VALUING CONTROL OVER INCOME AND WORKLOAD: A FIELD EXPERIMENT IN RWANDA

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Abstract

Agricultural development programs often aim to enhance women's control over income, but as an unintended negative consequence, these programs may increase women's already heavy work burden. By means of a lab-in-the-field experiment with 1,000 men and women in rural Rwanda, we elicit men's and women's valuations of control over income, changes in workload, and trade-offs between them. Survey data indicate that women in this setting are less empowered than men, with control over the use of income contributing less to disempowerment than high workloads. In the experiment, we find indeed that although women are willing to sacrifice more household income to gain control over income than their husbands are, both women and men are willing to forgo even more personal and household income with the aim of reducing their workload. This indicates that in the setting where the experiment was conducted, agricultural development programs that introduce time-saving practices and technologies have potentially greater welfare impacts for both women and men than programs increasing women's control over monetary resources.

Keywords: Household economics, Experiment, Labor, Rwanda

1. Introduction

Impact evaluations and cost-benefit analyses often guide investments in agricultural development, but determining whether an investment is cost effective in empowering women is challenging. The multidimensional, dynamic nature of women's empowerment does not lend itself easily to quantitative measurement, and poses challenges both for aggregation across different dimensions, and for analyzing trade-offs in development. For instance, agricultural development programs often come with new tasks that require additional human labor. These tasks tend to be assigned to women, which can increase their control over income. However, these women typically already have greater responsibility for domestic chores and care work, resulting in increasing work burdens, and limiting whether and how they can engage in other productive activities (Seymour et al. 2020).

An important question therefore is whether increasing control over income at the expense of an increase in workload benefits women. To address this question, we implemented a lab-in-the-field experiment eliciting respondents' valuation of changes in control over income and workload, two indicators of women's empowerment. The experiment also quantifies how respondents manage trade-offs between these two indicators to help answer questions such as whether an increase in women's control over income is large enough to justify the increase in their workload that generates that income; to what extent the costs of a potential agricultural development program are offset by positive impacts on enhanced incomes and control over resources for women; and whether labor-saving technologies generate greater benefits for particular groups of women.

By providing a method to study workload-related trade-offs in empowerment and agricultural development, the paper contributes to the study of gendered labor dynamics and time use. Traditional gender norms typically assign greater responsibility for domestic chores and care work to women. These tasks are often unpaid and undervalued, result in heavy work burdens for women, and limit whether and how women can engage in other productive activities (Seymour et al. 2020). Moreover, new tasks that require additional human labor tend to be assigned to women as a means to increase their income. The resulting time poverty is considered disempowering and is thus reflected in the time-use based "workload" indicator in the project-level Women's Empowerment in Agriculture Index (pro-WEAI, Malapit et al. 2019). However, traditional time-use instruments capture the duration of activities and do not capture the quality of time, including work effort or control over time. Our experimental design aims to fill this gap by eliciting respondents' valuation of changes in workload.

Our experiment also relates to the literature on gender and climate, which has documented gender inequality in the reach, use, and benefits of climate information (Gumucio et al., 2019). Most research uses qualitative approaches to elicit perceived benefits of climate information (Tall et al., 2018), and does not quantify gender gaps in costs and benefits to guide future investments and program design. Mutenje et al. (2019) provide a gender-disaggregated cost-benefit analysis for climate-smart agriculture (CSA) and find that women may choose to increase their workload when adopting labor-intensive CSA for cost reasons. However, their quantitative analysis focuses on profitability of CSA investments at the household level and

does not quantify the trade-offs with individual-level effects of CSA on workloads, bargaining power, and control over income. Our experimental design provides a framework to help researchers quantify such costs and benefits.

The remainder of this paper is structured as follows. First, we describe our experimental methods, including sampling strategies, experimental tasks, and treatments. Next, we present summary statistics, followed by a discussion of the findings from each of the experimental tasks. The final section concludes.

Section 2. Methods

2.1 Context and sampling

The experiment was implemented from August 2021 to January 2022 in partnership with four cooperatives from different regions of Rwanda. Implementation was done in the context of a climate information service program led by the Alliance of Bioversity and CIAT (ABC). Cooperatives were selected from a pool of cooperatives actively engaged in the program with ABC, with the additional criteria that the cooperative was willing to participate, that they facilitated maize production for their farmers, and that they had at least 200 active members (the latter was to ensure a sufficiently large number of members to implement the study). The final set of cooperatives was selected such that there was representation of cooperatives from different provinces in the country, spanning Rwanda's southern and eastern regions.

For each cooperative, we recruited 125 members to participate in the experiment together with their spouse, yielding a total study sample of 1,000 respondents. Our sampling framework for a cooperative was the total set of married cooperative members, from which we invited a randomly selected 125 members to participate in the experiment (plus replacements in case members were unable to attend). Each respondent participated in four rounds of the experiment, conducted during different stages of the agricultural season. The first round focused on weeding, the second on weeding combined with fertilizer application, the third on weeding and pesticide application, and the fourth on harvest.[1] We repeated the same set of experimental tasks at different stages in the cropping season in order to decrease the risk that focusing on one particular task only (and on the associated gender norms around that task) could reduce external validity. Attrition was extremely low; only two out of 1,000 respondents dropped out just after round 3, meaning that the number of observations for round 4 was reduced from 1,000 to 998 observations.

2.2 Experimental tasks

For every cooperative, we organized ten experimental sessions with 12 to 13 cooperative members in each round. Participants were invited to join one of these sessions together with

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[1] The plan originally was to do the first round at the time of planting, but the pandemic delayed the start of field-work, and thus we were unable to interview respondents prior to planting.

their spouse. We randomized the session for which a participant was invited. They were not able to participate in any other session, and they were told that they would be unable to participate if they did not come together with their spouse. If they indicated at the time of invitation that they would be unable to participate in the assigned session, or that they were unable to come together with their spouse, a replacement was selected. During every round, each participant completed a core set of three incentivized experimental tasks from which we derive our main outcome variables:

1. Willingness to pay for control over income

2. Willingness to pay for a reduction in workload – affecting one's spouse's income

3. Willingness to pay for a reduction in workload – affecting one's own income

Task 1 - Willingness to pay for control over income

We first identified respondents' willingness to pay for control over income by offering them the choice to be paid a larger amount through their spouse, instead of being paid directly. Specifically, we asked participants: "What do you prefer, Rwandan Franc (RFW) X paid to you, or RFW 2,500 paid to your spouse?" The minimum amount by which a payment needs to increase for a respondent to choose an indirect payment, via his or her spouse, provides a measure of control over income (Almås et al., 2018). To derive this amount, we elicited preferences using a multiple price list in which the payment paid to the respondent, amount X, was reduced from RFW 3,000 to RFW 1,000 in increments of RFW 250. We study at which amount the respondent switches from preferring to being paid directly to preferring his or her spouse to be paid the RFW 2,500:

#	A. Amount to you (X)	B. Amount to spouse	WTP if still preferring (A)
0a	3,000 RFW	2,500 RFW	- 500 RFW
0b	2,750 RFW	2,500 RFW	- 250 RFW
1	2,500 RFW	2,500 RFW	0 RFW
2	2,250 RFW	2,500 RFW	250 RFW
3	2,000 RFW	2,500 RFW	500 RFW
4	1,750 RFW	2,500 RFW	750 RFW
5	1,500 RFW	2,500 RFW	1,000 RFW
6	1,250 RFW	2,500 RFW	1,250 RFW
7	1,000 RFW	2,500 RFW	1,500 RFW

As our main dependent variable from this experimental task, we indicate a respondent's "willingness to pay for control over income" based on the respondent's switching point. For instance, consider a respondent who prefers option (A), being paid directly, in scenario 4, but prefers option (B), the RFW 2,500 for one's spouse, in scenario 5. This person is willing to pay the difference of RFW 750 to gain control over income in scenario 4, but not the difference of RFW 1,000 to control that income in scenario 5. Thus, this person's willingness to pay for control over income is at least RFW 750 RFW, and we assign that value to that respondent's

willingness to pay. For respondents who always choose (A), even in the last choice where they sacrifice RFW 1,500 to maintain control over income, we assign a willingness to pay for control over income of RFW 1,500. Respondents who choose (A) in scenario 1 but (B) in scenario 2 are willing to pay zero to keep control over income.

In the first round, a substantial number of participants always chose to be paid through their spouse, even in Scenario 1, whereby the participant would not sacrifice any earnings by choosing to be paid directly. To be able to derive a valuation of control over income for these participants, we included two additional scenarios in which the respondent would sacrifice income if choosing for the payment of RFW 2,500 for his or her spouse. These are the two scenarios indicated in red in Scenarios 0a and 0b. We assign a negative willingness to pay for control over income to participants who choose option (B) in these scenarios: - 250 for those who switch from (A) to (B) in scenario 1, - 500 for those who switch from (A) to (B) in scenario 0b, and -750 for those who always choose option (B), even in Scenario 0a.

Tasks 2 and 3 - Willingness to pay for a reduction in workload

Second, in each round, we elicited women's and men's valuation of changes in workload. We do this by offering respondents labor to work on their fields, but at varying costs, and identifying the maximum amount that a respondent is willing to pay for a day of labor that reduces their personal workload by a similar amount. We did this by hiring laborers for respondents, and paying for the labor costs. Our method follows Agness et al. (2021) with the difference that instead of offering people to work in exchange for a payment, we offer people to pay us out of their experimental earnings to reduce their workload in the fields in one of the weeks following the experiment.

Moreover, to further unpack the trade-off between an increase in workload vis-à-vis an increase in control over income, the experiment elicited preferences for two versions. In the first version, any labor hired through the experiment would be paid out of the spouse's earnings from the experiment (this was the second task in our experiment). Choosing to reduce one's workload (by hiring labor through the experiment) would mean reducing household income, but the respondent would not necessarily have control over the use of this income, since the earnings would otherwise have been paid to their spouse. In the second version, when a respondent chose to hire laborers and reduce one's workload, the respondent's personal earnings from the experiment were reduced, thereby directly affecting earnings that are under his or her control (this was the third task in the experiment).

#	A. Receive …but no labor	B. Receive … + one day of labor	Cost of labor in this choice	WTP if switches from B in previous choice to A here
1	2,500 RFW	2,500 RFW	0 RFW	-250 RFW
2	2,500 RFW	2,250 RFW	250 RFW	0 RFW
3	2,500 RFW	2,000 RFW	500 RFW	250 RFW
4	2,500 RFW	1,750 RFW	750 RFW	500 RFW
5	2,500 RFW	1,500 RFW	1,000 RFW	750 RFW

| 6 | 2,500 RFW | 1,250 RFW | 1,250 RFW | 1,000 RFW |
| 7 | 2,500 RFW | 1,000 RFW | 1,500 RFW | 1,250 RFW |

Similar to our "willingness to pay for control over income" indicator, we construct a variable that indicates the "willingness to pay for a reduction in workload" based on a multiple price list (see overview above). Respondents are presented with the choice between one day of labor for a varying cost that is deducted from their experimental earnings, versus earning RFW 2,500. In each wage scenario they were asked which option they prefer. Costs range in increments of RFW 250 from a minimum of RFW 0 (whereby laborers are fully subsidized by the project and experimental earnings are RFW 2,500 regardless of the participant's choice to hire labor) to a maximum of RFW 1,500 (in which case the participant – or his spouse, depending on the task at hand – receives RFW 1,000, and in this scenario, the farmer is likely paying more than what the experiment actually had to pay the laborers as this was higher than the ongoing casual wage labor rate). We construct the respondent's valuation of a reduction in workload based on the wage at which the cost is high enough for respondents to prefer putting in the labor themselves.

Other data collected

Recall that we randomized by round and session whether participants would receive their earnings in cash or in kind, with a respondent being paid in cash for two rounds, and in kind for the other two rounds. Participants may not have valued the in-kind good the same as cash income. Although we randomized which rounds were associated with cash earnings, ideally, we would want to control for respondents' valuation of the in-kind good. Therefore, our final experimental task elicited willingness to pay for the in-kind good. Specifically, participants were asked to choose between a fixed RFW 2,500 paid in-kind, or a smaller amount but paid in cash. We varied the cash amount to range between RFW 2,500 and RFW 1,000, and we define the amount at which a respondent no longer prefers the cash option and switches to the in-kind good as the willingness to pay for the in-kind good. This variable will serve as a control variable in our analyses as opposed to an outcome variable.

In addition, we collected survey-based measures on household and farm characteristics in the first round; empowerment indicators based on the project-level Women's Empowerment in Agriculture Index (pro-WEAI) in the second and third round (see Figure 1, except for the membership in influential groups and respect among household member indicators); empowerment indicators based on the gender empowerment index for climate smart villages (GEI-CSV) in the fourth round; and a series of hypothetical questions to collect survey-based data on respondents' valuation of control over income and reduced workload in the first, second and fourth round. Each round included survey questions on labor practices, use and cost, as well as the work balance module from the Pro-WEAI to capture workload at varying points across the agricultural season.

Figure 1 –Pro-WEAI domains and indicators
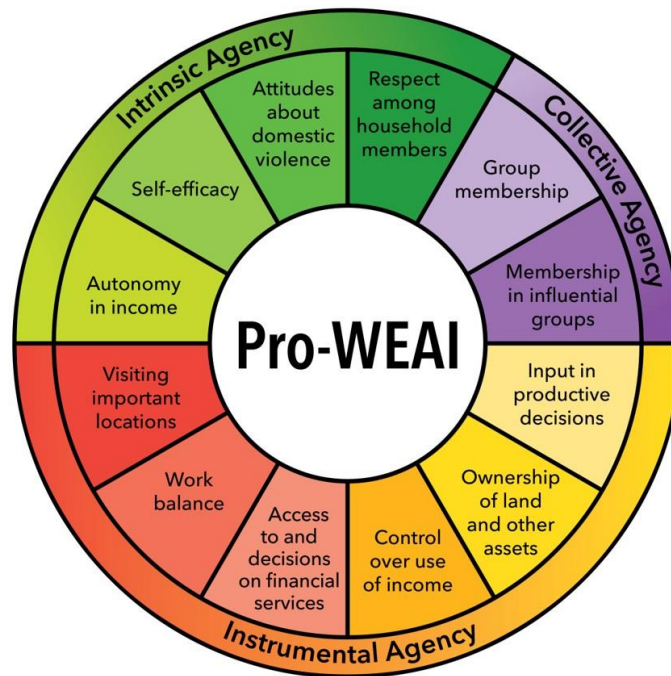
2.3 Research questions and experimental treatments

Our main research questions relate to whether the willingness to pay for control over income, and the willingness to pay for a reduced workload, differ between women and men. We first hypothesize that women will be willing to pay more to receive their experimental earnings directly instead of via their spouse, given that in many settings women have less control over the use of household income than men. We can test this hypothesis by comparing women's and men's willingness to pay for the control over income across the four rounds in the experiment. A related, second, research question is whether these measures for willingness to pay for control over income correlate with survey-based empowerment measures, such as the pro-WEAI items that we collected for both female and male study participants. Third, we also hypothesize that women will be willing to pay more to reduce their workload, by hiring laborers through the experiment, since their total workload is often higher than that of men (Seymour et al, 2021). Our fourth research question therefore investigates whether the willingness to pay for a reduction in workload is associated with the work balance indicator from the Pro-WEAI.

Gender gaps might however not be as large when payments are made in kind. For household goods provided in kind, issues around bargaining power and control over income are considered less of a concern. Moreover, subsistence farmers might not be accustomed as much to cash transactions as wage laborers who are typically paid in cash (c.f. Agness et al., 2021). As an important robustness analysis, the experiment therefore also varied within sessions across rounds whether valuations are elicited for participants being paid in cash versus in kind.

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We randomized at the session-round level whether payments for that round were made in cash or in kind (meaning that this variable varies within respondents over time). As the in-kind alternative, we used soap, given that it is valued by respondents, that it is divisible, and that it is not creating a confounding effect on choices in the experiment, particularly those around agricultural workload. For instance, providing seeds could have influenced planting decisions and demand for agricultural labor, and would therefore be suboptimal.

A final research question that we investigate within the experiment is if the finding from other contexts, of women valuing flexibility in hours work more than men, hold in a developing country, and what the impacts on optimal policy design might be. In the second and third task, we therefore also varied whether respondents were provided with flexibility to choose when laborers would come, versus whether the laborer would come on fixed days selected by the experimenter. This was randomized at the session level (i.e. this is a time-invariant variable). Participants were informed of whether they would be paid in cash or in kind, and whether they would be able to choose when laborers would come, at the start of their session in a given round.

2.4 Procedures

To avoid wealth effects, we randomly selected only one of the four experimental tasks (see the figure below) to be implemented for payment. Moreover, to allow participants to hide their experimental earnings from their spouse, we told participants that we would select either one of the tasks for payment, or that they would receive a fixed RWF 1,000 as a participation fee. In this way, there was random noise in payments, and when receiving RWF 1,000 because a participant opted to keep the money from the first task for him or herself, the participant would be able to say that he or she was randomly selected to just receive the participation fee. In the first two rounds, the probability of receiving the RFW 1,000 participation fee was 50 percent. Participants however complained that too many respondents were receiving the fixed (and lower) participation fee, and in the last two rounds, we therefore increased the odds of one of the tasks being implemented for payment to 80 percent.

Task 1: Willingness to pay for control over income (RFW 2,500 for spouse or alternative amount for respondent?)		Task 2: Willingness to pay for labor - from spouse earnings (RFW 2,500 paid to spouse or a smaller amount plus a day of labor?)		Task 3: Willingness to pay for labor - from own earnings (RFW 2,500 paid to self or a smaller amount plus a day of labor?)		Task 4: Willingness to pay for in-kind good (RFW 2,500 in kind or a smaller amount in cash?)

A session proceeded as follows. First, the team of enumerators provided a plenary training to all participants in a session on the experimental procedures, by reading out the experimental instructions in Kinyarwanda. Participants then provided their individual choices for the first task in private. The team then proceeded with the plenary instructions for the second and third task, after which participants again provided their choices in private. After participants received a plenary instruction on the fourth task, and had made their individual choices in private, the

team prepared the experimental payouts. Whilst participants were waiting for their payouts, the enumerators would administer an individual survey with each participant on subjects which varied across the four rounds. The vast majority of participants was indeed able to be interviewed alone without other participants, household members or children listening in on the interview.

Section 3. Findings

3.1 Sample description

Table 1 describes summary statistics for the participants in the experiment. In total, 500 men and 500 women participated in the first round of the experiment. On average, male participants are 47 years of age, and their spouses are on average four years younger. We do not observe a strong gender gap in education. Empowerment indicators, which are available for 95 percent of respondents, are higher for men than for women: 69 percent of male participants are classified as empowered according to the Pro-WEAI, versus 56 percent of female participants; and continuous pro-WEAI scores are on average 0.77 for men, against 0.73 for women. In 67 percent of households, there is gender parity, meaning that a woman achieves empowerment, or if she does not achieve empowerment, that she has an empowerment score that is at least as high as her husband's score. This shows that despite great strides in Rwanda to promote gender equality, there are still areas in which women do not have the same opportunities as men.

Table 1 – Summary statistics for study participants

	Male (1)	Female (2)
Age	46.83	42.88
Education	2.682	2.532
Empowerment score	0.770	0.731
Achieves empowerment	0.686	0.556
Achieves gender parity	0.673	0.673
Willingness to pay for in-kind good	359.5	290.5
Nr. observations	500	500

Figure 2 visualizes the main contributors to disempowerment for women and men. The three top disempowering factors for both women and men are a lack of autonomy in decision making, a reduced sense of self efficacy, and – especially for women – a high workload (as measured through the work balance indicator). Interestingly, control over the use of income is not a major factor contributing to disempowerment in this setting, which may have implications for our experimental findings, especially regarding a respondent's willingness to pay for control over income, and the differences in valuation of changes in workload depending on whether labor costs are deducted from one's own earnings versus those of one's spouse.

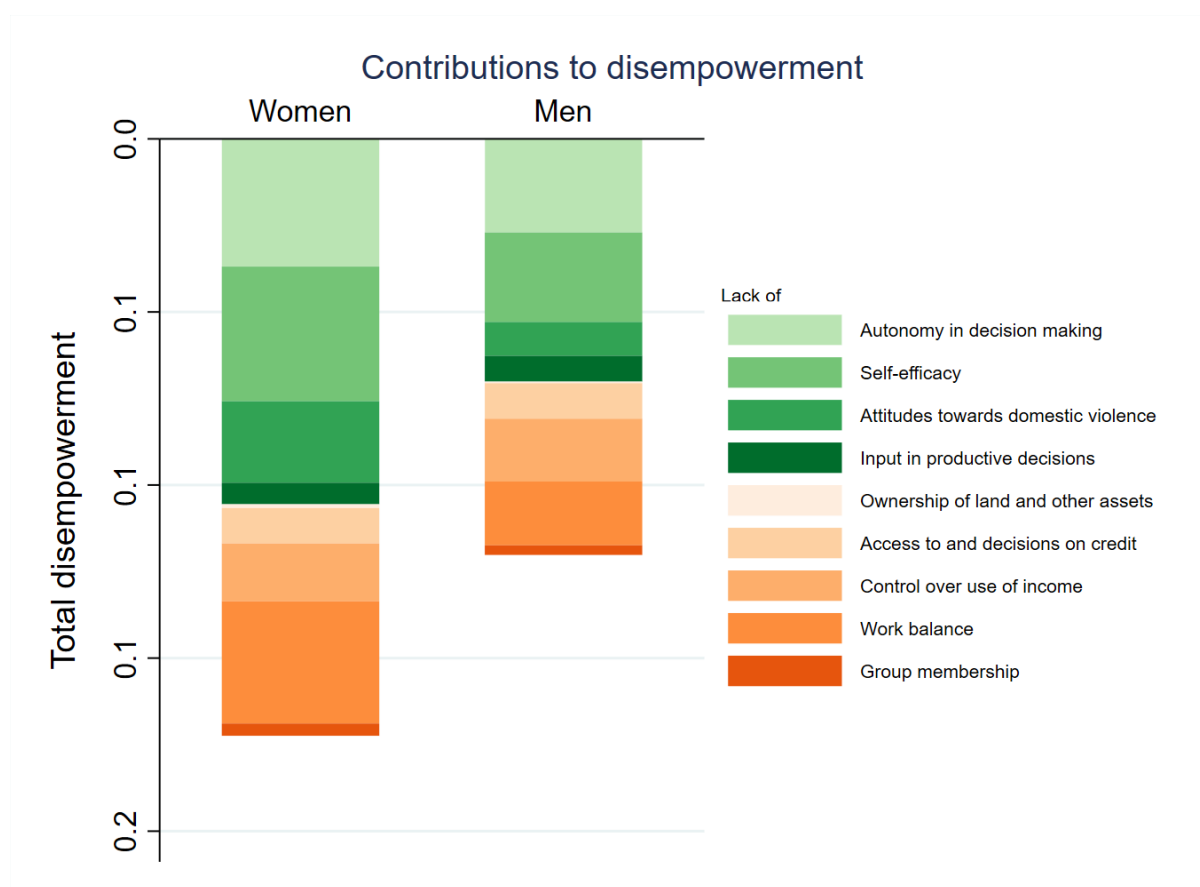**Figure 2 – Contribution to disempowerment by Pro-WEAI indicator**

Table 2 summarizes the proportion of male and female respondents with an inadequate work balance (i.e. with a workload that is too high) over time. Men's workload is significantly lower than women's workload, particularly later on in the season. In later rounds of the experiment, women are at least 1.6 times more likely than men to have a workload that is too high. Based on this finding, we would expect women to be willing to pay significantly more for laborers that could help them reduce their workload; especially when they can choose when these laborers come help them in their farms, that is, in our flexibility treatment arm.

Table 2 – Proportion of respondents with inadequate work balance (high workload)

	Round 1	Round 2	Round 3	Round 4
Men	0.338	0.372	0.384	0.402
Women	0.498	0.646	0.620	0.654

3.2 Willingness to pay for control over income

Next, we turn to choices in the first experimental task. Figure 3 plots, by round, the average that men and women are willing to pay for control over income, depending on whether their earnings will be paid in cash or in kind. In the first round, we did not yet have the options in which receiving a payment through one's spouse would lower earnings (scenarios 0a and 0b). In this round, many participants – particularly men – always opted for being paid via their spouse, and we assign them a willingness to pay of RFW -/- 250. Given the change in our design, data from that round should not be directly compared to the other rounds, in which the

willingness to pay for control over income is significantly higher. Nonetheless, even in later rounds, the average male participant does not sacrifice household income in order to be paid directly and gain control over income. In fact, in the second round, his willingness to pay for control over in-kind income is still negative. And although women are willing to pay a significantly higher amount to be paid directly in each round, even their willingness to pay for control over income is modest.

Figure 3. Willingness to pay for control over income.
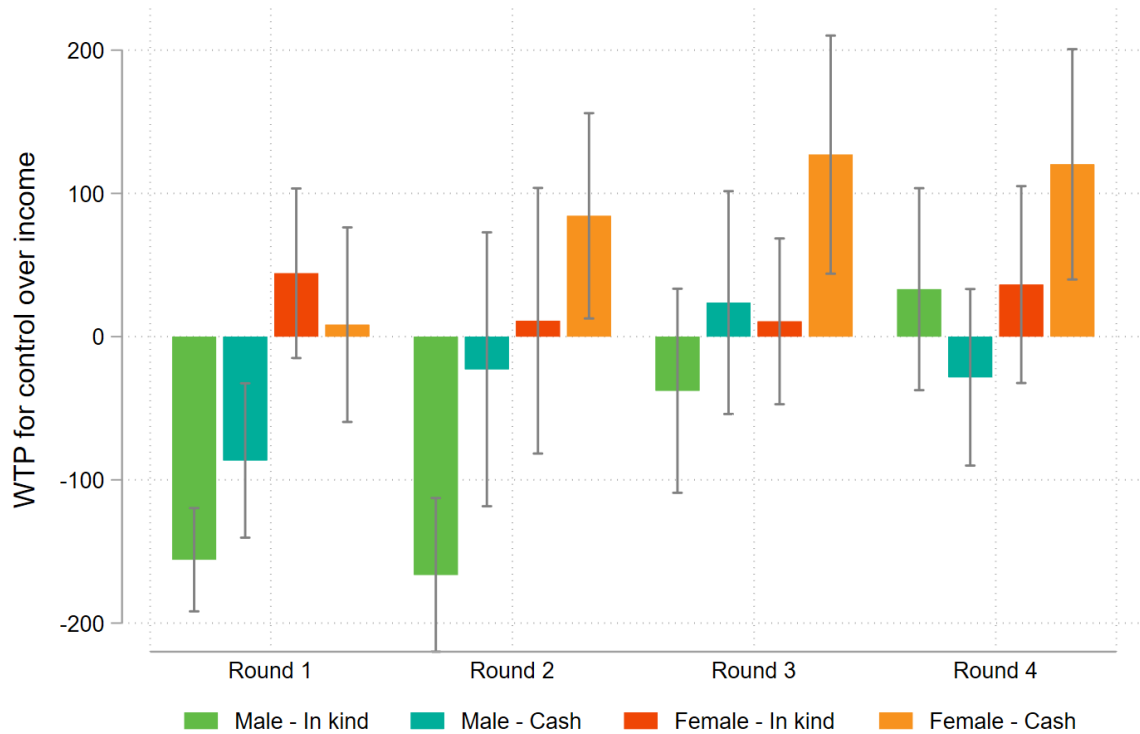
Next, we estimate a random effects model with the willingness to pay for control over income as the dependent variable. As explanatory variables we have an indicator for gender, for observations post round 1 (given the change in experimental design), an interaction between gender and round, an indicator for the cash treatment (as compared to in-kind), and its interaction with female. We also control for the respondent's willingness to pay for the in-kind good, as it could influence the effects of the cash treatment. Finally, to investigate whether gender gaps in the willingness to pay for control over income can be explained by disparities in empowerment, alternative specifications include a variable indicating that the respondent is empowered, and its interaction with female; or an indicator of the participant being inadequate in the control over income domain, again along with an interaction term capturing differences across women and men. Random effects are defined at the participant level and standard errors are clustered by session.

Table 3 presents the estimates from this regression. In Column (1), we replicate the finding that women are willing to pay significantly more than men for control over income. On average, the gender gap in the first round is RFW 162, or 6.5 percent of the amount that one could have

paid to the spouse. In subsequent rounds, the gap becomes marginally smaller, but the interaction term between "Post round 1" and "Female" is significant only at the 10 percent level, and women still sacrifice more income than men to be paid directly. Respondents in the cash treatment are willing to pay more for control over income, but also this difference is significant only at the 10 percent level, and we find no significant heterogeneity by gender in Column (2). There is a strong correlation between a respondent's willingness to pay for the in-kind good and his or her willingness to pay for control over income, again without significant heterogeneity by gender.

Table 3 – Willingness to pay for control over income: Regression estimates

	Dependent variable: Willingness to pay for control over income					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	161.7***	155.6***	156.6***	178.4***	160.6***	144.5***
	(29.44)	(34.01)	(29.39)	(40.78)	(30.11)	(33.84)
Post round 1	99.20***	99.37***	96.81***	97.32***	96.79***	96.85***
	(25.82)	(25.80)	(26.78)	(26.86)	(26.76)	(26.78)
… X Female	-54.60*	-54.94*	-53.06*	-54.60*	-52.18	-52.33
	(32.00)	(32.12)	(32.12)	(32.55)	(32.03)	(32.12)
Paid in cash	26.56*	20.10	28.39*	25.77	28.59*	25.95
	(15.87)	(19.53)	(16.02)	(20.08)	(16.07)	(20.14)
… X Female		12.69		5.494		5.379
		(30.01)		(30.36)		(30.54)
WTP in-kind	0.145***	0.145***	0.144***	0.144***	0.144***	0.144***
	(0.0261)	(0.0262)	(0.0266)	(0.0267)	(0.0267)	(0.0268)
… X Paid in cash	0.0507	0.0511	0.0557*	0.0559*	0.0564*	0.0560*
	(0.0339)	(0.0338)	(0.0338)	(0.0336)	(0.0339)	(0.0336)
Empowered			-16.41	4.753		
			(18.76)	(21.00)		
… X Female				-39.04		
				(31.90)		
Income control					29.50	-0.363
					(24.98)	(32.50)
… X Female						64.87
						(52.76)
Constant	-198.1***	-195.1***	-185.3***	-198.4***	-204.0***	-195.4***
	(17.39)	(18.86)	(20.52)	(23.54)	(20.28)	(20.97)
N	3998	3998	3906	3906	3910	3910

Standard errors in parentheses clustered by session. * $p < .1$, ** $p < .05$, *** $p < .05$

Columns (3)-(6) include survey-based measures of empowerment in order to test whether these correlate with our measure of the willingness to pay for control over income. Being empowered is indeed associated with a lower willingness to pay, especially for women (see Column 4), but the differences are not statistically significant. Having inadequate control over income based on the Pro-WEAI is associated with an increase in women's willingness to pay in Column (6), but also here, we find no statistical significance. Thus, although the Pro-WEAI data suggests that a lack of control over the use of income is not a major contributor to disempowerment, we do find a significant gender gap in the willingness to pay for control over income. Women give up more household income than men in exchange for being able to receive their income directly. Survey-based measures of empowerment cannot explain this observed gender gap in willingness to pay for control over income.

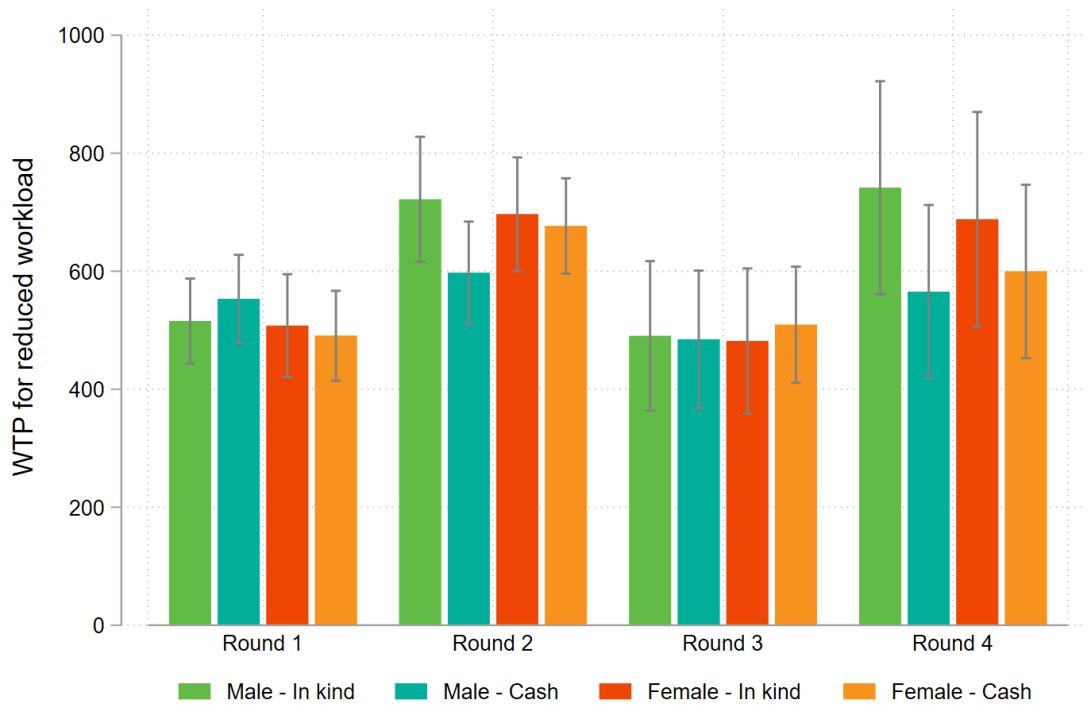### 3.3 Willingness to pay for a reduced workload

Next, we turn to the second experimental task, eliciting valuations of changes in workload. Demand for labor is high, with an average willingness to pay of RFW 580 to reduce one's workload by a day, or 23 percent of total earnings from the experiment that respondents forgoing labor would have received. This is also substantially higher than the amount that respondents were willing to pay in the first task. In other words, respondents are sacrificing more household income to reduce their workload than the amount of household income that they are sacrificing to prevent their spouse from receiving that income. It is worth noting, though, that the median daily wage paid by respondents based on survey data is substantially higher at RFW 1,214 for all agricultural activities across rounds, and that wages paid in practice vary substantially: the median participant paid RFW 700 for weeding in the first round; RFW 800 for weeding in the second and third round; and RFW 1,500 for harvest in the fourth round.

Figure 4 plots the willingness to pay for a day's worth of labor by round for men versus women, and by payment mode. Panel (a) focuses on choices in which the spouse would be paid, and labor costs are paid out of his or her experimental earnings, whereas Panel (b) focuses on choices that affect one's own experimental income. We do not find significant gender gaps in these valuations. Men and women are willing to pay on average the same amount for labor, regardless of whether they are paid in cash or in kind. Comparing panels (a) and (b), patterns are very similar, indicating that respondents do not value changes in workload differently depending on whether they would personally control the income from working more.

We test more formally for significant differences in the valuation of a change in workload using a random effects model. As in the previous section, we define random effects at the respondent level, and regress the willingness to pay for a day's labor on gender and payment mode (cash versus in kind). Instead of including a post-round 1 indicator, we now include indicators for every round, since Figure 4 shows that there is no clear break between earlier and later rounds, and since the design of this task did not change between the first and second round. In addition, we include an indicator for the income recipient – whether the labor hiring decision is made using the spouse's income or the respondent's own income – and a variable indicating that the respondent has the flexibility to choose which day the laborer will come. As before, standard errors are clustered by session.

Figure 4. Valuation of reduced workload

(a) Reducing workload affects spouse's income

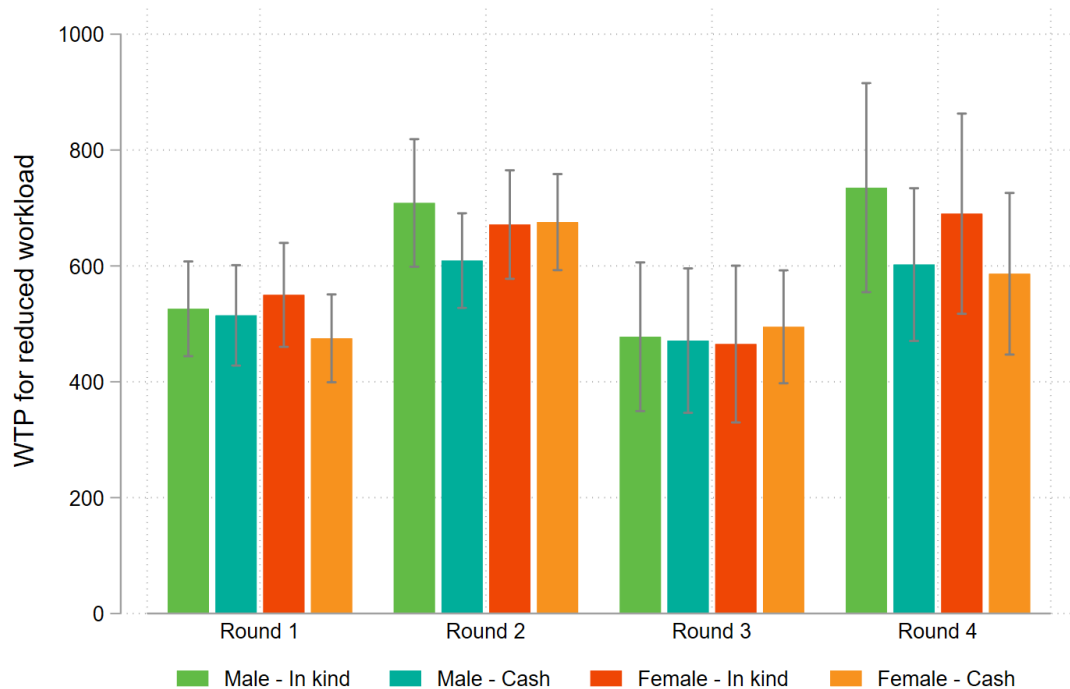### (b) Reducing workload affects own income

Table 4 presents the estimates of this random effects model. In Column (1), the difference between men's and women's willingness to pay for labor is a small and insignificant RWF 2.4,

and we also do not find significant differences depending on whether participants are paid in cash or in kind, whether decisions are made with their spouse's or their own earnings, and whether they have flexibility in the choice of labor days. Column (2) controls for the interaction of these variables with gender, and finds that there is no significant heterogeneity, although paying for labor out of cash income appears to reduce willingness to pay for labor particularly among men. Interestingly, flexibility reduces willingness to pay for labor especially among women. Thus, being able to choose which days they can take off, and which days they will show up to work, reduces women's valuation of free time. Although not statistically significant, this is inconsistent with developed country findings that more flexible work arrangements allow women to handle their workload more easily.

Columns (3) – (6) analyze to what extent the willingness to pay for a day's labor is correlated with survey-based measures of empowerment and work balance. More empowered respondents value a reduction in workload more than less empowered individuals, and respondents with too high of a workload (that is, an inadequate score on the work balance indicator in Pro-WEAI) are willing to pay less for help on their farms. These coefficients are in the opposite direction as what we would have expected a priori but are also small and statistically insignificant.

Section 4. Conclusion

Agricultural development programs often aim to increase incomes and enhance women's control over the additional income. However, an unintended negative consequence of these programs is that they may increase women's already heavy work burdens. Indeed, although women in our rural Rwandan study context are less empowered than men, control over the use of income is contributing less to disempowerment than high workloads. This would suggest a stronger valuation of changes in workload among women compared to their valuation of control over income.

With the aim of studying more closely to what extent women and men prefer increasing their control over income, reducing their workload, or a combination of the two, we designed and implemented a lab-in-the-field experiment with 1,000 men and women in rural Rwanda. We find that women are willing to sacrifice more household income to gain control over income than their husbands, but the proportion of income that they are willing to sacrifice remains relatively modest and lower than what we would have anticipated based on prior literature. This could be related to the context, in which control over the use of income is not a major contributor to disempowerment, but we cannot explain the low willingness to pay for control over income to survey-based measures of control over the use of income.

At the same time, consistent with the survey-based finding that an inadequate work balance is a major contributor to disempowerment, we find that women are willing to forgo significantly more personal and household income with the aim of reducing their workload compared to their willingness to pay for control over income. At the same time, we find an equally strong valuation of changes in workload among men, who are significantly less likely to have an

Table 4. Valuation of reduced workload: Regression estimates

	Dependent variable: Willingness to pay for one day of labor					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-2.428	-5.783	-6.062	-11.63	2.119	8.664
	(20.54)	(29.21)	(21.69)	(30.01)	(21.98)	(33.37)
Cash	-47.85	-65.28*	-49.64	-49.70	-48.03	-48.19
	(31.24)	(37.58)	(30.35)	(30.35)	(31.28)	(31.42)
Spouse	-3.752	-2.503	-4.480	-4.480	-3.752	-3.752
	(4.805)	(7.582)	(4.553)	(4.554)	(4.806)	(4.806)
Flexible	-17.82	-4.404	-16.50	-16.77	-17.19	-17.47
	(54.63)	(56.90)	(53.49)	(53.39)	(54.83)	(54.50)
Female x Cash		34.88				
		(28.66)				
Female X Spouse		-2.497				
		(10.31)				
Female X Flexible		-26.71				
		(42.18)				
Empowered			32.34	27.24		
			(28.41)	(37.62)		
… X Female				9.266		
				(37.60)		
Inadequate workload					-19.70	-12.76
					(21.14)	(35.73)
… X Female						-13.48
						(54.24)
Constant	551.5***	553.1***	534.5***	538.0***	557.2***	554.6***
	(27.81)	(28.83)	(34.31)	(36.21)	(28.81)	(32.96)
Round effects	Yes	Yes	Yes	Yes	Yes	Yes
N	7996	7996	7812	7812	7996	7996

Standard errors in parentheses clustered at the session level. * $p < .1$, ** $p < .05$, *** $p < .05$

inadequate work balance. Moreover, survey-based measures of inadequate work balance do not correlate well with the valuation captured in the experiment. Therefore, using qualitative data collection to validate the metrics collected through the lab-in-the-field experiment and through survey-based methods such as Pro-WEAI remain an area for future research.

We conclude that in the setting where the experiment was conducted, agricultural development programs that introduce time-saving practices and technologies have potentially greater positive welfare impacts for both women and men than programs increasing women's control over resources.

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