]	[0.91]	[0.23]	[0.38]
Strata FE	Yes	Yes	Yes	Yes	Yes	Yes
Household covariates	Yes	Yes	Yes	Yes	Yes	Yes
No. of HHs	556	556	1,134	556	556	1,134

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower or similar/higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan and *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include caste dummies, open defecation social norm dummies (e.g. a dummy =1 if the man/wife agrees that it is acceptable to defecate in the open), and household controls (log household consumption per capita, religion dummies, dummy =1 if a household member owns the dwelling, number of household members, number of female household members, the gender, age and education level of the household head, a dummy =1 if the household has a child under the age of 2/5 at baseline, a dummy =1 if the household owns a toilet at baseline). We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. p-values in square brackets. $*p < 0.10, **p < 0.05, ***p < 0.01$.

I Full interaction tables

Tables I1 and I2 below repeat the triple interaction results in Section 6 with the three intra-household perception categories (lower, similar and higher) for loan uptake and toilet ownership outcomes, respectively. Again we can see that loan uptake differs significantly by benefit perception and non-monetary cost perceptions in the Mid BP and toilet ownership differs by monetary cost perceptions in the Mid BP group.

Table I1: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power

	Loan uptake		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs
Low BP x Wife's perception lower x SL	0.09 (0.07)	0.13* (0.08)	0.21*** (0.06)
Low BP x Wife's perception similar x SL	0.24*** (0.09)	0.28** (0.11)	0.04 (0.06)
Low BP x Wife's perception higher x SL	0.18** (0.09)	0.17*** (0.06)	0.12** (0.05)
Mid BP x Wife's perception lower x SL	0.01 (0.09)	0.41*** (0.12)	0.24*** (0.09)
Mid BP x Wife's perception similar x SL	0.32*** (0.10)	0.18* (0.10)	0.13 (0.08)
Mid BP x Wife's perception higher x SL	0.31*** (0.11)	0.15* (0.09)	0.18*** (0.06)
High BP x Wife's perception lower x SL	0.08 (0.07)	0.19*** (0.07)	0.20*** (0.05)
High BP x Wife's perception similar x SL	0.16*** (0.06)	0.15 (0.10)	0.21** (0.09)
High BP x Wife's perception higher x SL	0.30*** (0.08)	0.23*** (0.08)	0.17*** (0.04)
Low BP x Wife's perception similar	-0.02 (0.04)	-0.02 (0.06)	0.03 (0.03)
Low BP x Wife's perception higher	-0.01 (0.07)	-0.03 (0.05)	0.06** (0.03)
Mid BP x Wife's perception lower	-0.03 (0.06)	-0.14* (0.07)	-0.01 (0.03)
Mid BP x Wife's perception similar	-0.13* (0.07)	-0.12 (0.08)	-0.02 (0.03)
Mid BP x Wife's perception higher	-0.11* (0.06)	-0.08 (0.07)	0.01 (0.03)
High BP x Wife's perception lower	-0.02 (0.06)	-0.03 (0.05)	-0.01 (0.02)
High BP x Wife's perception similar	-0.02 (0.05)	0.01 (0.06)	0.03 (0.05)

High BP x Wife's perception higher	-0.03	-0.06	0.01
	(0.05)	(0.06)	(0.03)
HH average perception x SL	-0.03	-0.03	-0.06**
	(0.03)	(0.03)	(0.03)
HH average perception	0.00	0.01	0.01*
	(0.01)	(0.01)	(0.01)
Strata FE	Yes	Yes	Yes
Covariates	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.04	0.05	0.00
Control DV mean (LowBP*similar)	0.00	0.00	0.02
Control DV mean (LowBP*higher)	0.03	0.00	0.02
Control DV mean (MidBP*lower)	0.10	0.00	0.04
Control DV mean (MidBP*similar)	0.00	0.08	0.00
Control DV mean (MidBP*higher)	0.03	0.04	0.05
Control DV mean (HighBP*lower)	0.02	0.00	0.01
Control DV mean (HighBP*similar)	0.00	0.03	0.04
Control DV mean (HighBP*higher)	0.00	0.00	0.00
No. of HHs	556	556	1,134
LowBP*lower=LowBP*similar	0.13	0.24	0.05
LowBP*lower=LowBP*higher	0.38	0.65	0.22
LowBP*similar=LowBP*higher	0.64	0.34	0.37
MidBP*lower=MidBP*similar	0.01	0.08	0.35
MidBP*lower=MidBP*higher	0.01	0.06	0.51
MidBP*similar=MidBP*higher	0.94	0.83	0.63
HighBP*lower=HighBP*similar	0.25	0.74	0.88
HighBP*lower=HighBP*higher	0.06	0.69	0.66
HighBP*similar=HighBP*higher	0.16	0.47	0.62
LowBP*lower=MidBP*lower	0.43	0.04	0.72
LowBP*lower=HighBP*lower	0.96	0.56	0.85
MidBP*lower=HighBP*lower	0.54	0.10	0.60
LowBP*similar=MidBP*similar	0.52	0.46	0.38
LowBP*similar=HighBP*similar	0.35	0.38	0.12
MidBP*similar=HighBP*similar	0.14	0.84	0.52
LowBP*higher=MidBP*higher	0.35	0.87	0.40
LowBP*higher=HighBP*higher	0.28	0.45	0.46
MidBP*higher=HighBP*higher	0.91	0.50	0.89

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Loan uptake* =1 if a household takes a sanitation loan. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.

Table I2: Effect of sanitation loan availability by differences in intra-household perceptions and wife's bargaining power

	Toilet ownership		
	(1) Benefits	(2) Non-monetary costs	(3) Monetary costs
Low BP x Wife's perception lower x SL	-0.01 (0.13)	-0.03 (0.13)	0.12 (0.10)
Low BP x Wife's perception similar x SL	-0.05 (0.14)	0.08 (0.19)	0.18 (0.13)
Low BP x Wife's perception higher x SL	0.03 (0.14)	0.05 (0.11)	-0.04 (0.07)
Mid BP x Wife's perception lower x SL	0.07 (0.14)	0.30* (0.15)	0.30*** (0.08)
Mid BP x Wife's perception similar x SL	-0.02 (0.13)	0.13 (0.15)	-0.05 (0.13)
Mid BP x Wife's perception higher x SL	0.24* (0.14)	-0.01 (0.10)	-0.06 (0.09)
High BP x Wife's perception lower x SL	0.14 (0.13)	0.02 (0.10)	0.10 (0.06)
High BP x Wife's perception similar x SL	0.12 (0.10)	0.06 (0.13)	0.06 (0.11)
High BP x Wife's perception higher x SL	0.10 (0.12)	0.27*** (0.10)	0.03 (0.08)
Low BP x Wife's perception similar	-0.01 (0.14)	0.05 (0.17)	0.00 (0.09)
Low BP x Wife's perception higher	-0.13 (0.13)	-0.14 (0.11)	0.06 (0.07)
Mid BP x Wife's perception lower	-0.13 (0.12)	-0.26** (0.12)	-0.17*** (0.06)
Mid BP x Wife's perception similar	-0.04 (0.13)	-0.12 (0.14)	0.12 (0.10)
Mid BP x Wife's perception higher	-0.25** (0.12)	-0.08 (0.12)	0.06 (0.11)
High BP x Wife's perception lower	-0.10 (0.10)	-0.07 (0.11)	-0.02 (0.08)
High BP x Wife's perception similar	-0.21* (0.10)	-0.09 (0.13)	-0.10 (0.09)

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High BP x Wife's perception higher	-0.07	-0.20*	-0.01
	(0.11)	(0.11)	(0.08)
HH average perception x SL	0.00	-0.05	0.02
	(0.04)	(0.04)	(0.03)
HH average perception	-0.01	0.03	0.01
	(0.03)	(0.03)	(0.01)
Strata FE	Yes	Yes	Yes
Covariates	Yes	Yes	Yes
Control DV mean (LowBP*lower)	0.50	0.54	0.39
Control DV mean (LowBP*similar)	0.42	0.43	0.44
Control DV mean (LowBP*higher)	0.44	0.34	0.48
Control DV mean (MidBP*lower)	0.38	0.35	0.28
Control DV mean (MidBP*similar)	0.45	0.42	0.60
Control DV mean (MidBP*higher)	0.34	0.40	0.54
Control DV mean (HighBP*lower)	0.36	0.43	0.45
Control DV mean (HighBP*similar)	0.30	0.41	0.36
Control DV mean (HighBP*higher)	0.51	0.31	0.46
No. of HHs	556	556	1,134
LowBP*lower=LowBP*similar	0.86	0.63	0.70
LowBP*lower=LowBP*higher	0.84	0.63	0.15
LowBP*similar=LowBP*higher	0.70	0.87	0.13
MidBP*lower=MidBP*similar	0.61	0.39	0.02
MidBP*lower=MidBP*higher	0.36	0.07	0.00
MidBP*similar=MidBP*higher	0.13	0.39	0.94
HighBP*lower=HighBP*similar	0.91	0.77	0.71
HighBP*lower=HighBP*higher	0.84	0.06	0.43
HighBP*similar=HighBP*higher	0.93	0.17	0.80
LowBP*lower=MidBP*lower	0.64	0.09	0.16
LowBP*lower=HighBP*lower	0.43	0.69	0.86
MidBP*lower=HighBP*lower	0.74	0.13	0.04
LowBP*similar=MidBP*similar	0.88	0.85	0.16
LowBP*similar=HighBP*similar	0.31	0.94	0.44
MidBP*similar=HighBP*similar	0.33	0.73	0.54
LowBP*higher=MidBP*higher	0.29	0.71	0.88
LowBP*higher=HighBP*higher	0.65	0.11	0.48
MidBP*higher=HighBP*higher	0.45	0.05	0.43

Note: Intra-household differences in the perception of toilet ownership are grouped into households where the wife has a lower, similar or higher perception than her husband. Columns refer to the type of perception difference analysed (benefits, non-monetary costs or monetary costs). A wife's bargaining power is measured relative to the average for all women and grouped into those with low, mid and high bargaining power. *Toilet ownership* =1 if a household owns a toilet at the endline. Covariates include a dummy =1 if the household has a child under the age of 2 at baseline, a dummy =1 if the household owns a toilet at baseline and log per capita household consumption. We control for the household average perception which is standardised with a mean of 0 and a standard deviation of 1. We display average control group outcomes (control DV mean) by perception and bargaining power group. Benefit and non-monetary cost perceptions were only elicited from half the sample. Standard errors in parentheses, clustered at the GP level. $*p < 0.10, **p < 0.05, ***p < 0.01$.