

# **Essays in Development Economics**

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March 2013



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# Acknowledgements

Many people have contributed their time, thoughts and good wishes in supporting my journey in producing this dissertation. I would like to take this opportunity to express how grateful I am for their support along the way. First, I would like to express my deep gratitude to my supervisors, Kjetil Bjorvatn and Erik Sørensen, who have guided me in my research and whose stimulating suggestions and enthusiasm have given me encouragement throughout my candidature.

Second, being a part of the Choice Lab at the NHH Norwegian School of Economics and being included in a diverse group of very exceptional researchers has always been a blessing for me. I would especially like to thank Lars Ivar Oppedal Berge, who always was eager to share his knowledge on a wide range of topics. I am grateful to Bertil Tungodden for much inspiration and support. I have also benefited greatly from discussions with Alexander Cappelen.

Third, I would like to thank the Promotion of Rural Initiatives and Development Enterprises Limited (PRIDE) in Tanzania and Pegadaian (the state-owned pawnshop company) in Indonesia for their approval and assistance with data collection. Discussions with the staff of these institutions enabled me to obtain a much deeper understanding of the field situation and their clients. I would particularly like to thank Mwaisela Abel, Hermenegild Kiyagi, Antusa Felix Massawe, and Sanuri. In return, I very much hope that the results of my studies will benefit these institutions and their clients.

Fourth, a research institution called Research on Poverty Alleviation (REPOA) provided me with facilities for conducting the necessary laboratory experiments in Dar es Salaam. My study would also not have been possible without the dedication and hard work of my research assistants in both Dar es Salaam and Jakarta. I am blessed to have had them. I am also grateful to have had Linda Helgesson Sekei help me settle in Dar es Salaam and her assistance with exposing me to the local culture.

Fifth, I would like to thank the Department of Economics at the Norwegian School of Economics (NHH), the NHH Fund, and the Vilhelm Keilhau Foundation for their generous financial support.

Sixth, in the process of finalizing the dissertation, I am indebted to Vivienne Knowles for her skills in language editing.

Seventh, studying and living far from home while undertaking a PhD can sometimes be exhausting. I would like to say thank you to RT Bergen, the Indonesian community in Bergen, for the warmth of family that has made Bergen another home for me.

Eighth, I was blessed to have my husband, Rizal Adi Prima, accompany me throughout this journey. He has supported me ever since my very first steps in the program and has always been an important discussion partner in my research. His love, patience and understanding have enabled me to complete this PhD project.

Last but not least, I would like to dedicate this dissertation to my late father, my mother, and my brothers, whose faith in me has allowed me to achieve my dreams, even though it meant that I had to be thousands of miles away from them.

Jakarta, March 2013  
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# Introduction

In many parts of the world, people rely on micro and small enterprises (MSEs) as sources of income. In fact, in some African countries, 20–40% of households operate micro businesses (Mead and Liedholm, 1998; Liedholm, 2002). Furthermore, the majority of these businesses are operated by a single person. Importantly, unlike their counterparts in developed countries who value entrepreneurship principally as an opportunity, a significant proportion of the so-called “entrepreneurs” in developing countries are forced into this kind of activity (Acs, 2006) after being excluded from the labor market because of the limited employment opportunities and/or a lack of appropriate skills to fill the positions available.

Because of the informality and the micro features of the activity, establishing a micro business is relatively easy in developing countries, with relatively small demand for the necessary startup capital. As a result, most of these businesses are established using personal savings or borrowings from informal sources, such as family and friends (Verheul and Thurik, 2001). In Indonesia, for example, almost four out of every five new micro businesses rely on informal sources of capital. In turn, these informal sources of capital help determine the size of the businesses able to commence. These effects are particularly pronounced in Africa, where the annual growth in the number of newly established MSEs is about 20–30%, a much higher rate than that typically found in developed countries (Mead and Liedholm, 1998).

However, despite the apparent ease in establishing MSEs, ensuring the survival and growth of such enterprises is challenging. A high percentage of MSEs close down before operating for at least three years, and less than 3% grow to employ more than three employees (Liedholm, 2002). These features are probably the result of the fact that necessity drives entrepreneurship, which means that entrepreneurs potentially lack the entrepreneurial skills and mindsets to expand their business, with most MSEs managed by people with a limited formal educational background.

The lack of financial capital is frequently cited as the most important barrier to the development of MSEs (see, for example, Batra et al., 2003). Obtaining credit from banks is almost impossible for the poor. From the banks’ perspective, there are many reasons not to extend loans to poor entrepreneurs, including the lack of collateral, the demanding documentation required and the higher cost of lending owing to the relatively small size of the loans.

In this regard, the establishment of microcredit in Bangladesh in the early 1970s has been seen as an important innovation in this area, because it requires the poor to have only social collateral to obtain a loan. Potential borrowers may then form a joint liability group in which they guarantee each other's loans. The presence of this group shifts the burden of screening and monitoring from the lender to the borrowers. Since then, millions of people around the world have accessed small loans using this type of scheme.

For years, microfinance has been recognized as a powerful tool for poverty reduction. Perversely, there are no rigorous evaluations concerning the causal relationship between microfinance and poverty reduction (Bateman, 2010). Recent randomized control trials used to evaluate the impact of microfinance provide some evidence that microfinance is not the miracle for poverty reduction, as claimed by some of its supporters. However, in the short run, microfinance has a significant impact on business establishment and business expenditure on durable goods (Banerjee et al., 2010). Whether this leads to poverty reduction in the long run remains unknown.

Furthermore, even though group lending practices have been praised for opening up access to finance by the poor, they are also criticized for several potential problems that may emerge (for a review, see Harper, 2007). Theoretically, group lending should work. A group of people with a common interest should collaborate as best as they can to secure access to finance. They should then follow the rules in borrowing and be disciplined in making repayments. However, in practice, free riding and moral hazard are not uncommon. Understanding the factors that affect group performance is then critical and useful for both borrowers and lenders to ensure that both parties benefit from the lender–borrower relationship.

For at least some entrepreneurs, relaxation of the financial capital constraint may also need to be accompanied by increasing human capital, particularly the managerial skills needed for running the business and generating profits. Training and mentoring processes may be able to play an important role, although whether entrepreneurship can be actually taught remains debatable (Klein and Bullock, 2006).

In a recent review on the impact of training for entrepreneurs, McKenzie and Woodruff (2012) suggest that although several types of training do have an impact on different outcomes, such as business practices and the establishment and survival of businesses, many training programs generate no significant results. Hence, many components need to be improved so that policy makers have greater confidence in scaling up these interventions.



Relaxing financial and human capital constraints may together improve the internal capacity of entrepreneurs to be able to expand their businesses. However, there are also external factors that determine the success, such as the availability of infrastructure, that play an important role in the progress of MSEs. Hence, along with the effort required to strengthen the capacity of entrepreneurs, there is a need to develop the necessary infrastructure, such as transportation, that could reduce the transaction costs for entrepreneurs. Nevertheless, even if all these necessary conditions are in place, the success of entrepreneurship cannot be taken for granted. Furthermore, the entrepreneurial character is indeed a critical input for business success. Entrepreneurs' traits and characteristics may affect their willingness and ability to expand their businesses. Necessary personality traits for entrepreneurship include vision and passion, integrity, and the ability to work in teams (Ernst & Young, 2011). Hence, it is critical to learn how these personality traits are acquired and develop.

This dissertation aims to contribute to the ongoing effort to strengthen MSEs by providing evidence of the mechanisms that may or may not work in relation to increasing human and financial capital in these enterprises. In the first paper, we compare the outcomes of training for different types of instructors, namely professionals and credit officers, with the objective of ascertaining their effects on training outcomes. In the second paper, we consider the effect of different gender compositions in microfinance groups, with the objective of better understanding the impact of gender on group performance. In the third paper, we analyze whether a mobile phone text reminder can stimulate the timely repayment of loans. Ideally, borrowers would not forget the due date of their loans, but they may do so because of limited attention. The final paper employs quite a different setup in being a more descriptive analysis of the secondary data sources used in considering the formation of preferences important for the success of entrepreneurs.

The summary of each paper is as follows.

## **Business Training in Tanzania: From Research-driven Experiment to Local Implementation**

The first paper in this dissertation aims to shed light on the effect of replenishing the human capital of entrepreneurs. The paper is co-authored with Lars Ivar Oppedal Berge, Kjetil Bjorvatn, and Bertil Tungodden and published in the *Journal of African Economies*.

Field experiments to evaluate the impact of a particular intervention are designed and closely monitored by the researchers. After the evaluation period, the researchers remove themselves from the program, and the program may or may not be scaled up. The fact that the program was closely monitored by the researchers may influence the implementation of the program and eventually the impact of the program. The question, then, is whether the impact of intervention can be sustained after the researchers exit and the program is locally implemented.

We address the issue of scaling up of research-led interventions and compare the outcomes of a business training program for microfinance borrowers with different instructors, either professionals or credit officers, and whether this affects training outcomes.

The participants were randomly assigned into classes across the two types of instructors. The materials, the sequence of training, and the class environment are the same in the two groups; the only thing that differs is the type of instructor. If the program is scaled up, it is most likely that the credit officers will deliver training because hiring external instructors is relatively costly.

The results show that the class with the professional instructor was clearly more successful than that with the credit officer. First, attendance was higher and the externally trained entrepreneurs considered the course to be more beneficial. Second, the externally trained entrepreneurs gained more business knowledge and reported a higher level of happiness with their overall situation. Business knowledge, course satisfaction and general happiness were measured two and a half years after the training was completed, which suggests lasting differences in assessment and impact. The results thus indicate that the impact of external research projects may represent an upper bound of what would be the impact if such projects were to be scaled up by a local organization.

## **Group Composition and Group Dynamics: Evidence from a Laboratory Experiment with Microfinance Clients**

The second paper in this dissertation represents joint work with Lars Ivar Oppedal Berge and Linda Helgesson Sekei. This paper looks at how gender composition affects group performance in a microfinance setting in which the ability of each member of the group to cooperate with other group members is critical to group performance.

In this study, microfinance borrowers were randomly chosen to be part of a laboratory experiment and then randomly assigned into different groups by gender composition: single-gender groups (male or female) and mixed-gender groups. The participants were requested to solve problems and take decisions regarding risk in the group.

The results show that the gender composition is important for the functioning of groups in several respects. The main findings are as follows. First, the willingness of neither men nor women to contribute in the public good game was influenced by the gender composition of their group. Second, in the problem-solving, group composition matters, as female-only groups outperformed both male-only and mixed-gender groups, even though women individually performed much more poorly than men. These results suggest that gender composition matters in the ability to cooperate, but not in the willingness to cooperate in groups. Finally, we observed a shift to more cautious decisions in groups regardless of gender composition. However, the proportion of female-only groups that take risks was significantly higher compared with mixed groups.

## **A Nudge to Remember: Evidence from a Field Experiment with Pawnshop Borrowers**

Some entrepreneurs and employees may be able to accumulate in-kind savings such as jewelry or electronics. These people can then use these kinds of goods as collateral so they can access finance from sources other than microfinance institutions, such as pawnshops. Pawnshops can provide loans just as small as in microfinance. Furthermore, a pawnshop can provide loans with lower transaction costs because there is no joint liability or weekly meetings with the pawnshop and loan procurement is comparatively quick.

In some cases, such as in Sri Lanka and Indonesia, the pawnshop actually benefits the poor, even though it generally involves a negative stigma (Bouman and Houtman, 1988; Fernando, 2003).

In the pawnshop, a borrower pledges his or her collateral to obtain a loan, and the borrower has to redeem the goods before the maturity date or the pawned items may be auctioned. However, due to limited attention, some people may forget the item and the loan. This study aims to measure the impact of a nudge in the form of a Short Message Service (SMS) reminder to help borrowers remember their pawned items so that they do not lose their valuables in the auction.

In a field experiment in Indonesia, we randomly assigned one-third of the borrowers who could potentially miss their repayments into a control group, with the remaining two-thirds receiving an SMS reminder. The results show that a text reminder increases the proportion of borrowers who go to the pawnshop before the due date by 6.9 percentage points. Different content of the text did not appear to generate any difference in the main result. Furthermore, we find that women drive the overall treatment effect.

## **Intergenerational Transmission of Preferences: Evidence from the Indonesian Family Life Survey**

The fourth paper aims to identify the factors that determine an individual's preferences, with a particular emphasis on observing the effect of the intergenerational transmission of preferences. There are three preferences of interest: trust, risk and time preferences. These preferences are important for the development of enterprises because they affect both selection into entrepreneurship and the decisions made in these enterprises, which ultimately affect business outcomes.

The study employs data from the Indonesian Family Life Survey (IFLS), which is the first and most comprehensive longitudinal dataset available in the country. The fact that the survey measured the preferences of all adult members of the households surveyed provides an advantage in that the measurement of the preferences of parents and children is identical. Each child is paired with both father and mother using the first wave of the IFLS data (IFLS1), and the pairs are merged with the respective characteristics and preferences of the child, the father and the mother from the data in the fourth wave (IFLS4).

The results show that there is a positive correlation between the trust, risk and time preferences of children and their parents. In general, the mother has a larger role in shaping the child's trusting behavior than the father, whereas the father has a more important role in shaping the child's willingness to take risk and willingness to wait. In general, we discern similar results and patterns to the findings from a similar study using German data. On this basis, we conclude that the intergenerational transmission of preferences is robust across countries, regardless of any differences in institutional and policy settings.

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**Erratum**

Page 18, second paragraph of subsection 4.1: “On average, the clients in the externally trained group attended 13.0 sessions and the clients in the internally trained group attended thirteen sessions.”

Correction: “On average, the clients in the externally trained group attended 15.7 sessions and the clients in the internally trained group attended thirteen sessions.”

# Chapter 1

## **Business Training in Tanzania: From Research-driven Experiment to Local Implementation**





# Business Training in Tanzania: From Research-driven Experiment to Local Implementation<sup>†</sup>

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## Abstract

*Field experiments documenting positive treatment effects have a strong policy message: scale up! However, such experiments are typically implemented under close supervision of the research group in charge of the study. In contrast, scaling up would typically imply relying on local organisation. It is not obvious that the positive treatment effects identified in the research-driven intervention can be replicated locally. The present study explicitly addresses this challenge by analysing the local version of a research-driven business training programme among microfinance entrepreneurs in Tanzania. Comparing the local programme with the research-*

<sup>†</sup>This paper is part of a joint project between the research groups in development economics and experimental economics at the Department of Economics, Norwegian School of Economics and the research centre Equality, Social Organization, and Performance (ESOP) at the Department of Economics, University of Oslo. We have also received financial support from Sparebanken Vest and the Research Council of Norway. We warmly acknowledge the support of Promotion of Rural Initiatives and Development Enterprises (PRIDE Tanzania), Research on Poverty Alleviation (REPOA, Tanzania) and the University of Dar es Salaam Entrepreneurship Centre (UDEEC, Tanzania) in the design and implementation of the business training programme. A special thanks for excellent research assistance to Maria T. Frengstad, Tumainiel Ngowi, Linda Helgesson Sekei, Sheena Keller and Juda Lyamai.

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*led programme in terms of attendance and subjective evaluation, we find that success in local implementation cannot be taken for granted. Moreover, an analysis of long-term outcomes also demonstrates a weaker impact of the local programme. We conclude that the estimated effect of research-led interventions should be interpreted as an upper bound of what can be achieved when scaling up such interventions locally.*

**JEL classification:** C81, D04, I25, C93

## 1. Introduction

Field experiments are widely used in developing countries to investigate a host of issues of importance to policy-makers, such as the role of community participation in improving health services (Björkman and Svensson, 2009), the effect of deworming on educational outcomes (Kremer and Miguel, 2003) and the effect of business training on micro-enterprise development (Berge *et al.*, 2011; Karlan and Valdivia, 2011). These studies evaluate carefully implemented interventions, closely monitored by a research team. To draw policy implications, however, one would like to know what the effect of a programme is when the researchers have stepped back. Are local stakeholders able to implement similar programmes?

The difficulty of scaling up is particularly pressing when the programme is complex, where the intervention stretches over time, and where the organisational setting and skills of the service providers matter greatly for the quality of the services provided. As emphasised by Sternberg *et al.* (2006) when analysing the challenges of scaling up educational programmes: ‘Programs often work on a small scale due to adoption by highly motivated individuals. Moreover, in the context of small-scale implementations, a key factor is often the proximity of the creators of the program to its first adopters and implementers. This proximity implies not only the physical proximity, but also the proximity of ideas and beliefs - those educators who are willing to try new programs usually see a value in doing so and thus are more predisposed to raise the odds of the program to succeed. Therefore, programs may work on a small scale, but they fail when they are upscaled because the initial sample of the program’s deliverers was not representative of the larger population’ (pp. 206–7).

In Bjorvatn and Tungodden (2010) and Berge *et al.* (2011), we document by a randomised field experiment that a business training

programme given by professional trainers from the University of Dar es Salaam Entrepreneurship Centre (UDEEC) significantly affected business skills, entrepreneurial attitudes, business practices and business outcomes among microfinance clients of the microfinance institution Promotion of Rural Initiative and Development Enterprise (PRIDE) Tanzania. For PRIDE, the business training programme was seen as a pilot project that, if successful, would be scaled up in one form or another by the institution. However, two important questions remain: Can they implement the programme? Should they implement it?

The main focus of the present paper is on the first question. We analyse a local version of the intervention where some microfinance clients were offered training by internal credit officers, and compare it with the intervention using professional trainers from UDEEC. This comparison sheds light on PRIDE's ability to implement such a programme. Outsourcing business training to professional trainers, such as UDEEC, is expensive and hard to implement on a large scale in Tanzania, and thus an important question for PRIDE when considering whether to scale up is whether such a programme can be offered in-house. Would the quality of an internal programme be sufficiently high to attract the attention of the entrepreneurs?

The second question is whether PRIDE should implement the programme. In *Berge et al. (2011)*, we document a positive impact of business training on business outcomes, in particular for male entrepreneurs. Thus, from a societal point of view, business training is likely to be beneficial. However, as stressed by *Armendáriz de Aghion and Morduch (2010)*, a microfinance institution typically balances social impacts, on the one hand, and financial sustainability, on the other hand, and the impact of business training on the latter is not trivial.

One motive for PRIDE to offer business training to its clients on a regular basis is clearly that this could provide a competitive edge over other microfinance institutions and, thus, attract more customers. Another argument in favour of business training is that the clients' increased skills and potentially stronger loyalty to the institution could translate into higher loans and fewer repayment problems. But this is not necessarily the outcome. Indeed, a more knowledgeable and successful entrepreneur may find cheaper sources of finance outside the microfinance institution. If training triggers the exit of clients, the microfinance institution may become more reluctant to offer such services to its clients. Further, PRIDE's decision on whether to offer the training would also depend on the clients' willingness to pay for the service. Does PRIDE

have to offer the programme for free in order to make it attractive to the clients, or can the costs be covered by imposing a participation fee? We discuss these issues in the concluding part of the paper.

Our main finding is that the external training clearly worked better than the internal training. First, attendance was higher and the course was considered more beneficial by the externally trained entrepreneurs; second, the externally trained entrepreneurs gained more business knowledge and reported a higher level of happiness with their overall situation. Business knowledge, course satisfaction and general happiness were measured two and a half years after the training was completed, which suggests enduring differences in assessment and impact. Our results thus indicate that the impact of external research projects may represent an upper bound of what would be the impact if such projects were to be scaled up by a local organisation.

The remainder of the paper is organised as follows. Section 2 briefly describes the intervention, a business training programme offered to microfinance clients in Dar es Salaam, Tanzania. Section 3 presents the data and the empirical strategy, with an emphasis on randomisation procedures and the treatment–control balance, and Section 4 reports the main results. Section 5 concludes.

## 2. The training programme

The business training programme consisted of twenty-one sessions, each lasting 45 min, and was offered for free at the premises of the microfinance institution immediately after the weekly loan meeting of the clients. The aim of the programme, which commenced in August 2008 and ended in January 2009, was to unleash entrepreneurship among the microfinance clients. It was developed by UDEC and piloted extensively.<sup>1</sup> The course covered a range of topics, such as record-keeping, marketing practices, customer care and employee management. A participatory method was adopted, with the sessions focusing on real-world examples in order to make the insights vivid for the clients. The trainers also encouraged the participants to learn from each other's experiences and to share their business challenges and problems.

For capacity-building purposes, PRIDE chose four of its most experienced credit officers to be involved in the training of a subset of the clients. The credit officers attended the sessions given by the professional trainers, and were also instructed and evaluated by them.

<sup>1</sup> The training programme is described in detail in Berge *et al.* (2011).

### 3. Empirical strategy

We use a randomised field experiment to study PRIDE's ability to implement the business training programme using internal resources.<sup>2</sup> One group of clients was randomly assigned to be trained by professional trainers (external intervention), whereas another group of clients was assigned to receive the same training from the internal credit officers (internal intervention). In all other respects, the training programmes were identical. They covered the same content and were given at the same premises following the loan meeting of the clients. The two groups were also treated in the same manner by PRIDE. A snack and a soft drink were offered to all participants in each session, and everyone was given the incentive of receiving a graduation diploma if attending at least ten sessions. Thus, the only difference between the two interventions was the trainers. Given that the clients were randomly allocated to an internal or an external trainer, we can therefore identify the causal effect of replacing an external trainer by an internal trainer.

#### 3.1 Randomisation procedures

We selected two of PRIDE's branches in Dar es Salaam, located in Magomeni and Buguruni, for the interventions. The training was offered on Tuesdays in Magomeni and on Thursdays in Buguruni. The external training was offered to clients who had their loan meetings between 9 a.m. and 1 p.m., the internal training was offered to clients who had their loan meeting at 2 p.m. We included only clients with PRIDE loans between 500,000 TZS (USD 335) and 1,000,000 TZS (USD 670), amounts that represent the second and third steps on the loan ladder in the group lending programme. This was motivated by the fact that there are very high dropout rates among clients with smaller loans, and also that we wanted to avoid an excessively heterogeneous target group for the sessions. At the chosen time slots, there were 565 clients eligible for external training and 114 clients eligible for internal training.

As loan groups are randomly assigned a loan meeting day and hour according to the availability of time slots at the branches of PRIDE, there is no reason to believe that there is any systematic difference between the eligible clients according to the time of the loan meeting. This is also confirmed by our baseline data. There is, for example, no

<sup>2</sup> On the methodology of randomisation, see Duflo *et al.* (2008). For a critical perspective, see Deaton (2010) and Rodrik (2009).

correlation between the sectors in which the entrepreneurs are involved and the time of their loan meeting. Thus, our working hypothesis is that the entrepreneurs were effectively randomly assigned to either external or internal training.

The share of eligible clients that showed up at the first or second session was almost identical for the two groups, 290 out of 565 for the externally trained group (51.4%) and 59 out of 114 (51.8%) for the internally trained group. These clients constitute the sample of our analysis.<sup>3</sup> There is no reason to assume that the selection process into the initial sessions differs between the externally trained group and the internally trained group.<sup>4</sup> First, we used the same invitation letter for external and internal training, and there was no mentioning of who would be the instructor. Second, the external trainer played a leading role in the initial sessions also in the internal programme.

In sum, we argue that there should be no systematic difference between the pool of clients that initially showed up for the external training or the internal training. Hence, we shall think of the comparison between the clients receiving external training and those receiving internal training as a randomised field experiment measuring the treatment effect on the treated.

### 3.2 Treatment–control balances

Table 1 shows the balance on observables between the externally trained group and the internally trained group. There are no significant differences

<sup>3</sup> Focusing only on those who attended the first session gives very similar results to those reported here, but the sample size is naturally smaller. Note that our analysis is restricted to clients who received training. An alternative approach would be to include all eligible clients in the sample and conduct an intention to treat analysis. For the internal group, however, we have detailed data only on the clients actually attending the training, and thus we are restricted to a comparison of the treatment effect on the treated.

<sup>4</sup> There was a slight difference in the recruitment procedure between the external and the internal group. For the external group, we conducted a baseline survey where we managed to interview 319 of the 565 eligible clients. The baseline survey was presented to the entrepreneurs as an effort ‘to identify strategies to improve the functioning of microcredit institutions in Tanzania’, and, hence, they were not informed about the prospective business training course. After the baseline survey, the clients we had reached received an invitation to attend training. We did not conduct a baseline survey of the clients assigned to internal training because we did not initially plan to include them in the research part of the project. For this group, therefore, we invited all eligible clients whom we could reach at the loan meeting where the training was announced.



**Table 1:** Treatment–Control Balance (Full Sample)

	(1) Total	(2) Internal group	(3) External group	(4) Difference
Female	0.61 (0.03)	0.63 (0.06)	0.61 (0.03)	0.02 (0.07)
Age	39.20 (0.45)	37.59 (0.90)	39.53 (0.51)	– 1.94 (1.19)
Loan size	753.01 (12.74)	754.24 (31.27)	752.76 (13.97)	1.48 (34.04)
Education	7.82 (0.12)	7.83 (0.29)	7.82 (0.13)	0.01 (0.31)
Branch	0.49 (0.03)	0.44 (0.07)	0.50 (0.03)	– 0.06 (0.07)
Observations	349	59	290	

Notes: The table reports average values. Female is a dummy variable with a value of 1 if the participant is a female. Age is expressed in number of years. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Education is the number of years of schooling. Branch is a dummy variable that takes the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors are in parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

between the two groups on observable background variables, which indicates that the randomisation procedure was successful.

In 2011, we conducted a follow-up study of all the clients who received training. For both the internally and externally trained group, we collected information on their subjective rating of how beneficial they had found the course, conducted a business knowledge test and also collected data on how happy they were with their overall situation. For the externally trained group, we also collected more detailed information on their business performance, but for practical reasons it was not feasible for us to collect such data for the internally trained group.

In the follow-up study, we managed to reach 268 out of 290 in the externally trained group and forty-seven out of fifty-nine in the internally trained group. As we show in the appendix, the follow-up sample is also balanced on observable variables across the treatment groups (Table A1), and the thirty-four clients that we did not reach in the follow-up survey differ from the interviewed sample only on one observable background variable, loan size (Table A2). The assignment to internal training is predictive of attrition (Table A3), however, and, therefore, we report in the appendix robustness checks of our main analysis (Table A4), adopting the approaches of Kling *et al.* (2007) and Lee (2009).<sup>5</sup> Largely, our main

<sup>5</sup> These approaches are also adopted in other recent work on entrepreneurship training, see, for example, Karlan and Valdivia (2011) and Fairlie *et al.* (2012).

results are not sensitive to various assumptions about the treatment effect for attriters.

### 3.3 Econometric model

The main strategy in the empirical analysis is to estimate the following equation:

$$Y_i = \beta_0 + \beta_1 \text{Internal}_i + \gamma X_i + \varepsilon_i, \quad (1)$$

where  $Y$  is an outcome variable, *Internal* is a binary variable taking the value of 1 if the entrepreneur was offered training by the internal instructor and 0 if offered training by the external instructor, and  $X$  is a vector of control variables. Given that there are no systematic differences between the internally trained and the externally trained group,  $\beta_1$  is an estimate of the causal impact of receiving training from an internal trainer rather than an external trainer.<sup>6</sup>

## 4. Results

### 4.1 Attendance and subjective evaluation

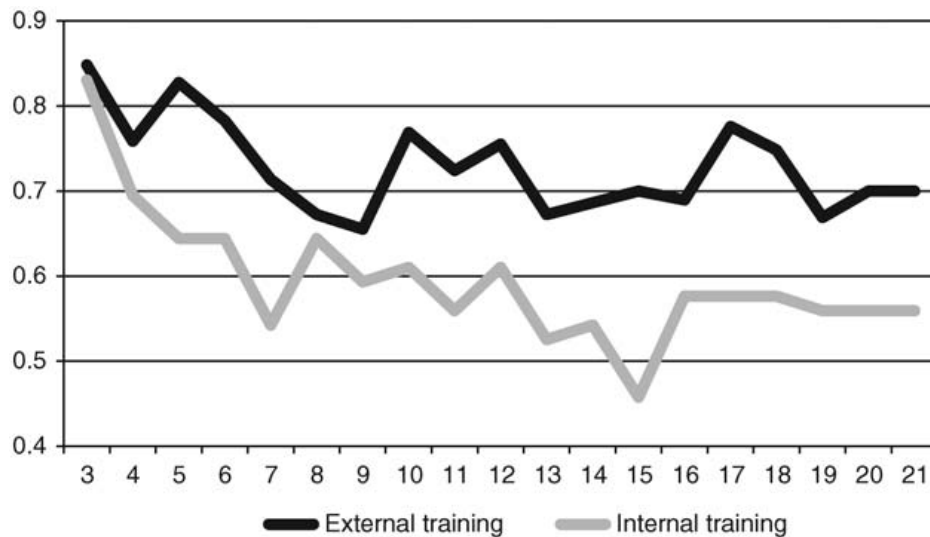
Is the local institution able to offer a business training programme in-house that attracts the clients and is perceived as beneficial to them? To study this question, we consider attendance rates and the participants' subjective evaluation of the course.

Figure 1 gives an overview of attendance over time for the two groups. As we have already reported in our discussion of the randomisation procedure, the two groups had similar levels of attendance in the first and second sessions, but the attendance in the internally trained group clearly dropped below the attendance in the externally trained group in later sessions. On average, the clients in the externally trained group attended 13.0 sessions and the clients in the internally trained group attended thirteen sessions. There is also a large difference in the share that received a diploma (which required attending at least ten sessions), 90 versus 66.6%.

Given that the internal training and the external training took place at different times of day, one might worry that the timing itself may affect the ability to turn up at the training. For example, it might be more difficult to attend training in the afternoon than in the morning. To investigate

<sup>6</sup> As a robustness check, we have also calculated propensity score matching estimates, and they are in line with the treatment effects that are reported in the paper.



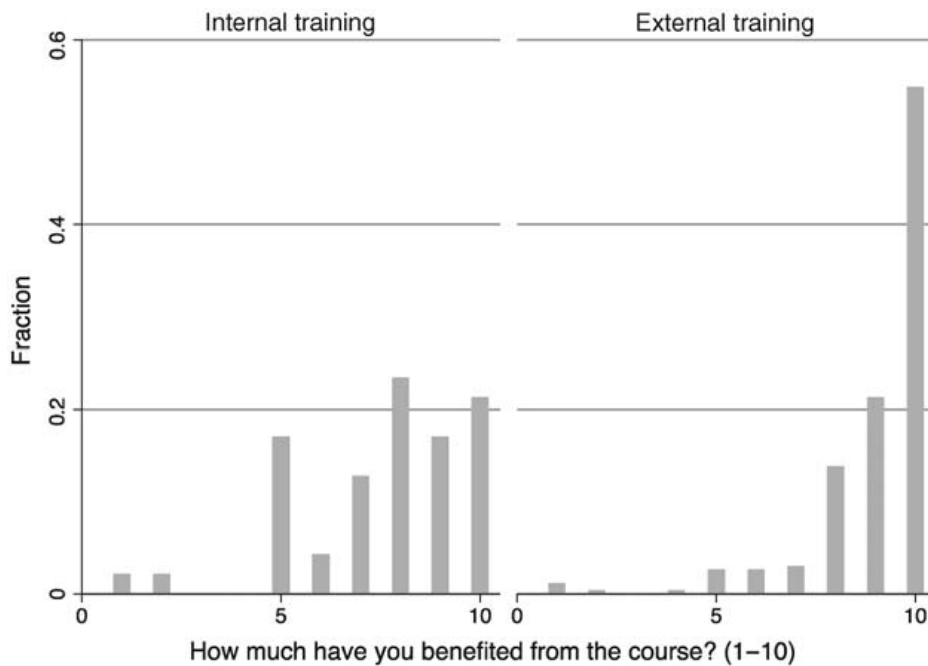


**Figure 1:** Attendance per Session. Notes: The figure shows the share of participants in our sample attending each of the sessions (3–21), by external training and internal training.

this possibility, we collected data on loan meeting attendance, but we did not find any difference in attendance at loan meetings between the time slots assigned to external training and the time slot assigned to internal training ( $t$ -test of equality,  $p = 0.32$ ).

Low attendance may be an indication of the internal training being of lower quality, and in the follow-up study we asked the entrepreneurs how much they had benefited from the course. This was reported on a scale from 1 to 10, where 1 indicated no benefit at all and 10 indicated that they had benefited a lot. Figure 2 shows the distribution of the subjective evaluations, where we observe that the majority of participants perceive the course to be beneficial, both in the externally trained group and in the internally trained group. At the same time, we observe large differences between the two groups. The average score is 9 in the externally trained group and 7.6 in the internally trained group, and there is also a large difference in the share of participants reporting the top score (54.9 versus 21.3%).

Tables 2 and 3 confirm the impressions from Figures 1 and 2, respectively, and report precisely estimated causal effects of being assigned to an internal trainer rather than an external trainer. Both the attendance and subjective evaluation of the course are significantly lower in the internally trained group than in the externally trained group, and these effects are statistically highly significant. We also observe that introducing covariates has a negligible impact on the estimated internal training coefficient, which indicates that the results are not driven by a lack of balance between the two groups.



**Figure 2:** Subjective Evaluation. Notes: The figure shows the participants' subjective evaluation of how much they benefited from the course, by internal training and external training. Each bin in the figure shows the proportion of participants who reported this value, where the course evaluation scale ranged from 1 (not benefited at all) to 10 (benefited a lot).

In sum, we find that the course offered by the internal trainers was less well received by the entrepreneurs; the internal training had lower attendance and was perceived as less beneficial. We now turn to a study of whether the asymmetry in quality is also reflected in long-term outcomes for the entrepreneurs.

## 4.2 Long-term outcomes

We investigate long-term outcomes in two steps. First, we investigate the impact on the business knowledge of the entrepreneurs; second, we investigate the impact on their overall situation. Ideally, for the latter, we would like to include detailed business and household data, but such data are not available for the internally trained group. Thus, in studying the long-term effect on their overall situation, we have to restrict ourselves to general self-reported evaluations from the entrepreneurs.

We conducted a business knowledge test, where the entrepreneurs were tested in their understanding of the profit concept. They were introduced to the case of Juma, who makes fruit juice at Kimara, Dar es Salaam, and

**Table 2:** Attendance and Diploma

	(1) Attendance	(2) Attendance	(3) Diploma	(4) Diploma
Internal Education	-2.714** (1.067)	-2.569** (1.025)	-0.239*** (0.080)	-0.237*** (0.078)
Age		0.136 (0.120)		-0.003 (0.008)
Female		0.045 (0.034)		-0.000 (0.002)
Loan size		-0.905 (0.605)		-0.017 (0.039)
Branch		-0.001 (0.001)		-0.000 (0.000)
Constant	15.714*** (0.291)	0.700 (0.603)	0.900*** (0.018)	0.955*** (0.143)
Observations	349	349	349	349

Notes: Attendance is the number of sessions (1–21) in which the clients participated. Diploma is a dummy variable taking the value of 1 if the participants attended ten sessions or more, thereby qualifying for a diploma awarded at the graduation ceremony. Internal is a dummy variable taking the value of 1 if the training is provided by internal trainers and 0 if the training is provided by external trainers. Education is the number of years of schooling. Age is expressed in number of years. Female is a dummy variable with a value of 1 if the participant is a female. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Branch is a dummy variable that takes the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Clustered standard errors are in parentheses. \* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

sells it in plastic containers to grocery stores and restaurants in different parts of the city. The entrepreneurs were given the task of deciding which expenses to include when calculating the profit of Juma's business. They were given a list of different expenses, including irrelevant expenses like school fees and relevant expenses like payment for posters to advertise the juice.

Figure 3 shows the distribution of the scores, where we observe a clear difference between the two groups; the average score was 81.7% for the externally trained group versus 75.7% for the internally trained group. And whereas 25.3% of the entrepreneurs in the externally trained group correctly identified all the cost items, only 12.8% did so in the internally trained group. Thus, the externally trained group showed significantly better understanding of the profit concept than the internally trained group, which we take as evidence of a difference in their knowledge of how to run a business. Regressions (1) and (2) in Table 4 show that the causal effect of having an internal trainer instead of an external trainer is precisely estimated both with and without covariates. We also note that the score on the test is significantly correlated with the entrepreneur's level of education,

**Table 3:** Benefit of Training

	(1) Benefit	(2) Benefit	(3) Max benefit	(4) Max benefit
Internal	-1.438*** (0.282)	-1.417*** (0.286)	-0.336*** (0.061)	-0.322*** (0.061)
Education		0.040 (0.039)		0.015 (0.012)
Age		0.012 (0.011)		0.007** (0.003)
Female		-0.117 (0.186)		-0.067 (0.057)
Loan size		-0.000 (0.000)		-0.000 (0.000)
Branch		0.078 (0.192)		0.005 (0.054)
Constant	9.034*** (0.099)	8.454*** (0.676)	0.549*** (0.030)	0.210 (0.192)
Observations	315	315	315	315

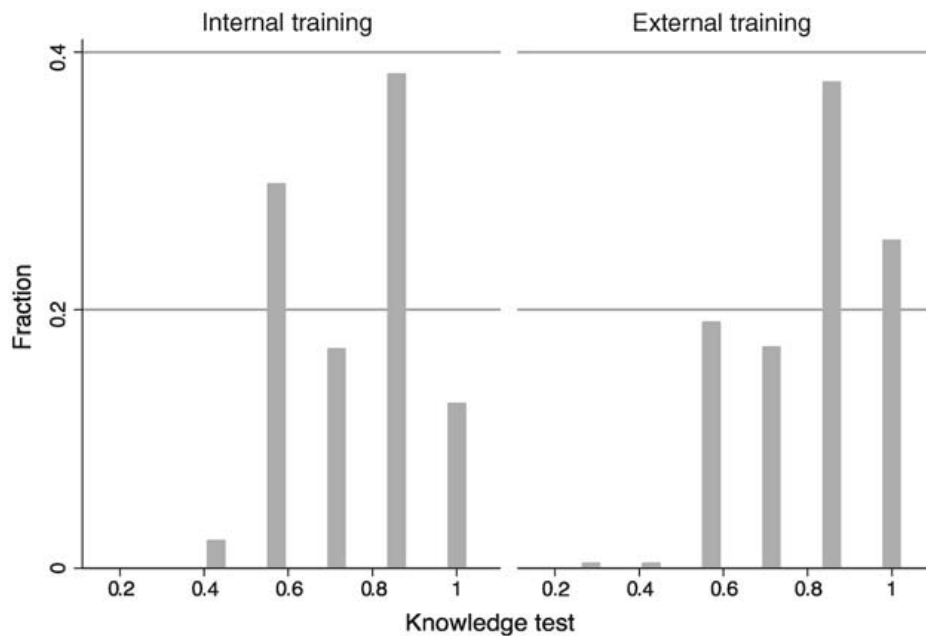
*Notes:* Benefit is a self-reported score of how much the entrepreneur benefited from the course (1–10), Max benefit is a dummy variable taking the value of 1 if the entrepreneur self-reported the top score (10). Internal is a dummy variable taking the value of 1 if the training is provided by internal trainers and 0 if the training is provided by external trainers. Education is the number of years of schooling. Age is expressed in number of years. Female is a dummy variable with a value of 1 if the participant is a female. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Branch is a dummy variable that takes the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors clustered at the loan group are in parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

which suggests that the test does indeed capture the entrepreneur's level of human capital.

To compare the wider impact of the training, we asked the entrepreneurs to evaluate their situation more broadly. Specifically, we asked them four questions on self-reported happiness: how happy they were with life in general, with their economic situation, with their situation as entrepreneurs and with their family situation. The reason for this broad set of questions was that we wanted to capture the possibility that the course had an impact not only on the performance of their businesses, but also potentially on their life situation in general, including family issues. One could, for example, imagine that the course could be beneficial both for monitoring household expenses and, for females in particular, in strengthening their bargaining power in the household.

For each dimension, the participants were asked to report a score from 1 (very unhappy) to 5 (very happy). Not surprisingly, the individual responses across dimensions are highly correlated and the pattern when comparing the externally trained group and the internally trained group is the same for each dimension. Thus, we focus on the average self-reported



**Figure 3:** Business Knowledge. Notes: The figure shows the participants' performance on a business knowledge test, by internal training and external training. Each bin in the figure shows the fraction of participants with this score, where the score is measured as percentage of correct answers.

score for each entrepreneur. As shown in Figure 4, the externally trained entrepreneurs are clearly happier with their situation than the internally trained entrepreneurs, and, as shown in regressions (3) and (4) in Table 4, this difference is precisely estimated with and without covariates. We also observe that the younger entrepreneurs are happier than the older entrepreneurs, which is in line with findings in the literature on happiness (Blanchflower and Oswald, 2008).

In sum, the follow-up study shows systematic differences between the externally trained group and the internally trained group in the long-term outcomes. Entrepreneurs in the externally trained group have more business knowledge and are more satisfied with their overall situation than entrepreneurs in the internally trained group.

## 5. Concluding remarks

Field experiments in poor countries have improved our understanding of the causal mechanisms at work in the development process. At the same time, from a policy perspective, there has been a lack of focus on how these research projects can be taken further and particularly on the

**Table 4:** Knowledge and Happiness

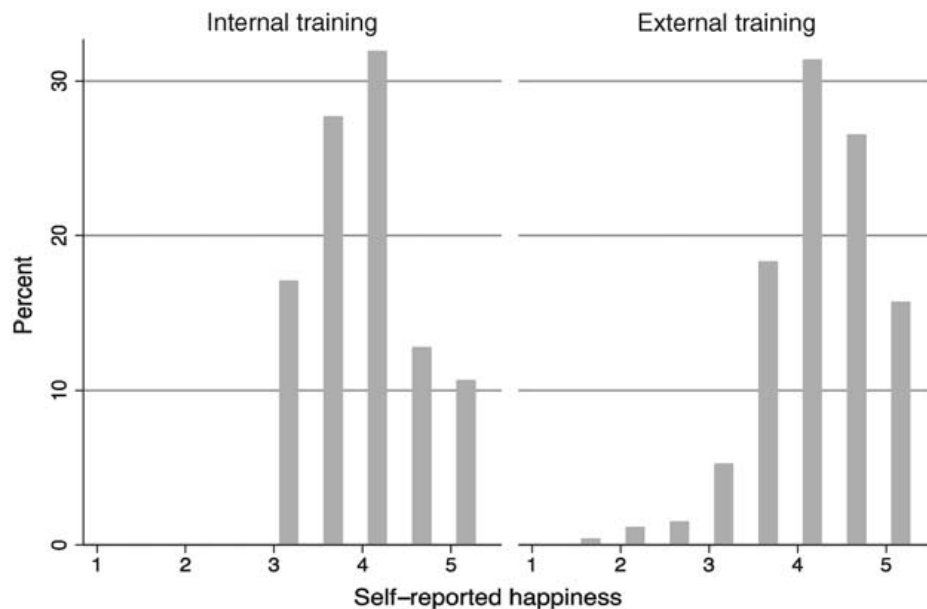
	(1) Knowledge	(2) Knowledge	(3) Happiness	(4) Happiness
Internal	-0.054** (0.027)	-0.056** (0.026)	-0.225** (0.108)	-0.208** (0.104)
Education		0.012*** (0.004)		0.001 (0.016)
Age		-0.001 (0.001)		0.008** (0.004)
Female		-0.024 (0.018)		-0.012 (0.069)
Loan size		0.000 (0.000)		0.000 (0.000)
Branch		0.025 (0.017)		-0.140* (0.076)
Constant	0.811*** (0.009)	0.713*** (0.058)	4.186*** (0.041)	3.857*** (0.242)
Observations	315	315	315	315

*Notes:* Knowledge is the percentage of correct answers in the knowledge test. Happiness is the average of the self-reported happiness on four dimensions (1–5). Eleven entrepreneurs did not report on one of the four dimensions, and for them we use the average of the three other dimensions. The results are not sensitive to excluding these entrepreneurs. Internal is a dummy variable taking the value of 1 if the training is provided by internal trainers and 0 if the training is provided by external trainers. Education is the number of years of schooling. Age is expressed in number of years. Female is a dummy variable with a value of 1 if the participant is a female. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Branch is a dummy variable that takes the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors clustered at the loan group in are parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

extent to which they can be implemented and scaled up by local stakeholders. In this paper, we have discussed these challenges in the light of a recent field experiment in Tanzania, where our research team organised a business training programme for a group of entrepreneurs in the micro-finance institution PRIDE.

As part of this research project, we also implemented a capacity-building component to assist PRIDE in scaling up the programme by using internal resources. In particular, local credit officers were trained by professional instructors, and subsequently trained a subset of the clients. To evaluate this local version of the intervention, we randomly assigned entrepreneurs to external trainers or internal trainers. Our analysis shows that the internal training programme systematically performed worse than the external training programme. The internal training programme attracted lower attendance, was considered less beneficial by the entrepreneurs and was less effective in increasing the human capital of the entrepreneurs and improving their overall situation. We believe that this provides an important lesson to the present literature on field experiments in developing



**Figure 4:** Self-reported Happiness. Notes: The figure shows the participants' happiness, by internal training and external training. Happiness is the average of the self-reported happiness on four dimensions. Eleven entrepreneurs did not report on one of the four dimensions, and for them we use the average in the other three dimensions. Each bin in the figure shows the proportion of participants that reported this level of happiness, where the scale is from 1 (very unhappy) to 5 (very happy).

countries. It shows that the impact of external research projects most likely represents an upper bound of what would be the impact if such projects were to be scaled up by a local organisation.

This certainly has implications for the second question that we raised in the introduction, namely whether the local institution *should* implement such a training programme. It is beyond the scope of this paper to answer this question in detail, but let us still highlight some of the critical issues involved in this decision. First, even though we have shown that the effect of the internal training programme is weaker than that of the external training programme, we have not provided evidence of whether the internal training programme overall had a positive impact on the entrepreneurs. To do this, we would need a control group receiving no training that could be compared with the internally trained group. An extensive evaluation of the internally trained group was not part of the initial research project, and thus no control group was established.<sup>7</sup> In *Berge et al. (2011)*, we show that

<sup>7</sup> To be able to compare the group assigned to internal training with the control group used in the impact analysis of the external training in *Berge et al. (2011)*, we would have needed detailed data on the eligible clients in the internal group that did not attend training.



the external training programme clearly had a positive impact on the entrepreneurs, so we cannot rule out that even though the impact from the internal training programme was weaker, the overall effect may still be positive compared with not receiving training. Furthermore, one cannot exclude the possibility that the quality of the internal training would improve over time.

In addition to considering the impact for the entrepreneurs, a microfinance institution would also have to study how beneficial the training programme is for the organisation itself. By offering a training programme, a microfinance institution could potentially obtain both better clients (higher loan levels, fewer repayment problems) and more clients (existing clients stay, training attracts new clients). But it also runs the risk of better clients exiting the microcredit institution, since they may now have better access to credit from other sources. Two years after the baseline study, however, there is no evidence of (external) training affecting loan size, exit rates or default rates. This suggests that, to the extent that training has an impact on the financial sustainability of the institution, the impact would come from the recruitment of new clients rather than from existing clients.

Offering a business training programme is costly. Indeed, the variable cost per participant of the externally provided training programme was estimated to be about 100,000 TZS (USD 67). This covers compensation to the trainers, as well as expenses related to providing teaching materials and soft drinks to the participants. These costs would be lower if using internal trainers, and thus the cost–benefit analysis of using external versus internal trainers is not straightforward. The use of internal trainers certainly reduces costs, but, as we have documented, also seems to reduce the impact of such a training programme. We do not have detailed data on the costs of internal trainers, and thus we cannot elicit more details on this trade-off.

A relevant question for the microfinance institution, when considering whether to offer training in-house or not, is whether at least part of their costs can be covered by a participation fee. How much are entrepreneurs willing to pay for such a training programme? In a follow-up survey conducted in mid-2009, we asked both the externally trained and the untrained entrepreneurs a hypothetical question on the willingness to pay for such a training programme. Specifically, we asked them: ‘Imagine that you were given the opportunity to participate in a 20-session (with 60 minutes per session) entrepreneurship training course catered to your level. What is the maximum amount you would be willing to pay per session?’ It is



well-known that one should interpret such responses with care, since they may reflect strategic reasoning and not reveal the underlying true preferences for receiving training. Still, we find it interesting that the median self-reported willingness to pay in both the untrained group and the externally trained group was 20,000 TZS (approximately USD 13), which is one-fifth of the estimated cost of offering such a course using the external trainers. Presumably, however, PRIDE can organise the course cheaper in-house. Our numbers therefore indicate that it may be possible for PRIDE to cover a significant part of its costs through participation fees.

Our study highlights the importance of investigating the local capacity and local willingness to build on the lessons from a research-driven field experiment. Further research is clearly needed in this area to ensure that not only researchers but also the local communities benefit from the many important field experiments presently conducted in developing countries.

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## Appendix A

**Table A1:** Treatment–Control Balance (Follow-up Sample)

	(1) Total	(2) Internal group	(3) External group	(4) Difference
Female	0.60 (0.03)	0.60 (0.07)	0.61 (0.03)	–0.01 (0.08)
Age	39.12 (0.45)	37.00 (1.04)	39.49 (0.54)	–2.05* (1.35)
Loan size	746.03 (13.42)	729.79 (34.93)	748.88 (14.55)	–19.09 (37.70)
Education	7.83 (0.12)	7.96 (0.35)	7.80 (0.13)	0.16 (0.34)
Branch	0.49 (0.03)	0.46 (0.07)	0.50 (0.03)	–0.03 (0.08)
Observations	315	47	268	

*Notes:* The table reports average values. Female is a dummy variable with a value of 1 if the participant is a female. Age is expressed in number of years. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Education is the number of years of schooling. Branch is a dummy variable with the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors clustered at the loan group are in parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table A2:** Attrition Balance

	(1) Total	(2) Interviewed sample	(3) Attrition sample	(4) Difference
Female	0.61 (0.03)	0.60 (0.03)	0.70 (0.08)	0.10 (0.09)
Age	39.20 (0.45)	39.12 (0.48)	39.94 (1.10)	-0.82 (1.51)
Loan size	753.01 (12.74)	746.03 (13.42)	817.65 (39.49)	-71.61* (42.85)
Education	7.82 (0.12)	7.83 (0.12)	7.77 (0.35)	0.06 (0.39)
Branch	0.49 (0.03)	0.49 (0.03)	0.50 (0.09)	-0.01 (0.09)
Observations	349	315	34	

*Notes:* The table reports average values. Female is a dummy variable with a value of 1 if the participant is a female. Age is expressed in number of years. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Education is the number of years of schooling. Branch is a dummy variable that takes the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors are in parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

**Table A3:** Predicting Attrition

	(1)	(2)
Internal training	-0.128** (0.052)	-0.130** (0.052)
Education		0.001 (0.007)
Age		-0.001 (0.001)
Female		-0.035 (0.031)
Loan size		-0.000 (0.000)
Branch		-0.014 (0.032)
Constant	0.924*** (0.017)	1.067*** (0.095)
Observations	349	349

*Notes:* The dependent variable is a dummy variable with the value of 1 if the client was reached in the follow-up study. Education is the number of years of schooling. Age is expressed in number of years. Female is a dummy variable with a value of 1 if the participant is a female. Loan size denotes the loan size in PRIDE in 2008, in thousand Tanzanian shillings. Branch is a dummy variable with the value of 1 if the branch is Magomeni and 0 if it is Buguruni. Standard errors clustered at the loan group are in parentheses.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

Table A4: Bounds Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Lower Lee	-0.20	-0.10	-0.05	Unadj.	+0.05	+0.10	+0.20	Upper Lee
		Standard deviation	Standard deviation	Standard deviation		Standard deviation	Standard deviation	Standard deviation	
Benefit	-1.271*** (0.296)	-1.300*** (0.228)	-1.355*** (0.227)	-1.383*** (0.226)	-1.417*** (0.286)	-1.438*** (0.226)	-1.466*** (0.225)	-1.521*** (0.226)	-1.920*** (0.265)
Max benefit	-0.253*** (0.064)	-0.298*** (0.053)	-0.311*** (0.053)	-0.317*** (0.053)	-0.322*** (0.061)	-0.329*** (0.053)	-0.335*** (0.053)	-0.347*** (0.053)	-0.412*** (0.062)
Knowledge	-0.028 (0.027)	-0.045** (0.022)	-0.050** (0.022)	-0.052** (0.022)	-0.056** (0.026)	-0.056** (0.022)	-0.058*** (0.022)	-0.063*** (0.022)	-0.095*** (0.024)
Happiness	-0.088 (0.105)	-0.185** (0.087)	-0.202** (0.087)	-0.210** (0.087)	-0.208** (0.104)	-0.227*** (0.087)	-0.236*** (0.087)	-0.253*** (0.087)	-0.379*** (0.106)
Observations	278	349	349	349	315	349	349	349	278

Notes: The table reports bounds analysis for Internal training variable in Tables 3 and 4, using various assumptions about the treatment effect for attriters. Each reported coefficient is from a separate regression. Columns (1) and (9) report the lower and upper Lee-bound (Lee, 2009). Columns (2)–(4) and (6)–(8) impute to the lower (upper) bound the mean minus (plus) a specified standard deviation multiple of the observed external training group distribution to the non-responders in the external training group, and the mean plus (minus) the standard deviation multiple of the observed internal training group distribution to non-responders in the internal training group (Kling *et al.*, 2007). Column (7) reports the unadjusted estimates. Benefit is the self-reported score of how much the entrepreneur benefited from the course (1–10); Max benefit is a dummy variable taking the value of 1 if the entrepreneur reported the top score (10). Knowledge is the percentage of correct answers in the knowledge test. Happiness is the average of the self-reported happiness on four dimensions (1–5). Bootstrapped standard errors (500 reps; unadjusted estimates are not bootstrapped) are clustered at the loan group.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

## Chapter 2

# Group Composition and Group Dynamics: Evidence from a Laboratory Experiment with Microfinance Clients



# Group Composition and Group Dynamics: Evidence from a Laboratory Experiment with Microfinance Clients

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March 2013

## *Abstract*

*Using a laboratory experiment, we investigate the effect of gender composition on the group dynamics of microfinance clients in Tanzania. We focus on three dimensions: i) the willingness to cooperate in a public-good game, ii) the ability to cooperate in problem solving, and iii) joint decision making in risk taking. We find that gender composition shapes group dynamics. In problem solving, we find female groups outperform male and mixed groups, even though males at the individual level outperform females. Moreover, the proportion of female groups that take risks is significantly higher than that found in male and mixed groups. However, we find no differences in the contribution to the public good between the female groups and the other groups.*

*Keywords: group composition, gender, microfinance, laboratory experiment*

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We would like to thank Kjetil Bjorvatn, Bertil Tungodden, Erik Ø. Sørensen and Alexander Cappelen for their useful comments and suggestions. We have also benefited from comments and suggestions by seminar participants at the Bergen Econometrics Group and the Bergen Seminar in Development Economics held at the Chr. Michelsen Institute (CMI) and delegates at the Asia Pacific Economic Science Association (APESA) Meeting and the 2011 Centre for the Study of African Economies (CSAE) conference. We gratefully acknowledge the financial support of the CMI, the Vilhelm Keilhau Foundation and the Research Council of Norway, and the research support of Promotion of Rural Initiative and Development Enterprises (PRIDE, Tanzania) and Research on Poverty Alleviation (REPOA, Tanzania) in the implementation of the experiment. We express our particular gratitude to Hermenegild Kiyagi and Antusa Felix Massawe at PRIDE Buguruni for assistance and fruitful discussions and to Juda Lyamai and the team for excellent research assistance.

*“Loan group composition should be based on gender; once you have a man in a group of women, there is a problem.”*  
– A female member of a loan group

## 1. Introduction

Group lending is a key element in microfinance. This is because as a substitute for physical or financial collateral, microfinance institutions typically require borrowers to form joint liability groups, mostly consisting of about five people (Armendáriz de Aghion and Murdoch, 2010). However, while joint liability is considered crucial in reducing transaction costs and risk for creditors, thus allowing the poor to access loans at reasonable interest rates, it clearly poses some challenges for borrowers. For instance, Madajewicz (2011) argues that one source of tension is that more progressive group members may be held back by less progressive group members, as the latter may be unwilling to accept the responsibility for larger loans by their fellow members.

The fact that most borrowers prefer individual loans to group loans is one indicator of the costs of group lending (Armendáriz de Aghion and Murdoch, 2010). For example, in an evaluation of the dropout rate in several microfinance institutions in Tanzania, Maximambali et al. (1999) reported that problems with cooperation in loan groups was actually an important motivation for dropping out. It is then clearly in the interests of microfinance institutions to promote positive group dynamics among their clients, both to reduce the dropout rate and to stimulate business growth and the demand for larger loans. In this regard, gender composition may be one possible determinant of group dynamics.



It is well established that there are systematic gender differences in preferences, for instance, in the willingness to take risks and to compete, and that males and females react differently to institutional settings (see, e.g., Croson and Gneezy, 2009). These differences may make cooperation and joint decision making more difficult in mixed-gender loan groups. Moreover, in male-dominated societies, males are expected to lead, speak and decide, while females are expected to comply, even though they may have more knowledge that is relevant or a higher degree of competence (Feinstein et al., 2010). These tensions can make female borrowers prefer single-gender loan groups, as indicated by the opening quote in this article. However, males and females may have different skills and could thus complement each other, so it is not obvious that the costs of cooperation in loan groups outweigh the benefits.

In this paper, we analyze the impact of gender composition on group dynamics among microfinance clients in Tanzania. We explore three dimensions of group dynamics: the willingness to cooperate, the ability to cooperate, and joint decision making. Willingness to cooperate is measured by a standard public-good game while the ability to cooperate is measured by groups solving multiple-choice questions. Joint decision making is measured by groups making a common decision on a risky choice. The impact of gender composition on all three dimensions is measured by allocating participants randomly to either mixed or single-gender groups.

Our experimental design is novel, because we study group cooperation and decision making by letting group members communicate freely face-to-face, whereas to the best of our knowledge, communication and decision making in previous economic laboratory studies of group behavior have taken place via computers or voting devices (for example, Ertac and Gurdal, 2012, and Masclet, 2009). Our design thus enables us to measure the *ability* to cooperate, in addition to the *willingness* to cooperate, which is the standard measure in the literature when discussing how well groups cooperate.

Moreover, although many existing studies discuss gender issues and microfinance, very little work has been done on the role of gender composition in loan groups. Some exceptions are Anthony and Horne (2003) and Sharma and Zeller (1997), who report that repayment performance improves with the share of females in the loan group, while Wydick (1999) finds that gender heterogeneity impacts negatively upon informal insurance provision in loan groups. However, these studies merely illustrate correlations between gender group composition and group outcomes, without any strong argument for causality.

In different settings, the literature on the impact of gender composition on group outcomes indicates inconclusive results. In a business-game study of students, Apesteguia et al. (2012) show that both mixed and male teams outperform female teams. Conversely, Fenwick and Neal (2001), in examining student group performance in a business strategy game, conclude that groups may be more effective when the number of women outnumber or at least equal the number of men. Elsewhere, both Smith et al. (2006) and Ahern and Dittmarr (2012) consider the impact of gender composition of corporate boards, with the former concluding, unlike the latter, that the inclusion of females may improve firm performance. In a laboratory experiment, Dufwenberg and Muren (2006) find that female-dominated groups behave differently, and conclude that groups are more generous and egalitarian when females are in the majority, although female-only groups tend to be less generous. Finally, in a development setting, Chattopadhyay and Duflo (2004) find that female leadership in village councils in India influences the kinds of public goods provided.

Our study shows that gender composition may be very important for cooperation and decision making in groups. We find that group composition matters only for the ability to cooperate, not the willingness to do so. In fact, female-only groups outperform both male and mixed-gender groups in practical problem solving, even though females individually perform much poorer than males, while there is no effect of group composition on contributions to the public good. In joint decision making, we find that female-only groups are more inclined to take risks than either male or mixed groups.

This paper is organized as follows. Section 2 describes the experimental context and design, followed in Section 3 by an explanation of the empirical strategy. Section 4 presents the results, followed in Section 5 by a discussion and the findings from the focus group discussions. Section 6 provides some concluding remarks.

## 2. Experimental context and design

The experiment was conducted in October 2010 at the premises of Research on Poverty Alleviation (REPOA), a research institute in Dar es Salaam, Tanzania. Participants were recruited from among the microcredit clients of the Promotion of Rural Initiative and Development Enterprises (PRIDE) Tanzania, the country's largest microfinance institution (MFI). The participants' ages ranged from 21 to 68 years, with an average age of 36 years. Of the 229 participants, 129 were female and 100 male. Around 75% had completed primary education: i.e., seven years of schooling. In a field experiment of microfinance clients from the same MFI, Berge et al. (2012) report that most clients operate small-scale, nonregistered businesses with just a few employees, typically small kiosks or restaurants, with a daily profit in the range of 10–20 US dollars (USD).

The experiment was conducted as follows. We invited 309 PRIDE clients to a “Workshop on Microfinance and Entrepreneurship” where they would earn money, of which 229 attended. We conducted six sessions with different clients, each lasting approximately three hours. The experiment was single blind. The sessions consisted of two parts: the first part comprised individual games, and the second part included group games. Individual games were those in which the participants made decisions on their own, without the cooperation or influence of other participants. Group games refer to those in which participants made decisions in conjunction with other participants.

In the individual part, participants played a problem-solving game, two decision-making games involving a risky investment, a dictator game, and finally a public-good game.<sup>1</sup> These games were played independently of each other. In the group part, participants were allocated randomly to single- or mixed-gender groups of four persons, where they worked together in a problem-solving game and a decision-making game.<sup>2</sup> Because the participants were allocated to single-gender or mixed-gender groups on a random basis, we were able to establish causal relationships between gender composition and the outcomes of interest.

The mixed groups consisted of two females and two males. If there were not enough participants to form a complete group of four, or if the gender composition did not fit with the intended group composition, we still asked the participants to perform the task in the problem-solving and decision-making games, but excluded these groups from the analysis. As a result, only the data from 52 groups (204 persons) were eligible for further analysis. Of these, 22 groups were mixed, 12 were male, and 18

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<sup>1</sup> Instructions were given in Kiswahili. See the appendix for the English translation.

<sup>2</sup> When the participants entered the session, they received a tag with their ID number. A duplicate of this tag was placed in one of two boxes depending on the participant’s gender. In three of the six sessions, we formed mixed gender groups by picking two identity numbers from a “Male” box and two from a “Female” box to form one group. In the other three sessions, we formed single gender groups by picking either four identity numbers from the “Male” box, or four from the “Female” box.

were female. The same groups were maintained for both the problem-solving and decision-making games.

In the individual problem-solving game, participants were asked to answer 10 multiple-choice questions, related to both business and other topics. For each correct answer, the client received 150 Tanzanian Shillings (TZS), approximately equal to 10 US cents.<sup>3</sup> After this, the participants were allocated randomly to groups of four. Each group had to cooperate in answering 10 similar questions, with each group handing in a single answer sheet, and where the only difference was that the payoff was multiplied by four to keep individual stakes constant. In contrast, in the group game, participants sat around a table and could freely communicate with other members of their group.<sup>4</sup> It was also made clear that the amount the group earned would be shared equally among the group members.

The risk games were conducted in a similar way, with identical individual and group games. Participants on an individual basis first had to make two decisions involving risk. In the first round, clients could either make a safe investment, from which they would with certainty receive 1,000 TZS, or they could gamble and receive either 0 or 2,500 TZS with equal probability. In the second round, the safe bet was increased to 1,500 TZS, with the gamble left unchanged.

In the group decision game, the same procedure was used for each round played, with the only difference being that the payoff was multiplied by four to keep the individual stakes and incentives constant.<sup>5</sup> Before they made the first decision, we communicated to the participants that the outcomes of the lotteries would be determined at the end of the session by asking one of the participants to pick one of

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<sup>3</sup> As a comparison, a typical meal with rice, beans and meat costs approximately 1,500 TZS.

<sup>4</sup> Each group had a question sheet and a pen to record responses directly on the sheet.

<sup>5</sup> We do not use the result from the second round of the risk games in our analysis because almost everyone chose the safe option (48 of the 52 groups).

two envelopes, of which one contained a sheet of paper that read “LUCKY” and another that read “UNLUCKY.”

Between the individual and the group games in problem solving and decision making, we conducted a dictator game and a public-good game. In the dictator game, participants each received 1,000 TZS that they could decide to either keep themselves or share with another PRIDE client. The dictator game was played twice. The dictators in one round were told that the recipient was a male in the session and in the other round that the client was a female.<sup>6</sup>

In the public-good game, we allocated participants randomly to either single-gender or mixed groups of four.<sup>7</sup> We ensured that while the participants were made aware of their group composition, they could not identify who was in their group or cooperate with the other group members. Each participant received an endowment of 2,000 TZS, which could either be kept in a private account or contributed to a group fund. Contributions to the group fund were doubled and then shared equally among the group members.<sup>8</sup>

A few weeks after the experiment, we conducted focus group discussions (FGDs) with participants to better understand the dynamics of the groups in the laboratory experiment. We conducted five FGD sessions, two each with male and female groups, and one mixed session, all consisting of 7–9 participants. The participants in the mixed FGDs were selected randomly from participants in the single-gender FGDs. In total, 34 participants took part in the FGDs.

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<sup>6</sup> The order of the two dictator games was varied on a random basis to avoid systematic differences. Contribution rates in the dictator games are reported in Table A1. Participants contributed an average of 440 TZS to males, and 452 TZS to females, from an allocation of 1,000 TZS. However, this difference in contribution between males and females is not significantly different from zero. This also holds when we disaggregate by gender, and we see that contributions are very similar in all cases. We note that contribution rates are very high (40–47%). We use average contribution rates in the group as a control variable in the main games.

<sup>7</sup> Participants could see how the randomization was conducted.

<sup>8</sup> We explained the game thoroughly by conducting role-plays with research assistants as models.

### 3. Empirical strategy

To estimate the impact of group composition on public-good contributions, problem solving, and decision making, we begin by estimating the following equation:

$$Y_i = \alpha + SingleGender_i \beta_1 + \varepsilon_i \quad (1)$$

where  $Y_i$  is the group outcome of interest; that is, (i) the total contributions by the group in the public good game, (ii) the number of problems solved correctly, and (iii) whether or not the group decided to take the risk, and  $SingleGender$  is a dummy variable that takes a value of one if the group consists of only males or females, and zero otherwise. Because clients were allocated randomly to either single- or mixed-gender groups,  $\beta_1$  has a causal interpretation as the impact of gender composition on the group outcome of interest.

We also include a set of control variables,  $X_i$ , in our regression to account for potential initial differences between the groups by estimating:

$$Y_i = \alpha + SingleGender_i \beta_1 + X_i \delta + \varepsilon_i \quad (2)$$

The control variables include the group average of loan size in PRIDE, the average age of group members, the average contribution in the dictator game as a measure of altruism, and the years of membership in PRIDE, along with the number of literate group members. In addition, we control for total individual knowledge and the total number of risk takers in the group when analyzing the impact of group composition on problem solving and decision making.

Further, because we wish to explore the impact of gender composition on group dynamics, we include the interaction term  $SingleGender_i Male_i$  and estimate:

$$Y_i = \alpha + SingleGender_i \beta_1 + SingleGender_i Male_i \beta_2 + \varepsilon_i \quad (3)$$

where  $\beta_1$  is the difference in the outcome of interest between female and mixed groups, while  $\beta_1 + \beta_2$  captures the difference between male and mixed groups. However, we should interpret  $\beta_2$  with care as the estimated coefficient measures the difference between male and female groups, and should therefore not be given a causal interpretation, given an individual by definition cannot belong to both a male and a female group. Note that we do not need to include a term for male in our regression, because the constant term  $\alpha$  captures mixed-gender groups, while the remaining two terms capture the female and male groups. Finally, we also included covariates when we estimated the differences between the groups:

$$Y_i = \alpha + SingleGender_i \beta_1 + SingleGender_i Male_i \beta_2 + X_i \delta + \varepsilon_i. \quad (4)$$

We estimate regressions (1)–(4) by applying the ordinary least squares (OLS) method when we study the impact of group composition on public-good contributions and problem solving. However, we use a probit model and report marginal effects when estimating whether groups decide to gamble, as the dependent variable is binary. The results are similar to those obtained with OLS, but the null hypotheses are rejected at slightly weaker significance levels.

## 4. Results

### 4.1. Willingness to cooperate: Public-good game

Table 1 provides descriptive statistics at the individual level for the public-good game. Participants contributed an average of slightly more than 50% of their endowment to the group fund. Females contributed an average of 1,101 TZS from a maximum of 2,000 TZS, while males contributed 943 TZS. However, the difference between males and females is far from statistically significant. We also note that contributions from participants in mixed-gender groups are almost identical to those from participants in single-gender groups. Table 2 provides regression results from



the public-good game that confirm the descriptive evidence in Table 1. Regressions (1) and (2) in Table 2 show that the average public-good contribution is not affected by whether the group was single or mixed gender.<sup>9</sup> In addition, regressions (3) and (4) show that groups consisting only of males do not contribute differently to the public good compared with female or mixed groups.

#### **4.2. Ability to cooperate: Problem-solving game**

The individual results in Figure 1 depict the distribution of the number of correct answers for the individual problem-solving game for males and females, respectively. We can see that males are more often placed to the right of the graph, indicating that males achieve higher scores. The descriptive statistics in Table 3 show that males correctly answered an average of 5.75 questions from the 10 questions, while females averaged 5.39 correct answers (*t*-test,  $p = 0.01$ ). Examining the number of correct group answers in Table 4, the findings are reversed, with female groups achieving 0.79 more correct answers than male groups (*t*-test,  $p = 0.05$ ), and 0.9 more correct answers compared with the mixed groups (*t*-test,  $p = 0.01$ ). To investigate this issue further, we regressed gender group composition on the group score.

When estimating equation (1), we can see from the results of regression (1) in Table 5 that single-gender groups (both male and female) achieved 0.59 more correct answers than mixed groups ( $p < 0.05$ ). In regression (2), we included the control variables, and can see that the impact of being in a single-gender group becomes slightly stronger ( $p < 0.01$ ). From regressions (1) and (2), we conclude that single-gender groups perform better in the problem-solving test, indicating that the group dynamics are more positive in such groups. To explore whether this result is driven mainly by female or male groups, we include the interaction term

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<sup>9</sup> Note that these groups are not identical to those used in the problem-solving and decision-making games. Further, the sample in the public-good game is not identical to the sample in the problem-solving and decision-making games. This is because we conducted two separate randomizations: one for the public-good game and another for the problem-solving and decision-making games.

*SingleGenderGroup\*Male* in the regression, as reported in column (3). We observe that the overall effect of a single-gender group from regressions (1) and (2) must clearly be driven by female groups performing significantly better than both male and mixed groups (significant at the 1% level), because they achieved 0.9 more correct answers than the mixed groups ( $p < 0.01$ ). As expected from the size of the coefficients, we also note that a joint significance test of *SingleGenderGroup* and *SingleGenderGroup\*Male* reveals that the performance of the male groups is not significantly different from that of mixed groups. In regression (4), we control for the covariates, and see that the estimates are remaining the same.

### **4.3. Decisions in groups: Risk games**

The individual results in Figure 2 and Table 6 indicate that males and females are identical at the individual level when it comes to taking risks, with 50% of both males and females choosing the risky option. However, from the group-level result in Figure 2, we can see that the percentage of risk takers is much lower among male and mixed groups; 25% of male groups and 18% of mixed groups chose to take risks compared with 44% of female groups. Furthermore, the *t*-tests in Table 7 indicate that the female groups are significantly less risk averse than the mixed groups (at the 10% level).

Table 8 reports the regression results for the impact of group composition on group risk decisions. From regressions (1) and (2), we can see that single-gender groups are no more likely than mixed groups to choose the risky option. However, in regressions (3) and (4), we see that female groups are 25–26% more likely than mixed groups to choose the risky option. When the covariates are included, the coefficient of interest is significant at the 5% level, and when not included, the coefficient is significant at the 10% level. Moreover, in regression (4), the estimated coefficient for the interaction term *SingleGenderGroup\*Male* is also significant, but negative. This indicates that male groups take less risk than female groups. The number of risk

takers in the group also significantly affects the group outcome. All other things being equal, the more risk takers in a group, the more likely the group is to choose the risky option.

Finally, *t*-tests show that female groups do not make significantly different risk decisions than the average number of individual decisions among group members, while male and mixed groups become significantly more risk averse in groups (significant at the 5% and 1% levels). This potentially indicates that female groups are more efficient in making joint decisions, in the sense that joint decisions are closer to their individual choices.

## 5. Discussion and findings from the focus group discussions

In the previous section, we saw that group composition might be very important for cooperation and decision making in groups. At the individual level, we found that females are less able than males to respond correctly. However, when females are included in groups with only other females, we found that they outperform both male and mixed groups. Female groups also appear to employ a more constructive group process than male groups in managing to better utilize their members' capabilities. If this reflects a more general pattern for loan groups in microfinance, it may provide one reason why females find it more attractive to become members of microfinance institutions; they manage to cooperate well and can handle joint liability schemes in a constructive way.

Similar conclusions can be drawn from the risk game. At the individual level, both for males and females, there was an equal split between participants choosing the risky and the safe options.<sup>10</sup> When groups decided whether to gamble, we saw that in general they were more likely than individuals were to play it safe, because only 15

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<sup>10</sup> This is in contrast to previous research, which typically shows that females are more risk averse than males (Croson and Gneezy, 2009).

of the 52 groups chose the risky option. Ertac and Gurdal (2010) and Masclet et al. (2009) concluded a similar pattern, and suggest that there is a shift to caution when people enter a group. Because females are often found to be more risk averse than males (Croson and Gneezy, 2009), one may consider that female groups would likewise be relatively hostile toward risk. However, this does not appear to be the case, as we find that the proportion of female groups that take risks is higher than the proportion of male and mixed groups. Nor do we find that females make significantly different choices as a group than they do individually. Thus, the acceptance of risk by female groups may be the reason why females appear more comfortable than males with group loans.

The finding that female groups perform better in the problem-solving game is probably related to the finding in the decision-making game. As female groups are more able to discuss and make common agreements in the problem-solving game, the fear of being blamed if the outcome of the gamble proves to be negative may be less important. On the other hand, in the male and mixed-gender groups, the atmosphere may be less inclusive, and groups may therefore more easily choose the no-risk option if, for example, one member is reluctant to gamble. However, while we find that group composition may influence the *ability* of groups to cooperate and solve problems, we find no gender differences in public-good contributions between the different groups, indicating that group composition does not influence the *willingness* to cooperate.

Our main findings are in line with Kuhn and Villeval (2011), who find that women prefer cooperative work environments, which is reasonable if they are in fact better cooperators than males, as our study also suggests. Our results are also consistent with Booth and Nolen (2012) who have shown that girls in girls-only schools are more eager to compete than girls in mixed schools, indicating that the presence of males may alter the behavior and preferences of females.

Six weeks after the laboratory experiment, we included 34 participants in FGDs to shed further light on the results from the experiment and to better understand the local context. We conducted five sessions of FGDs, two each with male and female groups and one mixed session, all consisting of 6–9 participants. Several interesting explanations were provided concerning the cooperation dynamics in the male and female groups. For instance, a male participant said:

*There is a Kiswahili proverb: “Two bulls do not stay in one house.” When you put men together there is always a tendency for them to disagree with each other, while females on the other hand would listen to each other.*

This quote reflects that it may be difficult for males to cooperate and listen to each other. Another male pointed out that women’s general lack of confidence makes them more open to the arguments of others:

*Women lack self-confidence and this helps them to accept ideas and suggestions from other females. Unlike women, the self-confidence of males makes it difficult for them to accept ideas and suggestions from each other, and therefore they don’t perform well in a group.*

The response from a woman in another session indicates that the lack of confidence observed among females is related to their belief that they have a disadvantage in terms of education. Hence, working together is seen as a solution:

*... I told you that women lack experience and education; therefore it is more useful for them to work in groups rather than independently.*

Discussing gender differences in groups, a male participant indicated the issue that males are expected to make decisions when placed together with females:

*Whenever males and females are mixed in a group, females tend to step aside, assuming that males are supposed to lead, even when the male is inexperienced in the relevant subject.*

Conversely, a female participant said that it was not simply about females stepping aside, rather that male arguments are heeded to a greater extent:

*In most cases a male's suggestion, answer or idea is given more weight, thus women will tend to listen to men.*

The findings from the focus groups indicate that in mixed groups, females step aside and let the males decide. Females also appear to lack self-confidence and assume that males are more knowledgeable. Males, on the other hand, tend not to listen to each other and do not want to reveal weakness. However, when females are grouped, they realize that four heads are better than one, and in our games, this translates into discussing questions more openly and decisively to identify the correct response and by making decisions that suit the group as a whole. This indicates that females are dominated by males in group settings, thereby effectively constraining females from fully utilizing their knowledge and ability to cooperate.

## 6. Concluding remarks

Previous studies on gender composition and microfinance, such as those in Anthony and Horne (2003), Sharma and Zeller (1997) and Wydick (1999), have found that loan groups perform better in terms of repayment and insurance as the share of females in the group increases. In line with these findings, our experimental evidence indicates that females indeed perform better and behave differently when cooperating with other females, suggesting males may constrain females if they are placed together in the same group. Our findings then potentially shed light on the mechanism driving the relatively poor performance of mixed-gender groups in microfinance.

Female groups initially outperformed more-knowledgeable males in the problem-solving game, while groups consisting of females took more risks than mixed-gender groups. Hence, gender composition may be important for loan group dynamics, which is clearly important for social impact and the financial sustainability of microfinance institutions. For this reason, MFIs that allow mixed-gender groups should place more effort into monitoring the group dynamics because placing males in female groups may reduce the group's ability to cooperate, which in turn may eventually transmit into repayment problems.

As our findings suggest that females are more able to cooperate than males and that the presence of males may disturb the dynamics of female groups, our results also shed light on the female dominance in microfinance. Females may then not only be targeted (for good reason) by the MFIs, they may also be more attracted by the cooperative setting in group lending than males, at least as long as they can cooperate with other females. Finally, our study also contributes more general insights into the literature on gender differences in preferences. In particular, while males are often found to be more eager to compete than females (Croson and Gneezy, 2009), our findings are consistent with those in Kuhn and Villeval (2011) that women prefer environments where skills in cooperation are relatively more important than the eagerness to compete.

Of course, while our findings suggest female groups perform best, we were unable to identify the mechanisms that enable males to effectively constrain females in groups. As identified in the FGDs, the lack of confidence of women and the heightened attention given to the views of men are possible contenders. Clarification of the mechanism driving these group gender dynamics requires more research.

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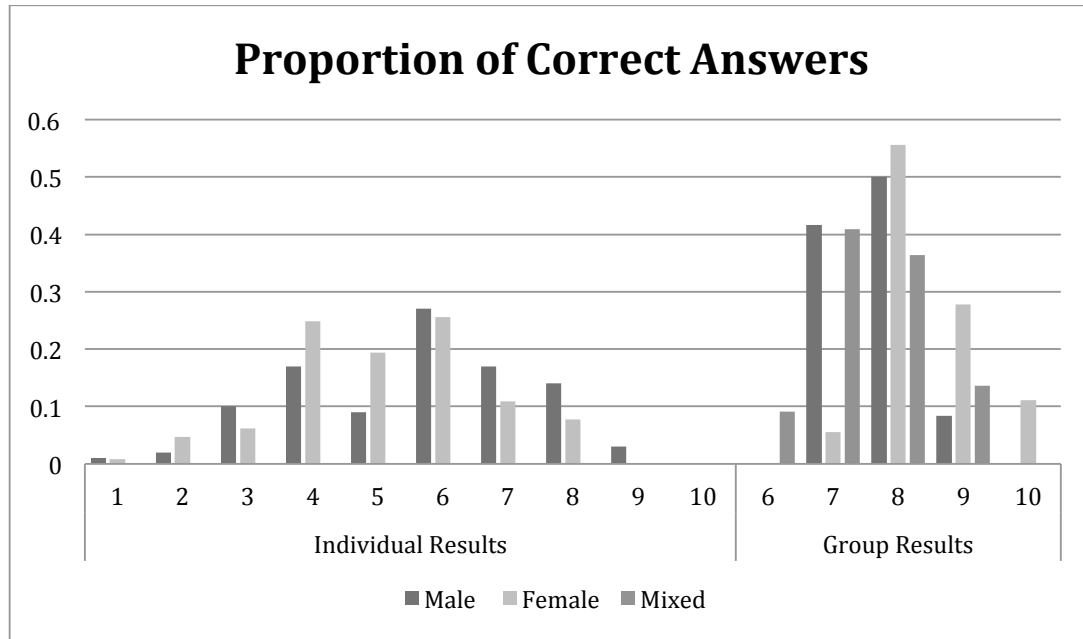
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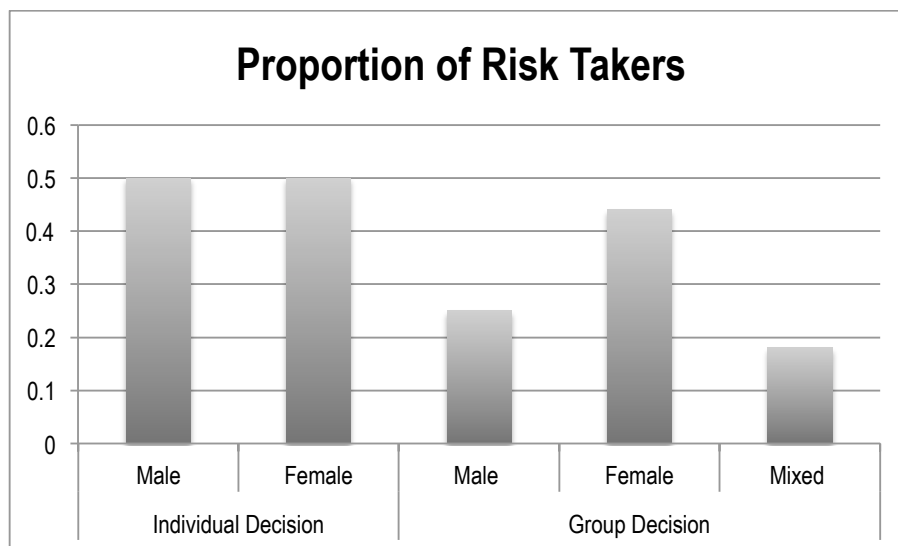
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## Figures and Tables

**Figure 1: Gender, gender composition and problem solving**



**Figure 2: Gender, gender composition and decision making**



**Table 1: Descriptive statistics of public-good game**

	N	Mean	Std. Dev.	Median	Min.	Max.
<b>Total</b>						
Contribution to Public Fund	208	1027.88	815.13	1000	0	2000
<b>By Gender</b>						
Male Contribution to Public Fund	96	942.71	848.74	1000	0	2000
Female Contribution to Public Fund	112	1100.89	781.60	1000	0	2000
<i>Difference</i>		<i>-158.18</i>	<i>(113.11)</i>			
<b>By Group Composition</b>						
Contribution in Mixed Groups	88	1018.18	844.39	1000	0	2000
Contribution in Same Gender Groups	120	1035.00	796.49	1000	0	2000
<i>Difference</i>		<i>-16.82</i>	<i>(114.67)</i>			

*This table reports the contribution in the public-good game. Participants were asked to distribute 2,000 TZS into either a private fund or a public fund. The first group of statistics details the average contribution across all participants. The second group of statistics provides the contributions when disaggregated by gender. The third group of statistics reports the contribution when disaggregated by group composition. Inferences employ t-tests. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors in parentheses.*

**Table 2: Regressions results for public-good game**

	(1) Average PG Contribution no covar.	(2) Average PG Contribution with covar.	(3) Average PG Contribution no covar.	(4) Average PG Contribution with covar.
Single-Gender Group	16.82 (121.87)	49.93 (118.88)	95.05 (129.10)	111.58 (128.85)
Single-Gender Group*Male			-180.54 (137.23)	-144.05 (124.42)
Average Altruism		71.89** (27.04)		71.29*** (26.47)
Average Loan Size		-1.57 (30.52)		-6.19 (30.38)
Average Years with MFI		23.50 (33.99)		22.90 (32.94)
Average Age		14.13 (12.54)		13.13 (13.48)
Number of Literate Members		185.30 (181.88)		181.83 (184.53)
Constant	1018.18*** (101.52)	-934.11 (899.36)	1018.18*** (102.55)	-855.47 (944.00)
Observations	52	52	52	52

*Notes: This table provides the results of the OLS estimations. The dependent variable is the average of group member contributions into the public fund in the public-good game. The unit of observation is the group (consisting of four members). Single-Gender Group is a dummy variable that takes a value of one if a group is single gender and zero otherwise. Single-Gender Group\*Male is an interaction term to capture male groups. Average Altruism measures the average contribution from the group members in the dictator game. Average Loan Size measures the average loan size of the four members in the group. Average Years with MFI is the average number of years of membership in PRIDE for the four members of the group. Number of Literate Members is the number of members able to read.*

*Robust standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .*

**Table 3: Number of correct answers, for individuals**

	N	Mean	Std. Dev.	Median	Min.	Max.
Total	208	5.39	1.70	6	1	9
Male	92	5.75	1.79	6	1	9
Female	116	5.11	1.57	5	1	8
<i>Difference Male–Female</i>		0.64***	(0.23)			

*This table reports the number of correct answers in the problem-solving game in the individual round, comprising 10 multiple-choice questions. Inferences employ t-tests. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\* $p < 0.01$ . Standard errors in parentheses.*

**Table 4: Number of correct answers, by group**

	N	Mean	Std. Dev.	Median	Min	Max
Total	52	7.88	0.87	8	6	10
Male	12	7.66	0.65	8	7	9
Female	18	8.44	0.78	8	7	10
Mixed	22	7.54	0.86	7.5	6	9
<i>Difference Male–Mixed</i>		0.12	(0.28)			
<i>Difference Female–Mixed</i>		0.90***	(0.26)			
<i>Difference Male–Female</i>		-0.78**	(0.27)			

*This table reports the number of correct answers in the problem-solving game at the group stage, comprising 10 multiple-choice questions. Inferences employ t-tests. \* $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\* $p < 0.01$ . Standard errors in parentheses.*

**Table 5: Regression results for problem solving**

	(1) Correct Answers no covar.	(2) Correct Answers with covar.	(3) Correct Answers no covar.	(4) Correct Answers with covar.
Single-Gender Group	0.59** (0.24)	0.78*** (0.22)	0.90*** (0.26)	1.07*** (0.25)
Single-Gender Group*Male			-0.78*** (0.26)	-0.75*** (0.27)
Total Knowledge Endowment		0.03 (0.04)		0.06 (0.04)
Average Loan Size		0.13* (0.07)		0.10 (0.08)
Average Years with MFI		0.09 (0.08)		0.08 (0.07)
Average Age		-0.00 (0.02)		-0.02 (0.02)
Number of Literate Members		0.21 (0.29)		0.07 (0.28)
Average Altruism		0.10 (0.06)		0.09 (0.06)
Constant	7.55*** (0.18)	4.33*** (1.58)	7.55*** (0.18)	5.13*** (1.40)
Observations	52	52	52	52

*Notes: This table provides the results of the OLS estimations. The dependent variable is the number of questions a group was able to correctly answer (from 10 questions). The unit of observation is the group (consisting of four members). Single-Gender Group is a dummy variable that takes a value of one if a group is single gender and zero otherwise. Single-Gender Group\*Male is an interaction term to capture male groups. Total Knowledge Endowment is the total number of correct answers in the individual knowledge test by all the members in the group. Average Loan Size is the average loan size of the four members in the group. Average Years with MFI is the average number of years of membership of PRIDE for the four members of the group. Number of Literate Members is the number of members able to read. Average Altruism is the average contribution from the group members in the dictator game.*

*Robust standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .*

**Table 6: Proportion of risk takers, for individuals**

	N	Mean	Std. Dev.	Median	Min.	Max.
Total	208	0.50	0.50	0.50	0	1
Male	92	0.50	0.50	0.50	0	1
Female	116	0.50	0.50	0.50	0	1
<i>Difference Male-Female</i>		<i>0.00</i>				

*This table reports the proportion of individual participants that chose to take risks. Participants assigned a value of one if they took risks, zero otherwise.*

**Table 7: Proportion of risk takers, by group**

	N	Mean	Std. Dev.	Median	Min.	Max.
Total	52	0.29	0.46	0	0	1
Male	12	0.25	0.45	0	0	1
Female	18	0.44	0.51	0	0	1
Mixed	22	0.18	0.39	0	0	1
<i>Difference Male–Mixed</i>		0.07				
<i>Difference Female–Mixed</i>		0.26*				
<i>Difference Male–Female</i>		–0.19				

*This table reports the proportion of groups that chose to take risks in the decision-making game. Participants assigned a value of one if they took risks, zero otherwise.*

*Inferences from Mann–Whitney tests. \*  $z < 0.1$ , \*\*  $z < 0.05$ , \*\*\*  $z < 0.01$ .*

**Table 8: Regression results for risk and decision making**

	(1) Risky Investment no covar.	(2) Risky Investment with covar.	(3) Risky Investment no covar.	(4) Risky Investment with covar.
Single-Gender Group	0.18 (0.12)	0.20* (0.10)	0.25* (0.13)	0.26*** (0.10)
Single-Gender Group*Male			–0.16 (0.13)	–0.20*** (0.08)
Number of Risk Takers		0.30*** (0.08)		0.30*** (0.09)
Average Loan Size		–0.07 (0.05)		–0.07 (0.04)
Average Years with MFI		0.07 (0.05)		0.06 (0.04)
Average Age		–0.00 (0.01)		–0.01 (0.01)
Number of Literate Members		–0.11 (0.14)		–0.12 (0.11)
Average Altruism		0.02 (0.03)		–0.00 (0.03)
Observations	52	52	52	52

*Notes: This table provides the marginal effects using the probit estimations. The dependent variable is a dummy variable taking a value of one if the group decides to take a risk, and zero otherwise. The unit of observation is the group (consisting of four members). Single-Gender Group is a dummy variable that takes a value of one if a group is single gender and zero otherwise. Single-Gender Group\*Male is an interaction term to capture male groups. Number of Risk Takers is the number of members in the group that take individual risks. Average Loan Size is average loan size of the four members in the group. Average Years with MFI is the average number of years of membership of PRIDE for the four members of the group. Number of Literate Members is the number of members able to read. Average Altruism is the average contribution from the group members in the dictator game.*

*Robust standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .*

## Appendix

**Table A1: Descriptive statistics of dictator game**

	N	Mean	Std. Dev.	Median	Min.	Max.
<b>Total</b>						
Amount sent to Male Recipient	229	439.96	246.57	500	0	1000
Amount sent to Female Recipient	229	452.40	256.61	500	0	1000
<i>Difference</i>		-12.44	(17.37)			
<b>Sent by Male</b>						
Amount sent to Male Recipient	100	440.50	245.74	500	0	1000
Amount sent to Female Recipient	100	425.50	232.85	500	0	1000
<i>Difference</i>		15.00	(22.02)			
<b>Sent by Female</b>						
Amount sent to Male Recipient	129	439.53	248.17	500	0	1000
Amount sent to Female Recipient	129	473.25	255.72	500	0	1000
<i>Difference</i>		-33.72	(25.59)			

*This table reports the contribution in the dictator game. Participants were asked to share 1,000 TZS with another person. Each participant had to make this decision twice: once with a male and another with a female. The first group of statistics reports the average contribution of all participants to male and female recipients. The second group of statistics details average contributions by males. The third group of statistics reports the average contributions by females. Inferences employ t-tests. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\* $p < 0.01$ . Standard errors in parentheses.*

## Lab instructions

### **[Before the session starts]**

**[Moderator ensures that Overhead 1 (“Karibuni”) is on when participants enter room]**

**[MODERATOR ensures that the participants follow the rules of conduct after entering the room]**

**[When Moderator receives a sign from the Head of the Experiment (LHE), he starts reading the introduction]**

### **[The session]**

#### **[Introduction]**

Welcome. We appreciate your willingness to participate in this session, which I will lead. In this session you will be asked to make some financial choices, and you will earn money based on your choices and your performance.

The results from this session will be used in a research project on microcredit and entrepreneurship. It is therefore very important that all of you follow certain rules of conduct. You are not allowed to talk to any of the other participants during the session. If you have any questions or need any help, please raise your hand and one of us will assist you. All cell-phones must be turned off and put away. If anyone does not follow these instructions, we will have to ask him or her to leave the workshop.

If you need to go to the bathroom during the workshop, please raise your hand. Importantly, do not leave the room without permission.

#### **[MODERATOR proceeds when HE gives signal]**

The session will be conducted under anonymity. It will not be possible for the other participants or anyone else, except for the researchers, ever to find out what choices you make, and hence what you earn in the session. This session consists of three activities.

First, you will be asked to perform several individual activities. Second, you will be asked to make decisions in a group where other group members are anonymous. Finally, you will be asked to work together with other participants to solve problems.

The activities are completely independent, which means that your performance in one activity has no impact on what happens in the other activities. The estimated time of the whole session is approximately three hours.

In each activity, you can earn money. You will not be informed about how much money you have earned until the end of the session. The payment to you is organized as follows. The researchers keep track of how much money you earn throughout the session. At the end of the session, they prepare an envelope containing the money you have earned, where they will ensure that it is impossible to identify the amount of money inside the envelope simply by looking at it. This envelope will be handed over to you in private when you leave the session.



It is very important that you remember your desk number and report it in each activity, as the desk number is your identity in this experiment.

### **[Individual Game: Knowledge test]**

We will now explain the first activity in this session. We will shortly ask you some general questions. The questions are grouped in two topics: health and nutrition and business knowledge.

In total there are 10 questions, and for each question you can choose between four different answers. Your job is to tick off the correct answer. You should only tick off one alternative. If you tick off more than one alternative, your answer will be considered incorrect. We now provide an example of how you should do this.

#### **[MODERATOR reads Overhead KT]**

Your job is to tick off one of these answers. The correct answer is XXXX. Hence, if you tick off any of the other numbers, your answer is incorrect. In particular, you should never tick off more than one alternative.

For each correct answer, you are paid the fixed rate of 150 Tsh.

We will now hand out the questions but please do not turn over the page before you are told to do so.

#### **[MODERATOR waits until the first sheet has been handed out to all participants. He continues when HE gives signal]**

You can now turn over the sheet. First, now and for all sheets that you receive, make sure that you fill in your correct desk number, so that we can pay you correctly. We will now read question by question, and then for each question you tick off what you think is the correct answer.

Is this clear to everyone? If not, then please raise your hand and we will assist you.

#### **[MODERATOR proceeds when HE gives signal]**

I'll now start reading the first question.

#### **[MODERATOR reads the questions on the sheet]**

#### **[LHE gives a signal 15 seconds after Moderator has finished reading each question and the alternative answers; this applies for both topics]**

You have now answered all the questions on this topic. My assistants will collect the sheets.

### **[Individual Risk Game]**

We now move to the second part of the workshop, where you also can earn money, but in a different way. Let's explain in more detail.

First, we will simply give each of you 1000 Tsh. This is your money. You may decide to add it to the total amount of money that you are paid at the end of the session, or you may decide to take a risk. If you take risk, then you can be lucky or unlucky. If you are lucky, you will get 2500 Tsh instead of

1000 Tsh. If you are unlucky, you lose the 2500 Tsh and nothing is added to your final payment from this situation.

Here is how we decide whether you have been lucky or unlucky. When everyone has made their choice of whether to take the risk or not, we prepare two pieces of paper; one piece with the word LUCKY, the other piece with the word UNLUCKY.

**[F illustrates the procedure, as Moderator reads]**

We will then put them into two identical and empty envelopes, and the envelopes will be placed in this bowl. Thus it will be impossible for any of us to identify which envelope contains the word LUCKY. We will randomly select one of you to make the draw of one of the envelopes at the end of the workshop. If this envelope contains the word LUCKY, we will pay 2500 Tsh to those of you who chose to take risk. However, if this envelope contains the word UNLUCKY, those who chose to take the risk will not receive anything in this situation. Thus, it is equally likely that those who take the risk are LUCKY or UNLUCKY.

For those of you who chose the certain payment, the outcome of this draw does not affect your pay. In any case, you receive the certain payment of 500 Tsh.

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

On the overhead, we summarize the choice you have to make.

**[MODERATOR shows Overhead 5 and reads it. He then continues]**

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

We will now hand out the sheet where you have to make the choice of whether to risk your 1000 Tsh or keep it. Please do not turn over the sheet until you are told to do so.

**[MODERATOR waits until HE provides a signal]**

You should now make the choice of whether to risk your 1000 Tsh or keep it.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now collect the sheet.

**[MODERATOR waits until HE provides a signal]**

We remind you that the determination of LUCKY and UNLUCKY outcome will be done at the end of the experiment.

**[MODERATOR waits until HE provides a signal]**

Now we move on to a new situation. Again, we will give you some money, this time 1500 Tsh. This is your money. You may decide to add it to the total amount of money that you are paid at the end of the session, or you may decide to take a risk. If you take the risk, then you can be lucky or unlucky. If you

are lucky, you will get 2500 Tsh instead of 1500 Tsh. If you are unlucky, you lose the 1500 Tsh and nothing is added to your final payment from this situation

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

On the overhead, we summarize the choice you have to make.

**[MODERATOR shows Overhead 7 and reads it. He then continues]**

We will now hand out the sheet where you have to make the choice of whether to risk your 1500 Tsh or keep it. Please do not turn over the sheet until you are told to do so.

**[MODERATOR waits until HE provides a signal]**

You should now make the choice of whether to risk your 1500 Tsh or keep it.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now collect the sheet.

**[MODERATOR waits until HE provides a signal]**

Now all of you have made choice, at the end of the workshop, we will determine the outcome with the same procedure as has been explained.

**[MODERATOR waits until HE provides a signal]**

**[MODERATOR waits until HE provides a signal]**

When all of you have made your choices, at the end of the workshop, we will determine the outcome with the same procedure as has been explained.

You have now completed this particular part of this session.

We now proceed to another activity.

### **[Individual Game: Dictator Game]**

We now move to the next activity of the workshop, where you also can earn money, but in a different way. Let's explain in more detail.

We will start a pair-activity. Each of you will be assigned to another person. This person is also a PRIDE client. You and this person will receive 1000 TZS in total.

You will not be told who you will be paired with, and your partner will not know your identity. You will only know one characteristic of your partner. **This characteristic will be given to you privately in the sheet that we will hand out to you.**

You will decide how to share the money between you and your partner, and you can send from 0 up to 1000 TZS to your partner with 100 as increment.

**[MODERATOR waits until HE provides a signal]**

On the overhead, we summarize the choice you have to make.

**[MODERATOR shows Overhead DG and reads it. He then continues]**

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

We will now hand out a sheet where you have to make decisions how much to share for your partner. **In the sheet, you can see one characteristic of your partner.** Please do not turn over the sheet until you are told to do so.

**[MODERATOR waits until HE provides a signal]**

You should now make the decision.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now collect the sheets.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now do this one more time. You will be paired with another PRIDE client. You and this person will receive 1000 TZS in total.

As in the previous activity, you will not be told who you will be paired with, and your partner will not know your identity. You will only know one characteristic of your partner. **This characteristic will be given to you privately in the sheet that we will hand out to you.**

You will decide how to share the money between you and your partner, and you can send from 0 up to 1000 TZS to your partner with 100 as increment.

**[MODERATOR waits until HE provides a signal]**

We will now hand out a sheet where you have to make decisions how much to share for your partner. In the sheet, you can see one characteristic of your partner. Please do not turn over the sheet until you are told to do so.

**[MODERATOR waits until HE provides a signal]**

You should now make the decision.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now collect the sheets.

### **[Group Game: Public Good Game]**

We now move to the next activity of the workshop, where you also can earn money, but in a different way. In this particular activity, you will play in a group. This means, both your decision and others' decisions will matter for the sum of money that you earn in this activity.

Your group member will be randomly selected, and there are 4 persons in each group. We create the group by taking the number from two different boxes randomly. You will not know who your group members are, only the researcher will know who is grouped with whom.

To be read ONLY in SAME GENDER TREATMENT

Let's create the groups before we proceed with the information about the activity. Here, there are two boxes, one consists of desk numbers of male participants, and the other consists of desk numbers of female participants. Now, we will make groups of 4 persons that consist of people with the same gender. Now, my assistant will take 4 desk numbers from the male box, this is the first group. Then, we proceed to take 4 desk numbers from the female box, this is second group. We will proceed to create the next group.

In case the remaining desk numbers in the box are not enough to create a group, the participants with these desk numbers will do a different task.

To be read ONLY in MIXED GENDER TREATMENT

Let's create the groups before we proceed with the information about the activity. Here, there are two boxes, one consists of desk numbers of male participants, and the other consists of desk numbers of female participants. Now, we will make groups of 4 persons that consist of two female and two male participants. Now, my assistant will take 2 desk numbers from the male box and 2 desk numbers from the female box, this is the first group of 4 persons. We will proceed to create the next group.

In case the remaining desk numbers in the box are not enough to create a group, the participants with these desk numbers will do a different task.

Now, we will proceed with the information about how you can earn money in this session.

You are now in a group of 4 persons with 3 other members in this room. Each group member receives 2000 TZS and will decide how to allocate this 2000 TZS. You can either put this 2000 TZS into your **private fund** or you can invest it **fully or partially** into **group fund**. Each TZS you do not invest into the group fund will automatically remain in your private fund and will be added into your payment.

The total group fund from 4 people's contribution will be doubled and shared equally to all participants.

**To make you easily understand this particular activity, I will ask my assistant to visualize this activity.**

**First example:**

Now, I give each person 2000 TZS. This is their money; they will decide whether they want to keep it for private, or to contribute to group fund.

Now, you see that all of them do not contribute. This means each of them keeps 2000 for their private fund. Then, the group fund remains at zero. This means they will not get money from the group fund. So, everyone will get 2000 from this activity and can take home this 2000 TZS.

Because this was an example, I am taking the money back from them.

**Let's try second example:**

As before, I give each of the group members 2000 TZS. This is their money; they will decide whether they want to keep it for private, or to contribute to the group fund.

Now you see that all of them contribute 2000 TZS. Then the total group fund will be 8000. Then we will add 8000 more to the group fund, so, the group fund becomes 16000. We share the money equally between all participants. Then, you see that each participant receives 4000 from the group fund.

As you see they contributed all their money to the group fund, hence their private fund is zero, because, now, they receive 4000 from group fund, the total of private fund and their share from the group fund that they can take home is 4000 TZS.

Because this was an example, I am taking the money back from them.

**Let's try a third example:**

As before, I give each of the group members 2000 TZS. This is their money; they will decide whether they want to keep it for private, or to contribute to the group fund.

Now you see that member 1 contributes 0, member 2 contributes 500, member 3 contributes 1500 and member 4 contributes 2000.

This means, member 1 has 2000 in his private fund, member 2 has 1500 TZS in his private fund, member 3 has 500 in his private fund, and member 4 has nothing left in his private fund.

Now let's calculate how much money is in the group fund. You see that this is 4000. Then, we will double it with the meaning that we add 4000 more to the group fund, so now, it becomes 8000. Then we divided it equally between the 4 participants.

NOW YOU WILL RECEIVE A SHEET WHERE YOU SHOULD WRITE HOW MUCH EVERYONE WILL RECEIVE FROM THE GROUP FUND.

PLEASE WRITE DOWN NOW, and my assistant will check whether you have finished the answer.

As everyone has answered, let us calculate how much everyone gets. Now, you see that everyone has received the same amount of money. Please write it down, how much everyone gets in your sheet.

My assistant now will collect the answer.

So, now, you see that everyone receives 2000 from the group fund.

Now, let's us calculate how much money each member has.

Member one has 2000 in the private fund, and receives 2000 from the group fund, the total is 4000 that he/she can take home.

Member two has 1500 in the private fund, and receives 2000 from the group fund, the total is 3500 that he/she can take home.

Member 3 has 500 in private the fund, and receives 2000 from the group fund, the total is 2500 that he/she can take home.

Member 4 has 0 in the private fund, and receives 2000 from the group fund, the total is 2000 that he/she can take home.

Now, let us redo the same example so that it becomes clearer for you.

Now I am taking the money back from them.

Now we redo the example

As before, I give each of the group members 2000 TZS. This is their money; they will decide whether they want to keep it for private, or to contribute to the group fund.

Now you see that member 1 contributes 0, member 2 contributes 500, member 3 contributes 1500 and member 4 contributes 2000.

This means, member 1 has 2000 in his private fund, member 2 has 1500 TZS in his private fund, member 3 has 500 in his private fund, and member 4 has nothing left in his private fund.

Now let's calculate how much money is in the group fund. You see that this is 4000. Then, we will double it with the meaning that we add 4000 more to the group fund, so now, it becomes 8000. Then we divided it equally between the 4 participants.

So, now, you see that everyone receives 2000 from the group fund.

Now, let's us calculate how much money each member has.

Member one has 2000 in the private fund, and receives 2000 from the group fund, the total is 4000 that he/she can take home.

Member two has 1500 in the private fund, and receives 2000 from the group fund, the total is 3500 that he/she can take home.

Member 3 has 500 in the private fund, and receives 2000 from the group fund, the total is 2500 that he/she can take home.

Member 4 has 0 in the private fund, and receives 2000 from the group fund, the total is 2000 that he/she can bring home.

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

### **[Control Questions]**

Now, let's try more examples, but now, you should calculate by yourself and write down the answers.

Now, we will hand out a sheet with examples.

CHECK CONTROL SHEET QUESTIONS

THESE ARE CONTROL QUESTIONS INCLUDING THE P-EXPERIMENT

**[MODERATOR waits until HE provides a signal]**

Now, my assistant will collect the sheet.

**[MODERATOR waits until HE provides a signal]**

Now, we finish with examples and we hope you have fully understood the activity. We proceed with the main activity where you should make a decision which will determine how much money you will take home as this is a group activity, remember that the decisions of the other members in your group will also determine how much money you take home.

**[MODERATOR waits until HE provides a signal]**

**[Group Game: Public Good Game C-experiment]**

Remember now you have been grouped with 3 different participants in this room;

**[for SAME GENDER TREATMENT]** who have the same gender as you

**[for MIXED GENDER TREATMENT]** one of them has the same gender as you, and the two others are people with opposite gender.

The group for participants with these particular numbers: \_\_\_\_\_ is not full. So, these persons should do another task. My assistant will come to you and explain the special task.

Now, we give each of you 2000 TZS. Then you must decide how much you want to contribute to the group fund and how much you want to keep for your private fund. As you remember from our previous examples, the money that you keep in the private fund will be added directly to the amount that you take home, and money that you put in the group fund will be doubled and shared equally between all 4 members in the group.

**[MODERATOR shows Overhead CE and reads it. He then continues]**

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

We will now hand out the sheet where you have to make a decision about how much you will put into the group fund. Please do not turn over the sheet until you are told to do so.

**[MODERATOR waits until HE provides a signal]**

Now, considering the examples that have been shown before, how much do you want to contribute to the group fund and how much do you think the other participants will contribute? Please write it down.

**[MODERATOR reads the sheet and continues when HE provides a signal]**

We will now collect the sheet.



Thank you for your cooperation up to this point.

We now proceed to another activity.

### **[GROUP GAME]**

Now, we will form you into a group of four entrepreneurs. You will be allowed to talk with your group member in this session. Remember you are only allowed to talk with your group members, and not other participants. Further, please remember to talk in a tone such that only your group members can hear you. If anyone breaks this rule, we must kindly ask you to leave the classroom.

In this activity, you can earn money in a group. But then you will share the money equally among the members.

Now, let's determine the group.

Similar to before, we will randomly assign you into groups. But, now we will announce who is grouped with whom, and we will kindly ask you to take note of your group number. After everyone gets a group, we want you to sit together in your group. My assistant will let you know where each group should sit.

### **[GROUP COOPERATION 1: KNOWLEDGE TEST]**

**Now, you will do activity in a group. The first activity will be answering questions.** In this activity, your group will solve questions that are similar to previous individual questions. You can discuss among you what the right answers are.

There are 10 questions that a group should answer. For each right answer, the group will receive 600 TZS. Total amount received by the group will be distributed equally to each member. If your group answers the all questions right, your group will receive a bonus of 5000 TZS. The time limit to answer the questions is 8 minutes.

On the overhead, we summarize the choice you have to make.

### **[MODERATOR shows Overhead KT and reads it. He then continues]**

Is this understood? If there are any questions please raise your hands now and we will assist you.

### **[MODERATOR waits until HE provides a signal]**

We will now hand out the sheet of questions that should be solved in your group. Please do not turn over the sheet until you are told to do so. You will have 8 minutes to work on these questions, if you are still working when we say time is over, your group will be disqualified. After 7 minutes, you will be notified that there is 1 minute left.

### **[MODERATOR waits until HE provides a signal]**

Now, you can start working.

### **[F gives a signal that 7 minutes have passed; Moderator announces the reminder]**

**[F gives a signal that 8 minutes have passed; Moderator announces that participants should put down their pens, and if they are still working then their group will be disqualified.]**

Now you should stop working and put your pen on the table.

My assistant will collect the sheets.

**[MODERATOR waits until HE provides a signal]**

### **[Cooperation Game: Group Risk Game]**

We now move to the next group activity of the workshop, where the group also can earn money, but in a different way. The money that the group earns will be shared equally among the members.

You will be allowed to talk with your group members in this session. Remember you are only allowed to talk with your group members, and not other participants. Furthermore, please remember to talk in a tone that only your group members can hear your voice. If anyone breaks this rule, we must kindly ask you to leave the classroom.

[RISK GAME 1]

In this activity, you as a group of four people will receive 4000 TZS.

This is your money. Your group may decide to add it to the total amount of money that you are paid at the end of the session, or your group may decide to take a risk.

If your group chooses not to take risk, the amount of 4000 Tsh will be divided equally among members of the group, meaning that each member will receive 1000 Tsh.

If your group takes the risk, then your group can be lucky or unlucky. If your group is lucky, your group will get 10000 Tsh instead of 4000 Tsh. This money will then be shared equally between members, so that each member will receive 2500 TZs. If your group is unlucky, your group loses the 4000 Tsh and nothing is added to each member's final payment from this situation.

As this is a group activity, you must make a decision in the group. One group is only allowed to make one decision.

[RISK GAME 2]

Now, we will redo the same game. Now we move on to a new situation. Again, you as a group of four people will receive some money. This time it is 6000 TZS.

This is your money. Your group may decide to add it to the total amount of money that you are paid at the end of the session, or your group may decide to take a risk.

If your group chooses not to take risk, the amount of 6000 Tsh will be divided equally among members of the group, meaning that each member will receive 1500 Tsh.

If your group takes the risk, then your group can be lucky or unlucky. If your group is lucky, your group will get 10000 Tsh instead of 6000 Tsh. This money then will be shared equally between members, so that each will receive 2500 TZs. If your group is unlucky, your group loses the 6000 Tsh and nothing is added to each member's final payment from this situation.

As this is a group activity, you must make a decision in the group. One group is only allowed to make one decision.

We will then determine whether you will be lucky or unlucky using the same procedure as before.

Is this understood? If there are any questions please raise your hands now and we will assist you.

**[MODERATOR waits until HE provides a signal]**

On the overhead, we summarize the choice you have to make.

**[MODERATOR waits until HE provides a signal]**

We will now hand out the sheet where you have to make the decision of investing or not. Please do not turn over the sheet until you are told to do so. You have 4 minutes to make the group decision.

**[MODERATOR waits until HE provides a signal]**

Now, please mark whether your group wants to invest or keep the money.

We will now collect the sheets. Please remember to write your group number and each member's desk number in the sheet.

**[MODERATOR waits until HE provides a signal]**

## **[DETERMINING THE RESULT]**

**[MODERATOR waits until HE provides a signal]**

Now, we will determine the result of your investments.

Now, we will take the result for the investment choice one, when you decided to put 1000 in a risky project or not. If it turns out lucky, the one who chooses to invest will receive 2500.

And then... it is...

Now, we will take the result for the investment choice two, when you decided to put 1500 in a risky project or not. If it turns out lucky, the one who chooses to invest will receive 2500.

And then... it is...

Now, we will take the result for the group investment choice 1, when your group decided to put 4000 in the risky project or not. If it turns out lucky, the group who choose to invest will receive 10000, meaning that each member will receive 2500.

And then... it is...

Now, we will take the result for the group investment choice 2, when your group decided to put 6000 in a risky project or not. If it turns out lucky, the group who choose to invest will receive 10000, meaning that each member will receive 2500.

And then... it is...

Your payment from investment choice will be determined according to this result.

Our assistant will now prepare the payment.

## **[SOCIAL NETWORK SURVEY]**

### **[MODERATOR waits until HE provides a signal]**

In the meantime, we will call each of your desk numbers and please stand up when your number is called. Further, we will ask the others to raise their hands if they have known this person outside the workshop.

While we are waiting for the assistants to prepare the payments which you have earned, we would like to offer you [for morning session:] LUNCH; [for afternoon session:] REFRESHMENT. After the LUNCH/REFRESHMENT we will call your desk numbers one by one and give you an envelope with your payment and the signed sheet for your participation compensation.

### **[MODERATOR shows Overhead THANK YOU]**

We would like to thank you all for participating in this session. Your input will be most valuable for our research project on microcredit and entrepreneurship. May we ask you not to discuss this session with others before the end of this week, since we will arrange further sessions with other microcredit clients the coming days. Please leave the pen on your desk when you leave the room. Again, thank you for your participation in this workshop.

## Chapter 3

### **A Nudge to Remember: Evidence from a Field Experiment with Pawnshop Borrowers**



# A Nudge to Remember: Evidence from a Field Experiment with Pawnshop Borrowers

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March 8, 2013

## Abstract

This study measures the impact of a mobile phone text reminder on the repayment behavior of pawnshop borrowers in Indonesia. We randomly assigned borrowers into a treatment group, who received a reminder, and a control group, who received no reminder. The results show that the text reminder increased the proportion of borrowers that went to the pawnshop before the loan due date by 6.9 percentage points. Moreover, we find that female borrowers are more responsive to the reminder than male borrowers. We also investigated different content for the text reminder, but found no difference in impact.

*JEL Classifications: C93, D03*

*Keywords: field experiment, nudge, reminder, attention, repayment*

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\*The author would like to thank Kjetil Bjorvatn, Alexander Cappelen, John List, Erik Sørensen, Bertil Tungodden, seminar participants at The Choice Lab, delegates at the 7th Nordic Conference on Behavioral and Experimental Economics, and fellow students in the Field and Lab Experiments in Economics course at the NHH Norwegian School of Economics for their helpful comments and suggestions. The author gratefully acknowledges the financial support of the Female Fund and the Department of Economics at the NHH Norwegian School of Economics. The author also appreciates the assistance and support of Sanuri and the staff at Pegadaian and the dedication and hard work of the research assistants coordinated by Brian Simarmata and Ezraelli Risang.

# 1 Introduction

People do not always act in accordance with their best interests. For instance, we may have an ambition to stop smoking, start exercising, save more, or do our homework on time, but we often fail to live up to these commitments. The literature points to the potential of small and unobtrusive interventions, called “nudges”, that can assist people to stick to their commitments. For example, Giné et al. (2010) study how opening a deposit account conditional on urine test results may help people give up smoking, Ariely and Wertenbroch (2002) analyze different ways of setting student assignment deadlines that can help to reduce the negative effect of procrastination, while Benartzi and Thaler (2004) introduce an innovative employee retirement savings program that automatically increases the contribution to the pension plan every time there is an increase in salary.

Elsewhere, Karlan et al. (2010) argue that suboptimal behavior can arise from limited attention, and that reminders may better align behavior with intentions. In their model, Karlan et al. (2010) predict that people will undersave if they have limited attention, and that reminders can increase saving. Moreover, reminders about the goals of saving will have an even stronger effect. Using field experiments, Karlan et al. (2010) obtain supporting evidence for these theories. In a loan repayment setting, Cadena and Schoar (2011) contrast the use of pecuniary and nonpecuniary incentives to improve repayment behavior in Uganda. They find that mobile phone text reminders produce a similar effect to a reduction in interest rates or an equivalent pecuniary reward in improving repayment behavior. In contrast, Karlan et al. (2012) find no overall treatment effect of a text reminder among borrowers in the Philippines, but do conclude that the inclusion of the name of the account officer in the text exerts a positive impact on repayment behavior.

The purpose of the present study is to provide additional empirical evidence on the issue of reminders and loan repayment by implementing an experiment in a different sort of loan institution and a different country. Using a field experiment conducted in a branch of a state-owned pawnshop in Indonesia, we consider whether a reminder can nudge borrowers to repay their loans on time. We randomly assigned borrowers into treatment and control groups, where borrowers in the treatment group received a text message to remind them about the due date of the loan, while those in the control group received no such message. Our results show that a reminder with information about the due date assists borrowers in repaying their loans before the due date. Moreover, our analysis reveals an interesting gender asymmetry, with women being much more responsive to the reminders than men.



The remainder of the paper is structured as follows. Section 2 discusses the context and the pawning procedure. Section 3 provides a simple model to formalize the problem at hand. Section 4 describes the data collection and the experimental design. Section 5 details the results of the experiment, and Section 6 concludes.

## 2 The Context

### 2.1 Development of Pawnshops in Indonesia

Pawnshops have existed in Indonesia since the nineteenth century, when they were privately owned by traders. The practice became widespread in a relatively short time, indicating a high demand for this service. However, the private pawnshops soon gained a negative reputation because of high interest rates and low assessment values. In 1901, a state-owned pawnshop was established to protect borrowers from irresponsible lending practices.<sup>1</sup>

Since then, the Indonesian state-owned pawnshop, Pegadaian, has provided credit to millions of borrowers. The pawnshop's stated mission is "to better serve the country". This social mission is reflected in such policies as lower interest rates for the lowest category of loans, the existence of a grace period, public announcement of the auction date, and the practice of sending the borrower a letter advising that the item is about to be auctioned. These policies, combined with the speedy procurement of credit, have made Pegadaian popular among borrowers.

By 2011, Pegadaian had served some 25.5 million borrowers and had more than 4,500 branches across Indonesia (Pegadaian, 2011). In fact, the number of Pegadaian branches is comparable to that of Bank Rakyat Indonesia (BRI), which is widely recognized as one of the world's largest microfinance institutions. Pawnshop transactions peak during religious celebrations or the start of the school year, which indicates that, to a large extent, people use pawnshop loans for consumption purposes.

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<sup>1</sup>For more information about the history of pawnshops in Indonesia, see Nagazumi (1974).

## 2.2 The Pawning Procedure

The pawning procedure starts with a potential borrower taking an item intended to be pawned, such as jewelry or electronic goods, to the pawnshop. The borrower then fills in a borrowing form, hands in the form together with the item for pawning, and waits for the officer to assess the item. The officer states the maximum amount of credit that the pawnshop can offer and the borrower states the amount of money that he or she wishes to borrow. The assessment value is usually less than the market value of the good. After the two parties have agreed on the loan size, the transaction takes place. The pawnshop retains the item as collateral.

Following the agreement, a cashier delivers the amount of credit agreed to by both parties, and then both sign a letter of credit. The cashier then explains the terms of the loan, particularly to new borrowers. The loan is due on the 120<sup>th</sup> day. For a typical loan, the interest rate is 1.2% per 15 days without compounding. The longer a client delays the loan repayment, the higher his or her interest payment. If borrowers keep loans for more than 105 days, the interest payment increases to 9.6% of the loan.

For borrowers who are unable to repay their loan in full, other payment options are available. First, they may extend the loan, in which case they pay only the interest and then have another 120 days to repay the loan principal. Second, they may pay an installment, that is, they pay the interest and some of the loan principal. This option gives the borrower another 120 days to repay the remainder of the loan. Conditional on whether or not the assessment value is higher than the loan size, borrowers may also request an increase in the size of the loan. Borrowers can select these options at any point in time during the loan period. If a loan reaches its maturity date and the borrower has taken no action on the loan, the collateral will be auctioned. Until the auction date, there is a grace period, during which the interest payment is kept constant. Hence, borrowers who take advantage of the grace period are charged a lower effective interest rate.

The terms and conditions of the loan are stated in the letter of credit, including the interest rate, administration fee, the due date, and the date for auction, which is stated to take place three days after the due date. In reality, for practical purposes, auctions are held only twice a month. However, borrowers might not be fully informed about the auction dates, particularly those who have no prior experience with the pawnshop.

The status quo practice in the pawnshop is to send borrowers a letter informing them of the auction date and urging them to repay the loan before the auction date. If borrowers do not respond, a pawnshop officer will telephone them, inform them about the auction, and check their intentions to ensure that the pawnshop does not auction items that could be redeemed.

### 3 Model and Predictions

In our pawnshop setting, there are two deadlines for loan repayment: the due date and the auction date. Before the due date, there is a monetary incentive to repay sooner because the interest payment increases with the number of loan days. However, when the due date is approaching, the monetary incentive to repay sooner disappears because of the grace period between the due date and the auction date. Neoclassical economic theory would suggest that borrowers holding the loan for more than 105 days, at which point they reach the maximum interest payment, should repay precisely on the auction date. However, the data show otherwise: more than half of borrowers repay the loan in the period before the due date. Furthermore, the peak repayment period occurs on the due date, showing that the borrowers place a value on this deadline.<sup>2</sup>

One reason for repaying by the due date is the presence of a moral incentive. Such moral and ethical considerations are influenced by a concern both for others and for one’s own image (Levitt and List, 2007). Borrowers who value the due date may feel guilt or regret if they are unable to repay before this date. These feelings could be exacerbated by discomfort and shame because the borrowers are aware that their actions will generate costs for the lender.

The following model shows the scenario where borrowers are influenced by moral considerations and how a text reminder can help people achieve their own best interest. In the model, we make an implicit assumption that people are always willing to redeem their pawned item.

For simplicity, let us assume that there are two options for payment: either on the due date or after the due date if the due date is forgotten. Utility is then defined as  $U$ , if the payment is on time, with utility reduced by  $M$  if the payment is late.  $M \geq 0$  represents the moral cost of being late. Factors that determine the presence and magnitude of the moral cost include “the financial externality that an action imposes on others” and “the set of social norms and legal rules that govern behavior in a particular society” (Levitt and List, 2007).

Define  $p \in (0, 1)$  as the probability of forgetting the due date. Hence, we can define the expected utility of borrowing as:

$$EU = (1 - p) U + p (U - M). \quad (1)$$

People will borrow if  $EU > 0$ , which is equivalent to:

$$U > pM. \quad (2)$$

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<sup>2</sup>See Figure A1 in the Appendix.

For borrowers who are not influenced by moral considerations, the value of  $M$  is zero, which means that their utility is not determined by the timing of repayment; for those borrowers concerned about morality,  $M > 0$ , the repayment date is important.

Equation 2 shows that people borrow when the utility gain from borrowing is higher than the probability of forgetting the date multiplied by the moral cost. Where  $U > M$ , people borrow. Conversely, where  $U \leq M$ , there is a critical level  $p^* = U/M$  when  $EU = 0$ , at which individuals are indifferent between borrowing and not borrowing. If a person has  $p > p^*$  then  $EU < 0$ , whereas if  $p < p^*$  then  $EU > 0$ . This implies that only individuals who have  $p < p^*$  will take out a loan. For borrowers who have  $M > U$ , remembering the due date is especially important because if they forget, they are actually worse off than if they had not taken out the loan in the first place.

The presence of a reminder reduces the probability of forgetting the due date, such that  $p_r$ , the probability of forgetting the due date with a reminder, is lower than  $p$ , the probability of forgetting the due date without a reminder. For simplicity, let us assume that  $p_r = 0$ . This implies that the reminder guarantees that borrowers gain from the loan. The model generates a testable hypothesis: the reminder may induce early repayment, but only among those borrowers concerned about morality.

Furthermore, awareness of the reminder system may encourage potential borrowers, who previously had  $M > U$  and  $p > p^*$  such that they were not willing to borrow, to apply for a loan, because now they may have  $p_r \leq p^*$ . In this way, the reminder will provide the lender with a better mix of clients by increasing the share of moral borrowers in the client base.

Late repayment, of course, creates costs for the lender. These costs include the foregone earnings from the lower effective interest rate as borrowers take advantage of the grace period and both the monetary and nonmonetary costs and hassle of contacting borrowers to inform them about the auction date. Hence, the pawnshop will clearly benefit if a reminder turns out to be an effective way of increasing the timeliness of repayment. Ultimately, therefore, both parties can benefit from the intervention.

Improvements in Short Message Service (SMS) technology have made it easier to send bulk personalized text reminders in a short period of time, with the message reaching borrowers instantly. Furthermore, sending an SMS is cheaper than other means of communication such as conventional letters or telephone calls. Hence, in this study, we use SMS as the means of sending the reminder.<sup>3</sup> However, one limitation of SMS as a communication tool is that borrowers can change their mobile telephone number more easily than they change their postal address and may not inform the pawnshop about the change. Because of this limitation, we estimate the treatment

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<sup>3</sup>Throughout the paper, “SMS”, “text reminder”, “text”, “text message”, and “reminder” are used interchangeably when referring to the chosen intervention.

effect using the intention to treat (ITT) estimator.

## 4 Data Collection

### 4.1 Administrative Data

This study takes place in one of the Pegadaian branches in Jakarta, Indonesia. The branch has been in operation since 2000 and it is located in an area with both businesses and residential housing. Consequently, the branch serves borrowers who use loans for both productive and nonproductive purposes. In a normal day, the branch accepts more than a hundred items of jewelry, electronics, and motorcycles as pledges. Jewelry accounts for 95% of the pawned items.

From the branch’s administrative database, we collected the following information on loans registered in January 2012: the date when the loan was set, the loan identity number, and whether the loan was newly registered or extended from a prior loan. The focus of this study is on medium-sized loans. We include only medium-sized loans for several reasons: (1) loans in the lowest and the highest loan categories account for only 3.5% of the total loans made; (2) only a small proportion of borrowers in the lowest loan category have a mobile phone; and (3) as there is no upper limit of loan size, some of the loans in the highest loan category can be very large and are categorized as outliers. Overall, 2,294 medium-sized loans were registered in January 2012.

### 4.2 Experimental Design

We first organized the loans by borrowing date. On the 100<sup>th</sup> day of each loan, we checked whether the loan had been repaid. We then sorted the unpaid loans based on the name of the borrower and the loan identity number.<sup>4</sup> Randomization was done at the borrower level, rather than at the loan level, because a borrower may have more than one loan with the same due date. However, we assigned all loans to the treatment or control group based on the treatment assignment of the borrowers. Two out of every three borrowers received a text reminder containing information about the due date of their loan; the other third of the borrowers served as the control group and received no reminder. The number of loans in the experiment

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<sup>4</sup>Although our original plan was to send out the text reminder on exactly the 100<sup>th</sup> day for all loans, administrative issues meant that this was not possible. Instead, reminders were scheduled to be sent twice a week, so borrowers may have been sent a reminder on the 99<sup>th</sup>, 100<sup>th</sup> or 101<sup>st</sup> day of their loan; on one occasion, the reminder was sent on the 102<sup>nd</sup> day. For simplicity, we use the term “100<sup>th</sup> day” when we refer to the day that we sent the text reminder.

ranged from 31 to 95 per day, depending on the number of loans that had been made on any particular day and how many of them had been repaid. In total, 1,456 loans by 1,020 borrowers were included in the experiment.

In some cases, a borrower had multiple loans made on different dates. As the randomization was done for each day, there was the chance that such borrowers might have been randomized into both the treatment and control groups. Therefore, borrowers assigned to both control and treatment groups were excluded from further analysis.<sup>5</sup> Finally, 1,196 loans were eligible for further analysis, with a total of 926 borrowers, of whom 752 had one loan and 174 had multiple loans taken out on the same day. As a text message was sent for each loan, borrowers with multiple loans in the treatment group received more than one reminder, which means the treatment intensity was stronger for this group. We do not exclude this kind of borrower, but cluster standard errors at the borrower level and control for whether the loan is one of multiple loans.<sup>6</sup> The baseline characteristics of the loans in the treatment and control groups are reported in Table 1.

Table 1: Baseline Characteristics and the Treatment Balance

	Control Mean (Std. Dev.) (1)	Treatment Mean (Std. Dev.) (2)	Diff. Mean (Std. Dev.) (3)	Total Mean (Std. Dev.) (4)
Male	0.314 (0.465)	0.350 (0.477)	0.037 (0.029)	0.338 (0.473)
Loan Size	3.662 (3.337)	3.572 (3.430)	-0.089 (0.207)	3.603 (3.398)
New Loan	0.227 (0.420)	0.231 (0.422)	0.004 (0.026)	0.229 (0.421)
Multiple Loans	0.338 (0.024)	0.388 (0.017)	0.050* (0.030)	0.371 (0.014)
Observations	405	791		1196

Note: Loan size is in millions of Indonesian rupiah (IDR). Male, New Loan and Multiple Loans are dummy variables.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

<sup>5</sup>Based on this criterion, we excluded 260 loans for 94 borrowers.

<sup>6</sup>The characteristics of the borrowers with multiple loans differ significantly from those with single loans. In the single-loan group, the percentage of men is higher, the proportion of new loans is larger, and loans are smaller than in the multiple-loans group. However, within each treatment group, there is no difference in the baseline characteristics of borrowers with multiple and single loans.

Of the 1,196 loans eligible for subsequent analysis, the average loan size is 3.60 million IDR. Almost a quarter of these are new loans made in January 2012, while the other three-quarters are old loans for items pawned prior to January 2012. Around one-third of the eligible loans are obtained by men. There is no difference between the treatment and control groups in the mean of these three characteristics. Furthermore, as mentioned above, some borrowers have multiple loans. In the control group, 33.8% of loans share a borrower with another loan; the corresponding number in the treatment group is 38.8%. The difference is significant at the 10% level.

### 4.3 Survey Data

During the period between when the SMS reminders were sent and the auction date, we conducted a survey to obtain the characteristics of the borrowers that were part of the experiment when they came to the pawnshop to repay or extend their loan. Using this survey, we collected information such as the borrower's age, education and income level, employment and marital status, the purpose of the loan, and experience with the pawnshop.<sup>7</sup> We contacted 423 (41.47%) of the 1,020 borrowers that were initially part of the experiment.<sup>8</sup> Some borrowers refused to be interviewed even though they came to the pawnshop (225 borrowers), some did not show up to make the repayment before the auction date (187 borrowers) and in some cases the person could not be identified.<sup>9</sup> In addition to this target group, we also interviewed a random sample of borrowers to check whether the characteristics of the borrowers that were part of the experiment, i.e., those who had not repaid the loan by the 100<sup>th</sup> day, differed from the total population of pawnshop borrowers. We did this because there could have been important characteristics that drove selection into the group included in the study. We managed to randomly interview 220 borrowers that were not part of the experiment.

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<sup>7</sup>The SMS reminder was not mentioned in the survey.

<sup>8</sup>The initial intention of the survey was to estimate the effect of background characteristics that could interact with the treatment status. However, because of the low response rate, we were unable to use the data for further analysis.

<sup>9</sup>There was no difference in terms of age and gender between borrowers that refused to be interviewed and those that were interviewed.

Table 2: Characteristics of Borrowers

	Experiment Sample Mean (Std. Dev.)	Random Sample Mean (Std. Dev.)	Diff.
Age	41.712 (11.635)	37.578 (11.124)	4.133***
Male	0.374 (0.485)	0.366 (0.483)	0.009
Highest Education	0.505 (0.501)	0.477 (0.501)	0.028
Highest Income	0.375 (0.485)	0.403 (0.492)	-0.028
Experience	46.903 (36.555)	38.042 (41.290)	8.861***
Observations	423	220	

Notes: Loan size is in millions IDR. Experience is in months.  
Standard errors are in parentheses. Standard errors are clustered at the borrower level.  
\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

We then compared the characteristics of the truncated sample with those of the random sample as shown in Table 2, and found that the target group was slightly older and had more experience with the pawnshop compared with the random sample. The profile of borrowers that were part of the experiment is as follows: the average age is 41.7 years and 37.4% are male. The age range of borrowers is 20–76 years.

Compared with the population of Jakarta in the same age range, the pawnshop borrowers appear to be from the upper part of the distribution for educational background and income, as 50.5% attained an education level above senior high school and 37.5% of the borrowers have a monthly income of more than 5 million IDR.<sup>10</sup> The corresponding numbers in the population are 30% and 9.76%, respectively.<sup>11</sup> This is not surprising considering that borrowers must own valuable items to serve as collateral when borrowing.

The average size of the loan among survey respondents is 3.07 million IDR.<sup>12</sup> This is equivalent to about twice the regional minimum monthly wage in Jakarta.<sup>13</sup> Slightly more than a quarter of respondents said that they used the loan to pay school fees, while almost a quarter said that the money was for business purposes. The borrowers have typically been clients of the pawnshop for a long time, with an average pawnshop experience of slightly less than four years.

<sup>10</sup>1 USD (US Dollar)  $\approx$  9,500 IDR (Indonesian Rupiah), June 2012.

<sup>11</sup>Data on the population of Jakarta are calculated using data for the first quarter of 2011 taken from the National Socioeconomic Survey conducted by BPS (Statistics Indonesia).

<sup>12</sup>The loan size data are taken from the pawnshop’s administrative database.

<sup>13</sup>The regional minimum wage in Jakarta in 2012 was 1.53 million IDR.



## 5 Results

### 5.1 Qualitative Assessment of the Treatment

Immediately after sending out the reminder, we received more than 50 replies from borrowers. Most of the replies indicated that the borrowers were grateful for the reminder. Several borrowers referred to the date and their planned action in their reply and many asked questions about how much they needed to pay. These responses show that some borrowers were not fully aware of the conditions on their loans, whereas others were unable to calculate how much interest they owed.

In one of the replies, a woman indicated that she had completely forgotten about the loan. She answered the SMS with *“I never had anything to do with the pawnshop, or, maybe I had forgotten that? My name is Mrs. [...]”*. We replied with *“You have borrowed [...] and pawned [...]”*. She replied with *“Oh yes, that one. I had completely forgotten that. Thank you.”*<sup>14</sup>

We used the telephone number to link such responses to the data on borrowers in order to identify which borrowers sent a reply. We found that 30% of the replies were sent by men and 70% by women, which is similar to the gender composition of the borrowers that received an SMS.

### 5.2 Overall Effect of the Reminder

Figure 1 presents the cumulative distribution function (CDF) of the loan period after the treatment. To discern the treatment impact, the CDFs for the treatment and control groups were calculated and plotted separately.

The CDF shows that the loan period differs according to treatment status, with the CDF for the treatment group being higher than that for the control group for almost all days of the loan period. The two distributions are significantly different ( $p=0.037$ , Kolmogorov–Smirnov test). To test the mean treatment effect, the ITT estimator is estimated based on the following equation:

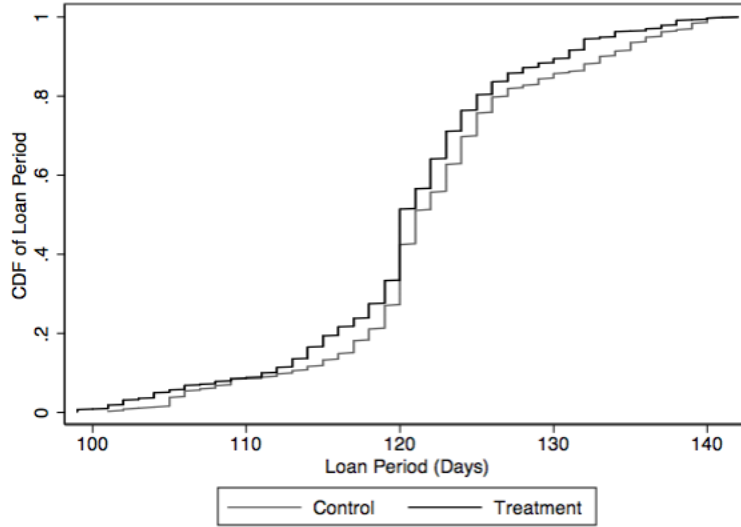
$$Y_i = \alpha + \beta SMS_i + \gamma X_i + \epsilon_i, \quad (3)$$

where  $Y$  shows the outcome variable of interest,  $SMS$  is an indicator showing whether or not the due date of the loan is communicated to the borrower using SMS, and  $X$  is a vector of loan characteristics.

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<sup>14</sup>This is the only reply that we followed up on. Other messages did not receive a reply because the text reminder was supposed to be automated.

Figure 1: Cumulative Distribution Function of Loan Period by Treatment



There are three outcomes of interest. The first two concern the dummy variables indicating whether clients repay their loan before the due date and before the auction date. The other outcome of interest is whether the SMS leads to a reduction in the average number of loan days. For this outcome variable, the observations included in the regression are conditional on whether the loan period is observed.<sup>15</sup>

Table 3: Timing of the Action, by Group (%)

Date of the Action	Control	Treatment	Total
(1)	(2)	(3)	(4)
Before Due Date	38.77	45.64	43.32
Between Due Date & Auction Date	52.59	43.11	46.32
Unknown	8.64	11.25	10.37
Loan Period	122.16	120.62	121.15
Observations	405	791	1196

Note: Before Due Date, Between Due Date & Auction Date, and Unknown are dummy variables indicating when the action is taken. If no action is taken by the auction date, the loan is recorded as unknown. The loan period is the number of days between when the loan is taken out and when it is repaid.

<sup>15</sup>The cutoff date for repayment monitoring was the auction date. Some loans had not been repaid by the auction date, so the exact loan period is not observed.

The mean values for the outcomes of interest by treatment group are shown in Table 3. Consistent with the result from the CDF plot, the proportion of borrowers who repay before the due date is higher in the treatment group than in the control group: 45.64% compared to 38.77%. The table also indicates that the reminder has an effect in reducing the mean loan period from 122.16 days to 120.62 days.

As the borrowers were assigned randomly into the treatment and control groups,  $\beta$  indicates the causal impact of a reminder, and  $\gamma$  is a vector of parameters showing the correlation effect of the independent variables with the repayment behavior. The independent variables are loan size, an indicator of whether a loan is a new loan, and the gender of the borrower.

Table 4 shows the regression results for Equation 3. The odd-numbered columns detail the estimations without control variables and the even-numbered columns show the estimations with control variables.

Table 4: Regression Results: Effect of SMS

	Before Due Date		Before Auction Date		Loan Period (Days)	
	(1)	(2)	(3)	(4)	(5)	(6)
SMS	0.069*	0.079**	-0.026	-0.025	-1.540**	-1.601**
	(0.037)	(0.035)	(0.023)	(0.022)	(0.658)	(0.646)
Loan Size		0.005		-0.003		0.065
		(0.005)		(0.003)		(0.081)
New Loan		0.070*		-0.041*		-1.601***
		(0.037)		(0.023)		(0.613)
Male		-0.036		-0.014		0.306
		(0.036)		(0.028)		(0.618)
Multiple Loans		-0.174***		-0.018		2.074***
		(0.040)		(0.028)		(0.687)
Constant	0.388***	0.424***	0.914***	0.945***	122.162***	121.461***
	(0.029)	(0.037)	(0.015)	(0.025)	(0.555)	(0.609)
Observations	1196	1196	1196	1196	1072	1072

Note: Loan size is in millions IDR. New Loan and Male are dummy variables. Columns (1)–(4) report the estimation results using the linear probability model.

Standard errors are in parentheses. Standard errors are clustered at the borrower level.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Columns (1) and (5) in Table 4 show that the reminder has significant unconditional effects on loan repayment. The reminder increases the proportion of borrowers that make the repayment before the due date by 6.9% and reduces the loan period by 1.54 days. After controlling for the loan characteristics shown in columns (2) and (6), we find that reminders continue to generate significant effects.

Furthermore, the results show that a new loan is more likely to be repaid before the due date than a loan that was extended and that a loan that is part of a multiple loan package is less likely to be repaid before the due date than a single loan. Loans that are extended from the previous period and multiple loans could indicate borrowers that are experiencing financial problems preventing them from repaying their loan(s) early.

However, we find that the SMS reminder has no effect on repayment before the auction date. This is as expected, because the auction date is a binding deadline and most borrowers do not want to lose their pawned items. Furthermore, the borrowers receive a letter from the pawnshop informing them of the auction date. The only possible reason a borrower would have to allow his or her collateral to be auctioned is that the borrower cannot repay the loan, in which case even an SMS would be of no assistance.

Our experiment shows that reminders exert positive effects on repayment, even in the absence of a monetary or dynamic incentive affecting borrower behavior. In line with our first hypothesis, these outcomes are likely to be driven by moral incentives. Two channels could be operating for this result. First, the SMS works as a reminder for those borrowers that intend to repay the loan before the due date. Second, the SMS could induce borrowers that had intended to repay after the due date to change their mind, because the SMS makes the due date more salient. This could activate  $M$ , the moral cost. However, this experiment is not designed to separate these two possible channels.

### 5.3 Heterogeneity of Treatment Effects: Gender

The interaction between moral development and gender has long been debated in the moral psychology literature. The debate started with seminal work by Carol Gilligan, who argued that boys' reasoning is based on *ethics of justice*, that is, they place more emphasis on rules, whereas girls' reasoning is based on *ethics of care*, that is, they place more emphasis on relationships (Gilligan, 1982). Walker (2006) provides a critical review of Gilligan's work, which he claims is not robust. However, many recent experimental economic results have pointed out that gender may well shape social preferences, and that men and women may respond differently to the manipulation involved in experiments (Croson and Gneezy, 2009).

Accordingly, we explore whether men and women respond differently to the SMS. In general, we expect women to be more responsive to the treatment. To estimate the heterogeneity, we include gender as an interaction effect in the regression model:

$$Y_i = \alpha + \beta SMS_i + \gamma X_i + \delta SMS * G_i + \epsilon_i. \quad (4)$$

The model above is an extension of Equation 3.  $G_i$  indicates the gender of the borrower, taking a value of one if the borrower is male. We include an interaction variable between SMS and  $G_i$ .

Table 5: Interaction Effect: SMS and Gender

	Before Due Date (1)	Before Auction Date (2)	Loan Period (Days) (3)
SMS	0.157*** (0.042)	-0.029 (0.026)	-2.157*** (0.764)
SMS * Male	-0.240*** (0.075)	0.013 (0.050)	1.738 (1.391)
Male	0.125** (0.061)	-0.023 (0.033)	-0.856 (1.212)
<i>SMS+SMS*Male</i>	-0.084 (0.062)	-0.016 (0.042)	-0.419 (1.177)
Observations	1196	1196	1072

Note: SMS\*Male indicates male borrowers that receive an SMS. Loan Size and New Loan are included in the regression. Standard errors are in parentheses. Standard errors are clustered at the borrower level.  
\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Columns (1) and (3) of Table 5 show that the reminder increases the percentage of women who repay before the due date by 15.7 percentage points and reduces the number of loan days by two days, both of which are significant at the 1% level. In contrast, we do not find any such effect for male borrowers. In fact, the coefficient is negative for men, although not statistically significant. This result indicates that the treatment effect is mainly driven by women.

After the inclusion of the interaction effect between gender and the SMS as shown in Column (1), we find that the proportion of male borrowers in the control group who repay the loan before the due date is indeed larger than that in the treatment group. This is probably because the men in this study have easier access to funds for repayment than the women. The survey data show that 43% of the female borrowers are housewives, which means that they do not generate income.<sup>16</sup> These results for the different treatment effects across gender are as expected and in line with the previous literature that shows that women are more affected by treatment in experiments.

One possible explanation of the diverging effect of the treatment is that when men receive the reminder, they become more certain of the exact due date and decide to delay the payment because there is no financial incentive to pay sooner. Put differently, men consider the rules and determine that there is nothing wrong with paying in the grace period. Another possible explanation is the men might be using the loan for productive purposes and

<sup>16</sup>Figure A2 in the Appendix depicts the loan period by gender and treatment.

so for them it may be more profitable to delay the payment. In contrast, women respond to the SMS by taking action faster. This could be because women believe it is unethical to delay the payment intentionally when they have the money available and they have been reminded about it.

## 5.4 Effect of Different Types of SMS

In addition to understanding whether there is an overall treatment effect, we were also interested in understanding whether different types of information in the SMS would have different impacts. In particular, we wanted to know whether people would respond differently if they were reminded about the monetary incentive to repay the loan sooner. That is, do borrowers take into account the difference in the interest payment when they decide on the timing of a repayment? Hence, we divided the treatment group into two subgroups, and sent out two different versions of the SMS, which we refer to as Type A and Type B.

Borrowers randomly allocated to receive a Type A SMS received a reminder about the due date. With a time period of 120 days and without weekly installments as in microcredit, people can easily forget the exact due date of their loan and some may even forget about the loan itself. Others people may have an approximation of the due date, but not the exact date. Hence, in the Type A SMS, we sent a pure reminder. The exact wording of the Type A SMS was as follows:<sup>17</sup>

```
[BRANCH NAME], [DATE].  
INFO: [LOAN ID] is reaching the 100th day,  
will be due on [DUE DATE].  
This is a reminder. Please don't miss the payment. Thank you.
```

In the other subgroup, borrowers received a Type B SMS, which told them about the monetary incentive to repay early. The incentive serves as a reminder to the borrowers that if they pay their loan two weeks before the due date, they could save some money. The wording of the Type B SMS is the same as that of the Type A SMS, except we replace the last sentence with:

```
If fully repaid before the [DATE 106th],  
you save [1.2% x LOAN SIZE] IDR.
```

There were no differences in the baseline characteristics of borrowers that were part of each treatment group and the control group.

---

<sup>17</sup>The words in square brackets are customized for each borrower.

As the Type B SMS nudges people to repay even sooner and the cutoff day of the different interest payment is day 106, we also include this cutoff date as an outcome of interest.<sup>18</sup> Table A1 in the Appendix shows that the proportion of borrowers that repay before day 106 and before the due date in both treatment groups is larger than the proportion of borrowers paying in those periods that are part of the control group.

We then attempt to test the result by estimating the following equation:

$$Y_i = \alpha + \beta_a typeA_i + \beta_b typeB_i + \gamma X_i + \epsilon_i, \quad (5)$$

where  $Y$  shows the outcome variables of interest as in Equation 3,  $typeA_i$  and  $typeB_i$  are indicators of the kind of treatment borrowers receive and  $X$  is a vector of loan characteristics. The results are shown in Table 6.

Table 6: Effects of Different SMS Content

	Before Due Date		Before Auction Date		Loan Period (Days)		Before Day 106th	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Type A SMS	0.072* (0.044)	0.089** (0.042)	-0.014 (0.026)	-0.012 (0.026)	-1.388* (0.742)	-1.556** (0.740)	0.012 (0.018)	0.012 (0.018)
Type B SMS	0.065 (0.042)	0.068* (0.040)	-0.039 (0.030)	-0.038 (0.030)	-1.707** (0.752)	-1.650** (0.727)	0.020 (0.018)	0.020 (0.018)
Loan Size		0.005 (0.005)		-0.003 (0.003)		0.065 (0.081)		0.001 (0.002)
New Loan		0.071* (0.037)		-0.040* (0.023)		-1.600*** (0.613)		0.017 (0.015)
Male		-0.036 (0.036)		-0.014 (0.028)		0.306 (0.618)		0.009 (0.015)
Multiple Loans		-0.175*** (0.039)		-0.019 (0.028)		2.070*** (0.687)		0.003 (0.016)
Constant	0.388*** (0.029)	0.424*** (0.037)	0.914*** (0.015)	0.945*** (0.025)	122.162*** (0.555)	121.463*** (0.608)	0.035*** (0.013)	0.023 (0.017)
Observations	1196	1196	1196	1196	1072	1072	1196	1196
<i>Type A = B</i>								
<i>p-value</i>	0.880	0.633	0.455	0.455	0.651	0.892	0.636	0.647

Note: Loan size is in millions IDR. Experience is in months. Standard errors are in parentheses. Standard errors are clustered at the borrower level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

<sup>18</sup>As the interest rate is 1.2% per 15 days, if a loan is repaid between day 91 and day 105, the interest payment is 8.4% of the loan, whereas from day 106, the interest payment is 9.6% of the loan.

The regression results show that there is no difference in the treatment effects for Type B SMS and Type A SMS in the four outcomes: namely, repayment before the due date, repayment before the auction date, repayment before the 106<sup>th</sup> day, and the number of loan days. Hence, adding more information about the monetary incentive in the reminder seems to serve no purpose. There are a couple of explanations for these outcomes. First, the condition of the incentive is “if fully repaid”, whereas most borrowers that repay late do not repay the loan in full. Second, the monetary incentive is too small for most borrowers.

## 6 Conclusion

We conducted a field experiment to measure the impact of receiving a reminder on loan repayment behavior. The results reveal positive treatment effects on repayment behavior. Overall, the reminder increases the proportion of borrowers that repay the loan before the due date by 6.9 percentage points and reduces the average loan period by 1.5 days. We find that female borrowers drive the overall treatment effect.

To the best of our knowledge, there are only two existing studies in this area, and the results point to somewhat different conclusions. Cadena and Schoar (2011) show that there are overall treatment effects, but Karlan et al. (2012) show that there are no overall effects of the SMS. Our study contributes to the literature on the effect of reminders on repayment by replicating the study in a different setting. Our results are then more in line with the findings in Cadena and Schoar (2011).

The experiment shows that reminders exert positive effects on repayment even where there is no monetary or dynamic incentive that could affect borrower behavior. These outcomes may then be driven by moral motives in that the SMS saves borrowers from experiencing regret and shame when they unintentionally miss the due date.

Our results are interesting for the pawnshop concerned because this simple intervention appears to reveal an effective way of improving the repayment behavior of borrowers. Furthermore, the experiment results also indicate that stating only the due date is sufficient to alter behavior. This finding is particularly useful considering that only a limited number of characters can be used in an SMS.

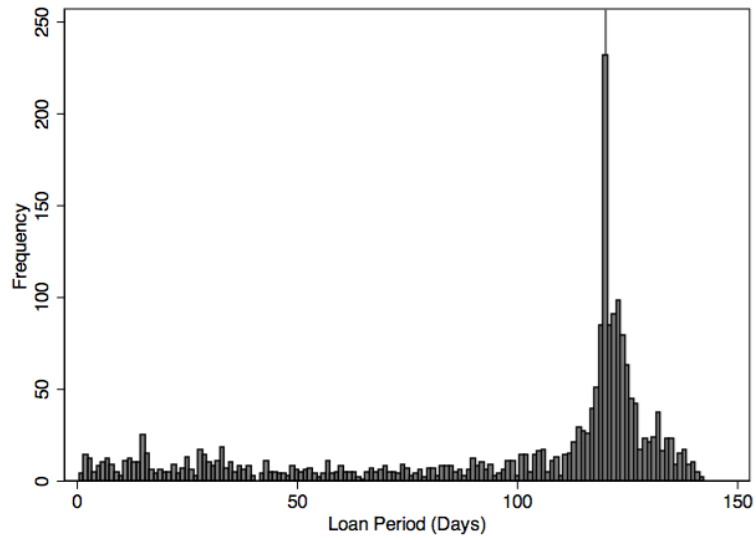


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# Appendix

Figure A1: Distribution of the Loan Period

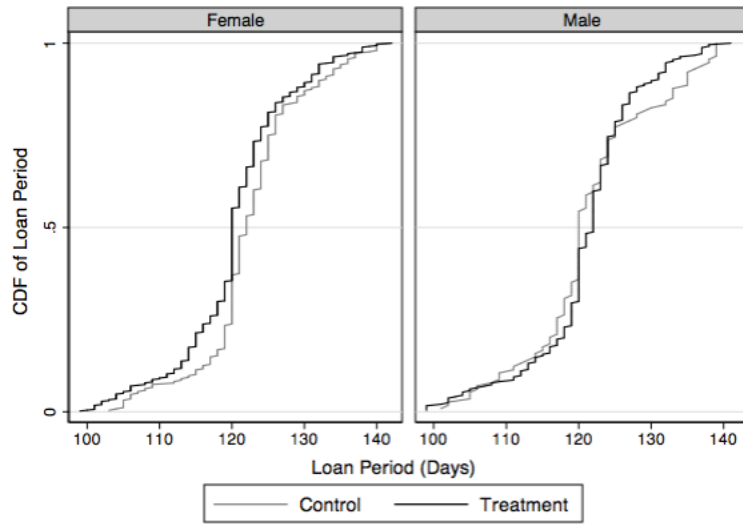


The figure depicts the distribution of the loan period for all loans made in January 2012. The graph shows that the mode of the loan period is 120 days. This is the maximum number of days allowed in the loan contract.

Table A1: Timing of the Action by Group (%)

Timing of the Action	Type A	Type B	Control	Total
Before Day 106	4.65	5.50	3.46	4.52
Before Day 106 & Due Date	41.32	39.79	35.31	38.80
Between Due Date & Auction Date	44.01	42.15	52.59	46.32
Unknown	10.02	12.57	8.64	10.37
Loan Period (Days)	120.77	120.45	122.16	121.15
Observations	409	382	405	1196

Figure A2: CDF of Loan Period by Gender and Treatment





## Chapter 4

# Intergenerational Transmissions of Preferences: Evidence from Indonesian Family Life Survey



**Intergenerational Transmission of Preferences:  
Evidence from the Indonesian Family Life Survey**

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March 2013

**Abstract**

*Noncognitive characteristics such as risk, time and trust preferences have been recognized as having significant effects on individuals' social and economic conditions. Using data from the Indonesian Family Life Survey, this study attempts to ascertain the determinants of those preferences. The results show that several individual characteristics are correlated with preferences, and that the preferences of parents are significantly correlated with their offspring's preferences. Fathers have a bigger influence on risk and time preferences than mothers do, while mothers have a more important role in shaping trust preferences. We compare our findings with those of a similar study that used German data. We conclude that intergenerational transmission of preferences is robust across countries, regardless of differences in institutional and policy settings.*

JEL Classifications: O12, O57, J1, J62

Keywords: intergenerational social mobility, risk, time and trust preferences, transmission of preferences

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\* The author would like to thank Kjetil Bjorvatn, Erik Sørensen, Marchel Fafchamps, Astrid Kunze, Lars Ivar Oppedal Berge and Xiaozhi Liu for comments and suggestions, and participants at the NHH PhD Workshop and CMI Development Seminar for valuable discussions.

## 1. Introduction

Noncognitive characteristics such as perseverance, time preferences, risk aversion and self-control have significant effects on individuals' social and economic conditions (Heckman, 2007). These characteristics are sometimes even more important than cognitive skills (Heckman, Stixrud and Urzua, 2006). For instance, trust has been recognized as a key ingredient that facilitates economic exchange at the micro level (Zaheer et al., 1998), and countries with high levels of trust are associated with higher economic growth (Knack and Keefer, 1997). Furthermore, risk preferences are highly correlated with whether someone ends up being an entrepreneur (Ekelund et al., 2005), chooses to invest in profitable crops (Dercon, 1996), or engages in risky activities such as smoking, sex and drugs (Gruber, 2001). Time preferences affect, for example, how people search for jobs (DellaVigna and Paserman, 2005) and whether they take financial literacy training (Meier and Sprenger, 2008).

Despite the significance of these preferences, little is known about how these preferences are formed, and more research on this issue is needed (Heckman and Rubinstein, 2001). This study responds to this call by investigating what factors determine preferences, focusing on the role of family and surroundings in shaping children's preferences. It is reasonable to imagine that one's preferences are influenced by one's surroundings, and that family plays an important role in shaping these preferences. This is known as family endowment, which is determined by "*the reputation and 'connections' of their families, the contribution to the ability, race, and other characteristics of children from constitutions of their families, and learning, skills, goals, and other 'family commodities' acquired through belonging to a particular family culture*" (Becker and Tomes, 1979, p. 1158).

This endowment may eventually contribute to similar outcomes between parents and their offspring, such as occupational choice (Chevalier, 2001). This, consequently, has an influence on intergenerational social mobility and inequality, as shown in the model developed by Solon (2004), who modified the model of Becker and Tomes (1979). In Solon's model, intergenerational mobility decreases as the degree of inheritability of endowment increases.<sup>1</sup>

Intergenerational social mobility and inequality are central issues in development, not only in developing countries but also in developed countries (Corak, 2004). However, few empirical studies estimate the size of the endowment effect. Furthermore, despite the fact that studies on intergenerational transmission of education, attitudes and income using developed countries' data have been conducted over the past few decades, almost no research scrutinizes this issue using data from developing countries.

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<sup>1</sup> Solon (2004) showed that there are four important aspects that affect intergenerational mobility and inequality. In addition to the degree of inheritability of the endowment effect, the three other aspects are the efficacy of human capital investment, the earnings return to human capital and progressivity of public investment in human capital.



This study aims to fill this gap by examining the similarity between parents' and children's fundamental attitudes regarding trust, risk and time preferences by looking at data from Indonesia. This study aims to shed light on intergenerational social mobility in Indonesia. To the best of our knowledge, only Pakpahan et al. (2009) has examined intergenerational transmission in Indonesia. They reported that children from a chronically poor family will have a 35 percent higher probability of being poor compared with a child who is not from a poor family.<sup>2</sup>

Location aside, the most-similar previous study to ours is Dohmen et al. (2012). Using data on 3751 child, mother and father sets taken from the German Socioeconomic Panel Study (SOEP), they scrutinized the transmission process of risk and trust attitudes. Their study showed that children's attitudes are shaped not only by parents' attitudes but also by the local environment. Furthermore, they showed that there is a tendency for parents to perform assortative mating when selecting each other as a partner. In that case, people choose a partner who shares similar preferences to their own with the intention of having offspring who have the same preferences.<sup>3</sup>

In this study, we utilize data on risk, time and trust preferences from the fourth wave of the Indonesian Family Life Survey (IFLS), which was carried out in 2007–2008. The fact that the survey measured the preferences of all adult members of the households is an advantage because the same metrics are used to measure the preferences of both parents and children.

The regression results on the determinants of preferences show that several individual characteristics such as age, gender, place of residence, religion, subjective well-being, current activity and ethnicity are correlated with the three preferences.

The regression results on the role of parents' preferences show that there is a positive correlation between the children's and the parents' trust, risk and time preferences. The mother has a bigger role in shaping the children's trust behavior than the father does, while the father has a bigger role than the mother does in shaping the children's willingness to take risks and willingness to be patient. We also find that the local environment has an influence on children's preferences. In general, we find similar results and patterns as found in Dohmen et al. (2012). Therefore, we conclude that intergenerational transmission of preferences seems robust across countries, regardless of differences in institutional and policy settings.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 discusses our empirical methodology. Section 4 reports the results for both the determinants and intergenerational transmission of preferences. Section 5 discusses the results. Section 6 provides concluding comments.

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<sup>2</sup> They utilized data from IFLS1 and IFLS3.

<sup>3</sup> Additional discussion of the results of Dohmen et al. (2012) is provided below.

## 2. Data Description

The main reason for the limited amount of research on intergenerational issues in developing countries is the absence of the longitudinal data necessary for analyzing such issues. In a longitudinal data set, researchers have information about the same subjects observed at different points of time. Even in developed countries, there is still an ongoing process to make this type of data available (Corak, 2004).

In this study, we take advantage of the IFLS, the first and the most comprehensive longitudinal data set available in the country. Four rounds of the survey have been conducted. The first wave (IFLS1) was conducted in 1993, and the latest wave (IFLS4) was conducted in 2007–2008.<sup>4</sup> In IFLS2 and the subsequent surveys, the households that were interviewed in IFLS1, including the split households, were revisited.<sup>5</sup> In addition to the household information, the IFLS also collects individual-specific information by interviewing each adult member of the households.

The fact that the IFLS collects information from all adult members of the households creates an advantage for the present analysis because characteristics and preferences of both parents and children are observed, and the same metrics are applied to the two generations. Furthermore, the fact that the IFLS follows the split households provides an advantage in the sense that it is still possible to include data for a child who has moved out from his/her parents' house.<sup>6</sup>

To construct pairs of children and parents, we use roster data from the first wave of the IFLS. The reason for using the IFLS1 to establish the pairs is to make sure that a child who has moved out from his/her parents' house will not be excluded from the analysis. Given this approach, we observe a wide range of ages of the children. In total, there are 6166 adult children who can be matched with their parents.<sup>7</sup> Subsequently, the pairs were merged with the characteristics and preferences data.

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<sup>4</sup> IFLS1 interviewed 7224 households in 13 provinces in Indonesia, which represent 83% of the population of the country. IFLS2 was conducted in 1997, and IFLS3 was carried out in 2000. In 1998, 25% of the sample of IFLS1 was reinterviewed in order to assess the immediate impact of the Asian financial crisis. This wave, which was called IFLS2+, was not released for public use. For more detail about the IFLS, including the attrition and recontact protocols, consult Strauss et al. (2009). When the IFLS was conducted for the first time, there were 27 provinces in Indonesia. At the time this paper was being written, there were 34 provinces in Indonesia.

<sup>5</sup> Split households are subhouseholds that are established after one member moves out from the main household—for example, a child who moves out and establishes a new household after marriage.

<sup>6</sup> Not all split households were reinterviewed; those who moved out to provinces where the IFLS was not conducted were unlikely to be reinterviewed.

<sup>7</sup> An adult is defined as 15 years or older. These 6166 children come from 2368 families, indicating that on average, there are two to three children in a household. Because of this, in the regression analysis we always cluster the standard errors at the household level.

Data on characteristics and background, such as years of education, age, marital status, gender, ethnicity, religion, subjective well-being and preferences are taken from IFLS4. Questions on risk and time preferences, as well as trust attitudes toward people who live in the same village, were included for the first time in IFLS4. For each measure of risk preferences and time preferences, there are two hypothetical questions, while for trust preferences, there are several responses measured using a Likert scale.

One critique of the hypothetical questions used to measure preferences is that they do not reflect people's real behavior. However, Dohmen et al. (2011) showed that the behavior of representative samples in a lottery experiment is correlated with their response to the general risk question in a survey. On the trust measures, a similar trust measure to the one we used here was tested in Fehr et al. (2002). They showed that the behavior of the sender in a trust game could be predicted by their response to the questionnaire about trust.

The measurement of preferences in this study is similar to that of Dohmen et al. (2012). However, for trust measurement, in our study, we use responses to eight statements compared with three statements used in Dohmen et al. (2012).<sup>8</sup> To measure risk in general, Dohmen et al. (2012) used an 11-point scale. In addition, their study used a hypothetical lottery. In this study, risk is measured by a principal component analysis (PCA) score from two questions on a hypothetical lottery.<sup>9</sup>

The types of questions we use to assess risk preferences are similar to those reported in Barsky et al. (1997). The first question is "*Suppose you have two ways to earn income. Option (1) guarantees you an income of Rp 800,000 per month. In option (2), you have an equal chance of receiving either Rp. 1,600,000 per month or Rp. 400,000 per month, depending on how lucky you are. Which option will you choose?*" The second question is similar, though the payoffs are different: "*Option (1) guarantees you an income of Rp 4,000,000 per month. In option (2), you have an equal chance of receiving either Rp 12,000,000 per month or nothing, depending on how lucky you are. Which option will you choose?*" Depending on the respondents' answer to each question, there are follow up questions that will increase the "risky" payoff if the respondent chooses the "safe" option and will reduce the "risky" payoff if the respondent chooses the "risky" option.

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<sup>8</sup> There are three statements to measure trust in Dohmen et al. (2012): "*In general, one can trust people.*" "*These days you cannot rely on anybody else.*" "*When dealing with strangers it is better to be cautious.*" The respondents rate these based on a four-point Likert scale labeled strongly agree, agree somewhat, disagree somewhat, and strongly disagree.

<sup>9</sup> "The central idea of PCA is to reduce the dimensionality of a data set consisting of a large number of interrelated variables, while retaining as much as possible of the variation present in the data set. This is achieved by transforming the data into a new set of variables, the principal components (PCs), which are uncorrelated, and which are ordered so that the first few retain most of the variation present in all of the original variables" (Jolliffe, 2002, p. 1).

Respondents' time preferences are measured from their responses to the following two questions. The first question is "*You have won the lottery. You can choose between being paid (1) Rp 1,000,000 today or (2) Rp 3,000,000 in one year. Which one do you choose?*" The second question is "*You have won the lottery. You can choose between being paid (1) Rp 1,000,000 today or (2) Rp 4,000,000 in five years. Which one do you choose?*" Similar to the measurement of risk preferences, depending on the respondents' answers, for each question there are follow up questions that will increase the "later" payoff if respondents choose the "immediate" option and will reduce the "later" payoff if respondents choose the "later" option.

Based on their responses, the respondents are categorized into one of four categories regarding risk and time preferences; smaller values represent a greater degree of risk aversion and more patience.<sup>10</sup> The two risk preference responses and two time preference responses are compressed using PCA. We use the first PCA score as our individual measure of risk and time preferences.

To measure trust preferences, we include responses from several questions on trust related to the community/village, such as: "*Do you help people?; Should you be cautious?; Do you trust only people who have the same ethnicity?; Are you able to ask neighbors to take care of the house?; Do you believe someone who lives in the village, a policeman, and a complete stranger would return your wallet if they found it?; Do you trust only people who have the same religion?*" We recoded the answers so that the four categories of responses reflect higher levels of trust as the scale increases. These eight responses are compressed using PCA, and we use the first PCA score as the measure of trust.

The PCA scores for risk, time and trust preferences are standardized so that the mean of each variable is zero, with a standard deviation equal to one. Standardization enables us to discuss and compare the regression coefficients directly, as the variables now have the same scale of measurement. We standardize each set of preferences for children, fathers and mothers separately.

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<sup>10</sup> The questions on risk and time preferences are preceded by a question that is used to check the respondents' understanding of the questions. For example, for the risk preference questions the preceding question is: "*Suppose you are offered two ways to earn some money. With option (1) you are guaranteed IDR 800,000 per month. With option (2), you have an equal chance of either the same income, IDR 800,000 per month, or, if you are lucky, IDR 1,600,000 per month. Which option will you choose?*" For this particular question, 40% of the respondents chose option (1), which seems an irrational response. The responses suggest that both parents and children can be irrational. Because of that, we still include the irrational response in the analysis because we find strong correlation in the irrational responses of parents and children. We record the answer as extremely risk averse, as people prefer certainty compared with a lottery with a higher expected payoff; thus, we have five categories prior to the PCA. These questions are part of Book 3A, Module SI in IFLS4.

The descriptive statistics of the pairs are reported in Table 1. The average age of the children, mothers and fathers are 24, 50 and 55 years, respectively. The gender of the children is equally divided between female and male. Of the children, 55% are living in an urban area, while 50% of the parents are living in urban areas. On average, children have more years of schooling than their parents. Children have 11 years of education, while fathers and mothers have 7.5 and 6 years of education, respectively. Of the pairs, 90% are Muslims, and the other 10% are either Catholics, Protestants, Buddhists, Hindus or Confucians. Among the children, 51% are working, 21% attend school and 18% are housekeepers. In terms of subjective well-being, the stated position of the children is no different from that of their parents. Four percent rate themselves in the poorest category, 21% rate themselves in the second poorest category, 55% rate themselves in the middle of the distribution, 18% rate themselves in the slightly above average category and 1% rate themselves in the above average category.

### 3. Empirical Strategy

To find the determinants of preferences, we estimate the following equation:

$$Pref_i = \alpha + \beta X_i + \varepsilon_i, \quad (1)$$

where *Pref* represents the outcomes of interest, which are trust, risk and time preferences. Subscript *i* represents each individual in the analysis.  $X_i$  represents a set of characteristics of person *i* that may influence the preferences of that person. These characteristics are gender, age, ethnicity, religion, educational background, place of living, subjective well-being, current activity and marital status.  $\beta$  is a vector of parameters to be estimated. Previous studies, both theoretical and empirical, have pointed out the importance of these variables in explaining the preferences that we are interested in.<sup>11</sup> The sample that is used to estimate equation (1) includes all respondents of IFLS4 who are older than 15 years, which is more than 28,000 observations.

To estimate the intergenerational correlation of preferences, we include each preference measure of fathers and mothers in equation (1). Consequently, only observations that can be matched with both the father and the mother are included in the regression. The household roster of IFLS1 is used as the basis on which to establish the pairs of children and parents. Each child that was recorded in IFLS1 was matched with its father and mother. Then, we merge the pairs with the preferences and characteristics that were collected in IFLS4. We regress the preferences of the child on the preferences of the parents, and we control for the child's and the parents' characteristics. As there are a number of households that have more than one child, we cluster the standard errors of the estimations at the household level.

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<sup>11</sup> Some examples: Becker and Mulligan (1997) considered the role of wealth and income on time preferences; Chao et al. (2009) considered age and time preferences; Dohmen et al. (2011) considered the determinants of risk preferences; Benjamin et al. (2010) considered social identity and preferences; Güth et al. (2008) and Alesina and La Ferrara (2002) considered the determinants of trust; Croson and Buchan (1999) considered gender and trust; and Compton (2009) considered marital status and time preferences.

The equation to be estimated is:

$$Pref_{c_i} = \alpha + \gamma_m Pref_{m_i} + \gamma_f Pref_{f_i} + \beta X c_i + \beta_m X m_i + \beta_f X f_i + \varepsilon_i, \quad (2)$$

where  $Pref$  is the measure of preferences and  $X$  is a set of characteristics. The subscripts  $c$ ,  $m$  and  $f$  represent the children, mothers and fathers, respectively. In addition to  $\beta$ , we also have another parameter to be estimated,  $\gamma$ , which is the correlation of the fathers' and mothers' preferences with the preferences of their children.

Furthermore, we are interested in the role of the place where the child grows up in shaping a child's trust, risk and time preferences. Hence, we estimate equation (2) and add a measure of each preference in the local environment. The measure of the local environment is constructed from the mean of the standardized measure of preferences of all people who live in the local environment, but not including the pairs. This is to make sure that we do not include parents' behavior when measuring the local environment. The location where the father resides is used as the local environment that might shape the children's preferences. The assumption made here is that the place where the father resides is the place where the child grew up. Another assumption we make is that the average preferences in the local environment are time-invariant. The equation to be estimated is:

$$Pref_{c_{ij}} = \alpha + \gamma_m Pref_{m_{ij}} + \gamma_f Pref_{f_{ij}} + \gamma_j \overline{Pref}_{-i} + \beta X c_i + \beta_m X m_i + \beta_f X f_i + \varepsilon_i, \quad (3)$$

where  $Pref_{c_{ij}}$  are the preferences of a child  $i$  who lives in village  $j$ .  $\overline{Pref}_{-i}$  is the average of the preferences from people not living in village  $j$ .  $\gamma_j$  is the parameter to be estimated that measures the influence of the local environment on children's behavior. The other variables and parameters are similar to those in equation (2).

## 4. Results

### 4.1. The Determinants of Preferences

Table 2 reports the regression results from the estimation of equation (1) for the three preferences, trust, risk and time, in columns (1), (2) and (3), respectively. Age is positively correlated with trust, which has also been shown in Welch et al. (2007) and associated with significantly more impatience and less willingness to take risks.

Gender significantly affects risk preferences and trusting behavior, but has no effect on time preferences. Males are significantly more willing to take risks, which confirms previous findings that gender is related to risk aversion, as reviewed in Croson and Gneezy (2009). There is no consensus on how gender affects trust preferences; trust depends more on the context (Croson and Gneezy, 2009). Our results show that males are less trusting. Furthermore, for time preferences, there is also no consensus on whether women or men are more patient or whether there is no difference. This finding is similar to that of Harrison et al. (2002).

Living in an urban area may significantly affect trust and time preferences, but not risk preferences. Urban dwellers are less trusting, but more patient. In urban areas, people move dwellings frequently and interaction with neighbors is more limited; therefore, it is expected that urban dwellers are less trusting. The result that urban people tend to be more patient than rural people seems counterintuitive, as it seems reasonable to assume that because the opportunity cost of time in urban areas is probably larger than in rural areas, people would be more impatient in urban areas.

The number of years a person spent in school is a significant predictor of all three types of preferences. More years in school are associated with less trusting behavior, more willingness to take a risk and less impatience. The relationships between years of schooling and the types of preferences, particularly the risk and time preferences, are as expected. However, it is important to note that the relationship does not necessarily signify causality, as we could not identify whether it is schooling that determines preferences or the other way around. We do find that the more patient people are, the more schooling they have received. Furthermore, the result that the number of years of education is associated with less trust is counterintuitive. Following Glaeser et al. (2000), one would expect that people with more education are more trusting.

Marital status seems to be associated with time preferences, but not with the other two types of preferences. An unmarried person tends to be more patient than a married person. A married person probably has higher expenditure, hence he/she is more impatient.

Religion only has an influence on trust preferences and time preferences. Compared with the Muslims, who are the majority, followers of all other religions are less trusting. This confirms the previous findings that minorities—in this case, religious minorities—are significantly less trusting (Alesina and La Ferrara, 2002; Johansson-Stenman, 2009). Furthermore, it seems that Catholic believers are significantly more patient than the majority.

Subjective well-being is significantly associated with all three types of preferences, although such a relationship is not monotonic for trust and time preferences. For risk preferences, compared with the individuals who stated that they are the poorest, respondents with other levels of well-being are more willing to take risks, and the coefficient becomes larger as the level of well-being increases. However, some of the coefficients are not significant. This is probably because of the small sample size in the different categories in the wealth scale. For the trust preferences, respondents in the second up to the fifth level seem to have less willingness to trust, while respondents in the highest level are more trusting than respondents in the lowest level. For time preferences, compared with the respondents in the lowest level, respondents in the second and third levels are more impatient, while those in the fourth, fifth and sixth levels are more patient.

People's current activity is correlated with their preferences. For example, those who are looking for a job are more willing to take risks than people who are working. However, people who are unemployed but are not actively looking for a job are less willing to take risks than people who are employed.

Ethnicity also plays an important role in one's preferences. We controlled for 26 ethnicities.<sup>12</sup> The preferences of Javanese, the biggest ethnic group in Indonesia, are significantly different from the preferences of several other ethnicities.

#### **4.2. Intergenerational Transmission of Economic Preferences**

In this subsection, we report the correlations between a parent's and a child's preferences. Columns (1), (3) and (5) of Table 3 show that there is an unconditional positive correlation between the preferences of the parent and the preferences of the child. Both parents have an impact on their child's preferences. However, the statistical test on the difference in the size of the coefficients indicates that, in comparison with a mother, a father has a much bigger role in shaping their child's risk preferences ( $p = 0.02$ ) and time preferences ( $p = 0.04$ ). The result for the child's trust preferences is the opposite: the mother has a greater role than the father ( $p = 0.05$ ).

The influence of the parents on the child's time preferences is smaller than their influence on the other two preferences. Having both a father and a mother who are one standard deviation higher in terms of time preferences results in the child being 0.20 standard deviations higher in terms of time preferences, compared with his/her peers who have parents with average levels of time preferences. For risk and trust preferences, the total influences are 0.24 and 0.32 standard deviations, respectively. The magnitude of the coefficients of risk and trust preferences shows the same tendency as was shown in Dohmen et al. (2012), who found that the influence of parents is 0.32 standard deviations for risk preferences and 0.40 standard deviations for trust preferences.<sup>13</sup> These results suggest that the correlation between the child and the parent for trust preferences is stronger than the correlation for other types of preferences. The results are robust after having included a set of control variables used in the regressions (reported in Table 3, columns (2), (4) and (6)).

After inclusion of both parents' preferences, we find that children's characteristics such as age, gender and living in an urban area remain as significant explanatory variables. The number of years of schooling remains an important determinant of the three types of preferences. However, the role of education is much smaller than the role of parents' preferences; it takes a decade of education to make a child who has a parent with an average measure of risk preferences have the same preferences as a child who has a parent with a risk preference that is one standard deviation higher than average. Furthermore, it takes many more years of education to make a child with a parent who is one standard deviation more impatient to be similar to a child whose parent has average time preferences. This might support Heckman's (2007) suggestion that in order to help people reach a higher social and economic status, early childhood intervention in a noncognitive skill is much more important than intervention at a later stage.

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<sup>12</sup> Ethnicity is included as an explanatory variable; however, because of limited space, it is not reported in Table 2.

<sup>13</sup> Although the measurement of preferences in this study is similar to the one by Dohmen et al. (2012), the data come from different sources with different sets of questions. Consequently, the magnitude of the results from the two studies cannot be compared literally; nevertheless, a comparison of qualitative results is possible.



In the regressions, we also include the characteristics of the parents such as age and educational background. For age, we use the difference in age between the parents and the children. This difference might affect the closeness of the relationship between the parents and the child. It turns out that these variables have no significant effect on the child's preferences after controlling for the child's characteristics.

One might think that the correlations between the parents' and the child's preferences might emerge because the parent and the child observe answers from each other when responding to the questions. As a robustness check, we estimate the model using two different subsamples: (1) children who do not live in the same household as their parents, and (2) children who answer the questions in the absence of any other adult respondents except their spouses. In these two subsamples, we are sure that when the child answered the questions on preferences, the parents were not present. Columns (2) and (3) in panels (a), (b) and (c) of Table 4 show that the correlation between the preferences of parents and the preferences of the child remain robust; thus, we reject the cross-influencing hypothesis.

Another important concern is whether the correlation operates the other way around. It is possible that the attitude of parents is shaped by their children's attitudes.<sup>14</sup> We have found that education is the other factor that determines people's attitudes in addition to their parents' attitudes. Hence, as a robustness check, we exclude all children who have more education than their parents. We use average years of education of the father and mother to create the cutoff. Assuming that children with a lower educational background than their parents might have more difficulty in affecting the preferences of their parents, correlation of the preferences of the parents and the child in this subsample will not be influenced by reverse causality. The result in column (4) of Table 4 (A) indicates that the correlation of trust preferences is robust; in terms of risk and time preferences, only the correlation with either the father or the mother is significant (see column (4) of panels (B) and (C) in the same table). This might be because of the small sample size.

### **4.3. The Influence of Environment on a Child's Preferences**

Heckman (2007) mentioned that environment, together with the family, plays an important role in the development of the noncognitive skills, such as time and risk preferences, of a child. In this section, we scrutinize the importance of the local environment in shaping children's preferences. Local environment is measured by the mean score of the standardized preferences in a community. To calculate this, we use data from a full adult sample of IFLS4 and exclude the children and parents who are included in the regressions from the calculation of the mean. Table 5 shows that environment has a significant influence

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<sup>14</sup> The most common way to deal with this issue when having an observational data set is to use the instrumental variable approach. However, finding good instruments is a challenge in implementing this approach. Dohmen et al. (2012) use parental characteristics as instruments for parents' attitudes. However, their instruments turn out to be weak, which eventually creates a problem of large standard errors of the estimates and large inconsistencies in the IV estimates (Bound et al., 1995). For this reason, we try to use a subsample to show that causality is not reversed.

on a child's preferences, even after having controlled for the parents' preferences. The environment has a higher impact than the total influence of both parents. A child who lives in an area where its dwellers have a one standard deviation higher willingness to take risks compared with a child who lives in an area whose dwellers have an average willingness to take risks will end up having a 0.4 standard deviations higher willingness to take risks. For trust preferences, the effect of environment is much larger than the impact of the mother's and father's trust preferences. Considering that the question on trust preferences is measured at the community level (e.g., "*Do you want to help people in this village*"), the response from children, parents and the other members of the community to this question is highly correlated with the safety and trust endowment in the village. This then makes the child's trust preferences highly correlated with the mean trust preferences of all members in the village.

Preferences and other noncognitive skills are developed over a lifetime; however, the best time to acquire and strengthen these skills is during early childhood (Heckman, 2007; Knudsen et al., 2006). In terms of similarity between the parents' and the child's preferences, one would expect that, at a young age, mothers' and fathers' preferences are probably the most important factors in determining a child's preferences. However, as they learn more from school, friends and their surroundings, the similarities in preferences of children and parents might decrease. We test this hypothesis on the subsample of children who are in the youngest age category (15 years old). We find, as reported in column (5) of panels (a), (b) and (c) in Table 4, that mothers have a bigger role in shaping the child's trust and time preferences when they are still very young, while fathers do not seem to have much of an impact in shaping these two preferences during this time. However, the results show that the importance of the father's preferences in shaping the risk preferences of his children occurs at a very early age.

## 5. Discussion

In this section, we discuss the results and compare them with those of Dohmen et al. (2012). Their main finding was that preferences are shaped by parents passing on their preferences to their children, and by local environment exposure. In addition, they found that assortative mating among couples might affect the strength of the transmission of preferences.

Our study and that of Dohmen et al. (2012) utilize data from two different countries with different institutional and public policy backgrounds. Furthermore, Germany and Indonesia are at different developmental stages. In Germany, people are supported by state welfare systems, while in Indonesia people most likely rely on their own savings or personal networks to finance certain expenditure, such as on education and health. Hence, the circumstances in which people make economic decisions vary greatly between the two countries. Even accounting for these differences in social and economic contexts, the results of this study and the one by Dohmen et al. (2012) are surprisingly similar.

On the issue of intergenerational transmission of preferences, both studies show that there is a positive correlation between the parents' and the child's attitudes toward risk and trust.<sup>15</sup> Furthermore, using data from Indonesia, as found in Dohmen et al. (2012), the mother has a greater influence on the child's trust behavior. The intimacy of the mother and her child at a young age might develop trust between them, and a child starts to learn about trust from their mother at a very early stage of his/her life. This might indicate that children learn about their parents' attitudes toward trust earlier than they learn about other attitudes (such as risk and time preferences). This finding is in line with Knudsen et al. (2006), who reported that children could obtain different traits at different stages of childhood.

In terms of the effect a father or a mother has on the child's willingness to take a risk, Dohmen et al. (2012) found that both parents play a similar role; in contrast, we find that the father's preferences play a stronger role than those of the mother. This difference might be because, in many developing countries, it is often the man, the main breadwinner, who makes household decisions. Even if a couple is making a joint decision, the husband tends to have a stronger influence on the final decision (Carlsson et al., 2010). Hence, a child probably learns more about risk and time preferences by observing frequent decision making by his/her father. Our results are consistent with those of Paola (forthcoming), who used occupational status as a proxy of the father's willingness to take risks. She found that university students' willingness to take risks is related to their fathers' occupation, but not to their mothers' or their own choice of occupation.

We then check whether there is an easier transmission of preferences within the same gender (i.e., from the father to his son and from the mother to her daughter). For time and trust preferences, we do not find such evidence. For risk preferences, both fathers' and mothers' preferences have the same effect on their daughter's, while, for sons, the fathers' preferences play a much bigger role in shaping risk preferences. Again, this probably relates to the fact that the son is expected to be a future income provider for his family; thus, he has to learn more from his father about economic decision-making. This probably explains why the son often ends up taking an occupation similar to his father's (Chevalier, 2001).<sup>16</sup>

## 6. Conclusion

This study showed that parents' preferences and the local environment play a significant role in the formation of a child's preferences. In general, the results of this study confirm what has been reported in Dohmen et al. (2012). This outcome is surprising, given that the two studies utilize data from two countries with very different institutions and policies. This seems to suggest that the attitude toward a particular set of preferences can be passed on from the parents' generation to the child's generation, regardless of the institutional setting.

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<sup>15</sup> Time preferences were not assessed in Dohmen et al. (2012).

<sup>16</sup> Chevalier (2001) reported that in one cohort of university graduates in the UK, 10% end up having the same occupation as their parents, and almost one-third are in the same occupational group, and that a son receives a wage premium compared with a daughter with the same occupation as the parent.

Our analysis also pointed out that it takes many years of education for a child whose parents have an average preference level to develop preferences similar to a child of parents having a one standard deviation higher/lower preference level. This finding is in line with Heckman (2007), who suggested that remediation in the early childhood period would have a better impact than providing training at a later stage of life.

The two key results (that children's preferences end up similar to those of their parents and those prevalent in the local environment and that it takes many years of education to create the same effect; and that these results hold in two countries that are at different stages of development) help to shed light on the existence of intergenerational social immobility, as well as the persistence of inequality between countries. As a child grows up with his/her parents, the child tends to take economic decisions, such as occupational choice or an investment in physical and human capital, similar to those the parents would take; thus, eventually the child is likely to have an economic status highly correlated with that of his/her parents. This then contributes to the lack of social mobility within countries. Furthermore, as the same pattern exists in different countries, this might contribute to the persistent economic status of a country as a whole.

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## Tables

**Table 1. Descriptive Statistics**

Variable	Child		Mother		Father	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Age	24.02	6.47	49.74	8.38	55.27	9.43
Gender	0.50	0.50	0.00	0.00	1.00	0.00
Urban habitat	0.55	0.50	0.49	0.50	0.50	0.50
Years of schooling	11.08	3.77	5.91	4.46	7.35	4.81
<i>Marital Status</i>						
Unmarried	0.55	0.50	0.00	0.00	0.00	0.00
Married	0.43	0.50	0.99	0.11	0.99	0.08
Divorced	0.02	0.15	0.01	0.11	0.01	0.08
<i>Religion</i>						
Islam	0.89	0.31	0.89	0.31	0.89	0.31
Protestant	0.03	0.18	0.04	0.19	0.04	0.19
Catholic	0.02	0.13	0.02	0.13	0.02	0.13
Buddhist	0.05	0.23	0.05	0.23	0.05	0.23
Hindu	0.00	0.04	0.00	0.05	0.00	0.04
Confucian	0.00	0.00	0.00	0.00	0.00	0.00
<i>Activity</i>						
Working	0.51	0.50	0.52	0.50	0.84	0.37
Looking	0.01	0.11	0.00	0.02	0.00	0.06
Schooling	0.21	0.40	0.00	0.03	0.00	0.00
Housekeeper	0.18	0.38	0.45	0.50	0.01	0.09
Retired	0.00	0.02	0.02	0.13	0.08	0.28
Unemployed	0.09	0.28	0.01	0.10	0.06	0.23
Sick	0.00	0.04	0.00	0.05	0.01	0.12
<i>Subjective Well-being</i>						
First	0.04	0.19	0.04	0.20	0.05	0.22
Second	0.21	0.41	0.23	0.42	0.24	0.43
Third	0.55	0.50	0.53	0.50	0.52	0.50
Fourth	0.18	0.39	0.19	0.39	0.17	0.38
Fifth	0.01	0.10	0.01	0.11	0.01	0.11
Sixth	0.00	0.05	0.00	0.07	0.00	0.04
Observations	6166		6166		6166	

This table provides the characteristics of respondents that can be matched for child–parent pairs. In total, there are 6166 pairs. The characteristics are disaggregated according to whether the respondent is a child, mother or father. Age and Years of schooling are measured in years, while the other variables are dummy variables having a value of 1 if the characteristic indicated by the variable name is present in the respondent, otherwise, the value will be 0.

**Table 2. Determinants of Preferences**

	(1) Willingness to Trust	(2) Willingness to Take Risks	(3) Unwillingness to Wait
Age	0.004*** (0.001)	-0.001* (0.001)	0.003*** (0.001)
Male	-0.033** (0.014)	0.188*** (0.013)	-0.000 (0.014)
Live in urban area	-0.224*** (0.016)	-0.002 (0.014)	-0.050*** (0.014)
Years in school	-0.009*** (0.002)	0.012*** (0.002)	-0.003** (0.002)
Marital status: Unmarried	-0.002 (0.021)	0.009 (0.021)	-0.059*** (0.021)
Marital status: Divorced	-0.037 (0.026)	-0.010 (0.023)	0.030 (0.023)
Religion: Protestant	-0.135*** (0.046)	0.033 (0.043)	0.056 (0.045)
Religion: Catholic	-0.145*** (0.053)	0.000 (0.050)	-0.126** (0.063)
Religion: Buddhist	-0.100 (0.070)	-0.033 (0.064)	0.028 (0.056)
Religion: Hindu	-0.221 (0.137)	0.194 (0.138)	0.114 (0.140)
Subj. well-being: Second level	-0.051 (0.032)	0.020 (0.028)	0.087*** (0.033)
Subj. well-being: Third level	-0.075** (0.031)	0.018 (0.027)	0.071** (0.032)
Subj. well-being: Fourth level	-0.034 (0.035)	0.143*** (0.031)	-0.003 (0.036)
Subj. well-being: Fifth level	-0.081 (0.068)	0.143** (0.065)	-0.043 (0.073)
Subj. well-being: Sixth level	0.132 (0.154)	0.165 (0.135)	-0.579*** (0.194)
Activity: Looking for job	-0.008 (0.084)	0.129* (0.074)	-0.024 (0.074)
Activity: Schooling	0.103*** (0.028)	-0.037 (0.027)	-0.149*** (0.029)
Activity: Housekeeper	-0.015 (0.017)	-0.051*** (0.016)	0.027 (0.017)
Activity: Retired	-0.036 (0.042)	-0.175*** (0.037)	0.135*** (0.032)
Activity: Unemployed	0.011 (0.029)	-0.060** (0.027)	0.014 (0.028)
Activity: Sick	-0.147* (0.083)	0.016 (0.089)	0.069 (0.072)
Constant	0.164*** (0.044)	-0.187*** (0.038)	-0.095** (0.043)
Observations	25475	28213	28304
Adjusted $R^2$	0.056	0.077	0.030

This table reports OLS estimates with clustering standard errors at the household level. The dependent variables in columns (1), (2) and (3) are trust, risk and time preferences, respectively, measured by standardized first principal component scores. All independent variables other than age and years of schooling are dummy variables showing characteristics of an observation in terms of gender, place of living, marital status, religion, subjective well-being and current activity. Subjective well-being captures respondents' perception of their well-being status, ranging from the poorest (1) to the richest (6). Age and years of schooling have number of years as the unit of measurement. Another characteristic that is controlled for but is not reported in this table is ethnicity. There are 26 ethnicities in the data set. All data come from the fourth wave of the Indonesian Family Life Survey (IFLS4).

Standard errors are in parentheses.  
\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Table 3. Parents' Influences on Child's Preferences**

	Child's Willingness to Trust		Child's Willingness to Take Risks		Child's Unwillingness to Wait	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's willingness to trust	0.190*** (0.018)	0.161*** (0.018)				
Father's willingness to trust	0.132*** (0.019)					
Mother's willingness to take risks			0.091*** (0.017)	0.053*** (0.016)	0.071*** (0.017)	0.060*** (0.017)
Father's willingness to take risks			0.152*** (0.016)	0.111*** (0.016)	0.125*** (0.018)	0.105*** (0.018)
Mother's unwillingness to wait						0.003 (0.003)
Father's unwillingness to wait						-0.007 (0.007)
Age		-0.002 (0.003)		0.006** (0.003)		0.003 (0.003)
Male		-0.060* (0.032)		0.182*** (0.028)		-0.007 (0.030)
Live in urban area		-0.183*** (0.036)		-0.020 (0.030)		-0.076** (0.031)
Years in school		-0.016*** (0.005)		0.016*** (0.004)		-0.008* (0.004)
Age difference with mother		0.001 (0.004)		-0.001 (0.003)		-0.004 (0.003)
Age difference with father		0.001 (0.003)		0.001 (0.003)		0.002 (0.003)
Mother's years in school		-0.008 (0.005)		-0.001 (0.004)		0.001 (0.005)
Father's years in school		-0.003 (0.005)		0.009** (0.004)		-0.004 (0.004)
Constant	-0.024 (0.016)	0.372*** (0.140)	0.040*** (0.014)	-0.459*** (0.119)	-0.068*** (0.014)	-0.066 (0.135)
Additional controls	No	Yes	No	Yes	No	Yes
Observations	4530	4530	5877	5877	5882	5882
Adjusted R <sup>2</sup>	0.068	0.105	0.038	0.085	0.023	0.054

This table reports OLS estimates with clustering standard errors at the household level. Columns (1) and (2) show estimates of children's trust preferences; columns (3) and (4) show estimates of children's risk preferences; and columns (5) and (6) show estimates of children's time preferences. In columns (1), (3) and (5), children's specific preferences are regressed on parent's preferences only, while in columns (2), (4) and (6), control variables used in Table 1 such as marital status, subjective well-being, religion and activity are included. All data come from the fourth wave of the Indonesian Family Life Survey (IFLS4). However, in constructing the pairs, the household roster from IFLS1 is used.

Standard errors are in parentheses.

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

**Table 4. Robustness Check****(a). Willingness to Trust**

	(1) Full Sample	(2) Child Outside Home	(3) Absence of Other adult	(4) Less-educated Child	(5) 15-Year-Old Child
Mother's trust preferences	0.162*** (0.018)	0.118*** (0.024)	0.162*** (0.024)	0.147*** (0.041)	0.229*** (0.067)
Father's trust preferences	0.119*** (0.018)	0.074*** (0.027)	0.079*** (0.027)	0.162*** (0.050)	0.116 (0.076)
Constant	0.403*** (0.140)	0.370* (0.206)	0.533** (0.240)	0.461 (0.376)	0.336 (0.526)
Additional controls	Yes	Yes	Yes	Yes	Yes
Observations	4530	1997	1971	684	261
Adjusted $R^2$	0.105	0.083	0.099	0.096	0.243

**(b). Willingness to Take Risks**

	(1) Full Sample	(2) Child Outside Home	(3) Absence of Other adult	(4) Less-educated Child	(5) 15-Year-Old Child
Mother's willingness to take risks	0.053*** (0.016)	0.047** (0.022)	0.052** (0.023)	0.022 (0.045)	0.109 (0.071)
Father's willingness to take risks	0.111*** (0.016)	0.069*** (0.022)	0.073*** (0.022)	0.119*** (0.040)	0.107* (0.063)
Constant	-0.504*** (0.119)	-0.569*** (0.173)	-0.423** (0.180)	-0.522 (0.330)	0.270 (0.491)
Additional controls	Yes	Yes	Yes	Yes	Yes
Observations	5877	2637	2577	869	341
Adjusted $R^2$	0.085	0.106	0.067	0.060	0.062

**(c). Unwillingness to Wait**

	(1) Full Sample	(2) Child Outside Home	(3) Absence of Other adult	(4) Less-educated Child	(5) 15-Year-Old Child
	b/se	b/se	b/se	b/se	b/se
Mother's unwillingness to wait	0.059*** (0.016)	0.036 (0.023)	0.048* (0.024)	0.085* (0.046)	0.232*** (0.071)
Father's unwillingness to wait	0.103*** (0.017)	0.086*** (0.023)	0.083*** (0.026)	0.066 (0.041)	0.110 (0.070)
Constant	-0.000 (0.133)	0.044 (0.182)	-0.102 (0.214)	0.216 (0.436)	-0.676 (0.591)
Additional controls	Yes	Yes	Yes	Yes	Yes
Observations	5882	2633	2567	866	340
Adjusted $R^2$	0.054	0.052	0.057	0.055	0.127

This table reports OLS estimates with clustering standard errors at the household level. Column (1) in panels A, B and C is reproduced from columns (2), (4) and (6) in Table 2, respectively. The specifications in columns (2)–(5) are the same as in column (1). The regressions control for both children's and parents' characteristics, but the results are not shown in the table because the most important thing to show is that the influence of parents' preferences is robust, even after we estimate regressions on the different subsamples. Column (2) shows the regression results for the subsample of children who live outside their parents' house; column (3) shows the regression results for the subsample of children who answered the questions in the absence of their parents; column (4) shows the regression results for the subsample of children who have less education than their parents; and column (5) reports the regression results for the subsample of children who are 15 years old. All data come from the fourth wave of the Indonesian Family Life Survey (IFLS4). However, in constructing the pairs, the household roster from IFLS1 is used.

Standard errors are in parentheses.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Table 5. Influence of Local Environment on Child's Preferences**

	(1) Child's Trust Preference	(2) Child's Trust Preference	(3) Child's Willingness To take risks	(4) Child's Willingness To take risks	(5) Child's Impatience	(6) Child's Impatience
Mother's willingness to trust	0.163*** (0.018)	0.122*** (0.017)				
Father's willingness to trust	0.117*** (0.018)	0.079*** (0.018)				
Mean of willingness to trust in village		0.532*** (0.046)				
Mother's willingness to take risks			0.055*** (0.016)	0.056*** (0.016)		
Father's willingness to take risks			0.111*** (0.016)	0.111*** (0.016)		
Mean of willingness to take risks in village			0.473*** (0.048)			
Mother's unwillingness to wait					0.059*** (0.017)	0.055*** (0.016)
Father's unwillingness to wait					0.105*** (0.018)	0.101*** (0.017)
Mean of unwillingness to wait in village						0.317*** (0.049)
Constant	0.394*** (0.141)	0.284** (0.138)	-0.513*** (0.119)	-0.445*** (0.121)	-0.006 (0.133)	0.022 (0.135)
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4485	5810	5810	5817	5817	4485
Adjusted R <sup>2</sup>	0.140	0.085	0.085	0.056	0.060	0.106

This table reports OLS estimates with clustering standard errors at the household level. Columns (1), (3) and (5) are reproduced from Table 4, column (1), panels (a), (b) and (c), respectively. The specifications in column (2) are similar to column (1), except that we controlled for the measure of village level of trust preferences, which is calculated as an average of the residents' preferences in the place where the father resides, though parents and children are excluded from the calculation of the mean. In column (4), we controlled for the average risk preferences in the village, and in column (6), we controlled for the average time preferences. The regressions controlled for both children and parent characteristics. All data come from the fourth wave of the Indonesian Family Life Survey (IFLS4). However, in constructing the pairs, the household roster from IFLS1 is used.

Standard errors are in parentheses.  
\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

