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# The policies that empower women

## Empirical evidence from India's National Rural Livelihoods Project

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Working  
Paper 40

**Social protection**



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## About this working paper

This paper, *The policies that empower women: empirical evidence from India's National Rural Livelihoods Project*, provides empirical evidence in support of the hypothesis that providing women with access to large loans significantly enhances their decision-making ability within the household. This paper has been copyedited and formatted for publication by 3ie.

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# **The policies that empower women: empirical evidence from India's National Rural Livelihoods Project**

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## **Abstract**

Government programmes supporting self-help groups (SHGs) generally target women on the assumption that doing so enhances women's intra-household decision-making power and alters household outcomes. The empirical evidence, however, is mixed. We advance and test one explanation: the loan amounts offered by most SHGs may be too small to impact women.

Our analysis is based on SHGs developed under India's National Rural Livelihoods Mission. After an initial period in which loans were made only out of the accumulated internal savings of SHG members, groups were provided with access to large loans through community investment funds. Exploiting variation in their phasing and amount, we document a large effect of community investment funds on an index of women's decision-making. Comparing their effect to SHGs' monthly savings, we show that improvements in women's decision-making and intra-household allocations stem from access to large funds; loans based on internal savings do not have such effects.

Keywords: women's empowerment; self-help groups; decision-making

JEL Codes: O12, O160, J12, J16

## Executive summary

Emanating from theoretical models of household decision-making that demonstrate how improvements in women's opportunities can enhance their bargaining power, and bolstered by empirical evidence that supports this view, government programmes are increasingly being targeted to women. Of these, programmes that promote and develop savings and loan groups that offer women opportunities to save, access credit and enhance their incomes are amongst the most popular.

These policies build on the premise that improvements in a woman's financial standing will improve her status within the household, helping to redress social norms that adversely affect her choices, opportunities and welfare. Evaluations of many of these programmes, however, suggest mixed results. A significant set of studies finds no impact from micro-finance or self-help groups (SHGs) on measures of women's decision-making role within the household, while others find positive effects.

In this paper, we advance and test one hypothesis explaining these mixed results: the loan amounts that such groups generally offer may be too small to impact women's decision-making unless the programme is sustained over a longer period of time. Large infusions of funds can, however, have a significant impact, both on indices of women's decision-making and on economic outcomes.

Our empirical work, conducted in 2019, utilises a large household data set covering eight of India's major states to evaluate the impact of India's National Rural Livelihoods Project (NRLP), a flagship programme of the government's Ministry of Rural Development intended to enhance women's livelihoods through a federation of community institutions with SHGs at the lowest level. The data set was designed to exploit the phasing of NRLP across blocks of the country and, within blocks, across villages. The considerable variation in SHG age and characteristics in the sample generates corresponding variation in the programme inputs provided to SHGs – variation that is rarely available in studies based on pilots of programmes in a particular state.

As with other such programmes, membership in an NRLP SHG requires regular savings. Loans, in early stages of the group's life cycle, are based on the group's accumulated internal savings. Given small monthly savings amounts, SHGs' internal savings accumulate very slowly. In NRLP, monthly saving amounts varied from INR 10 to INR 100, with the mean in our survey sample being INR 30 and a median value of only INR 10. Correspondingly, initial loan amounts are small: the average amount borrowed by all SHG members in the first year of formation for SHGs in our sample (formed between 2012 and 2018) is just INR 1,014, with this number increasing to INR. 4,150 if the sample is confined to those who report loans.

NRLP, however, promoted an institutional architecture that magnified the economic returns to members over time. This was primarily accomplished through a grant-in-perpetuity to the SHG, also known as the community investment fund (CIF). These funds, on average, doubled loan sizes to individual members and substantially increased the proportion of loans used for investment purposes.

We identify the effect of CIF funds on women's decision-making by exploiting both the variation in the timing of these funds and also variation in state-level norms regarding the

amount of CIF funds to be provided to each SHG. Though the central government set guidelines for the amount of CIFs to be provided to each state, the decentralised nature of the programme enabled states to independently determine funding amounts. The variation in state funding is significant, ranging from INR 30,000 to INR 110,000.

Our empirical analysis reveals that access to larger CIF funds significantly increases women's decision-making role within the household. Our estimates suggest that additional CIF funding per SHG of INR 33,000, the amount of the difference in the mean CIF funds per SHG in high relative to low CIF states, increases the index of women's decision-making by 2.7 percentage points. Given a sample mean score of 17 on the decision-making index, this amounts to a 16 per cent improvement in women's bargaining weight.

Embedding our analysis within the theoretical framework on dynamic intra-household decision-making, we provide evidence that targeting loans to women matters, in that the availability of CIF funds affects expenditures over and above their effect on household savings. Our analysis also supports the hypothesis that access to small loan amounts does not have a similar effect; that is, targeting funds to women only changes behaviour if these funds are of sufficiently large size.

Our results have strong policy implications. They suggest that the policy focus on ensuring women's financial inclusion, through access to bank accounts, savings mechanisms, and loans from SHGs and banks, needs to be complemented with a similar focus on the magnitude of funds that these institutional arrangements make available. This is particularly true of decentralised programmes, where resource-poor states may not be able to match the level of funding that is available in better-off states. In such cases, centralised intervention may help ensure the impact of the programme on women.

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## **Abbreviations and acronyms**

CIF	Community investment fund
GP	Gram Panchayat
IV	Instrumental variable
MIS	Management information system
NRLP	National Rural Livelihoods Project
RF	Revolving fund
SHG	Self-help group
VO	Village organisation

# 1. Introduction

The mixed success of microfinance programmes in reducing poverty has been mirrored by similar variation in their impact on women's empowerment, despite the fact that most group-based approaches to financial inclusion target women. A review of several microfinance programmes finds insignificant effects on women's decision-making ability in three out of the four studies that evaluated this outcome (Banerjee et al. 2015c). Similarly, recent systemic reviews of programmes that support women's self-help groups (SHGs) suggest an average effect on women's decision-making that is small and frequently insignificant (Brody et al. 2017; Jayachandran et al. 2020).<sup>1</sup> For example, the review of livelihoods-focused SHGs by Jayachandran and colleagues (2020) reveals positive effects on women's decision-making ability in only half the studies they examined.

One explanation for the marginal effects of microfinance programmes comes from theoretical models that explain the persistence of poverty as a consequence of poverty traps.<sup>2</sup> These models imply that movements out of poverty require a 'big push' that generates a large jump or change in the resource base of poor households. Responding to this, governments are increasingly embracing programmes that grant ultra-poor women livelihood-generating assets, requisite skills training and other complementary inputs. Can big push programmes enable changes in women's status? And, if so, are there less costly ways of making this push that may enable much wider coverage of all below-poverty-line women, not just the ultra-poor?<sup>3</sup>

We address this question by examining the impact of large increases in loan amounts to women members of SHGs formed and supported under India's National Rural Livelihoods Project (NRLP), a programme intended to enhance women's livelihoods through a federation of community institutions with SHGs at the lowest level. To evaluate NRLP we, along with other collaborators, implemented a cross-sectional survey of approximately 15,000 SHG members across 8 of India's poorest states in 2019, as the programme approached its end.<sup>4</sup> The data thus enable an evaluation of the impact of the programme at scale, after it had reached almost universal coverage of its targeted 70 million below-poverty-line households spread across 600 districts and 600,000 villages. The survey was designed to identify the impact of NRLP exploiting its phasing across blocks and, within blocks, across villages of the country, and provides a wealth of information on households and SHGs. The considerable variation in SHG age and characteristics in the sample generates corresponding variation in the programme inputs provided to SHGs – variation that is rarely available in studies based on pilots of programmes in a particular state.

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<sup>1</sup> Brody et al. (2017) note that low average returns mask heterogeneity across SHGs that differ in terms of their design, the socio-economic characteristics of their members and the geographies they cover. Available reviews do not assess variation in returns by loan size.

<sup>2</sup> The large literature on this topic is reviewed in Azariadis (1996), Banerjee (2003) and Piketty (2000).

<sup>3</sup> A BRAC programme (Bandiera et al. 2016) provided ultra-poor women with assets that doubled their baseline wealth, with the total cost of the benefits provided to each woman being approximately US\$1,120 (in 2007 PPP [purchasing power parity] terms).

<sup>4</sup> In 2019, the World Bank augmented the programme with additional resources, creating the National Rural Economic Transformation Project.

As in other such programmes, membership in an NRLP SHG requires regular savings. Loans, in early stages of an SHG's life cycle, are based on the group's accumulated internal savings. Given small monthly savings amounts, SHGs' savings accumulate very slowly. In NRLP, monthly savings varied from INR 10 to INR 100, with the mean in our survey sample being INR 30 and a median value of only INR 10. Correspondingly, initial loan amounts are small: the average loan size across all SHG members in the first year of formation for SHGs in our sample (formed between 2012 and 2018) is just INR 1,014, with this number increasing to INR 4,150 if the sample is confined to those who borrow. The amount of INR 4,000 is equivalent to wage earnings from approximately 20 days of work.<sup>5</sup> At this level, it is unlikely that the loans offered by the programme would significantly impact women's economic position within the household.

NRLP, however, promoted an institutional architecture that magnified the economic benefits to members over time. This was primarily accomplished through a grant-in-perpetuity to SHGs, a community investment fund (CIF). These funds, on average, doubled loan sizes to individual members and substantially increased the proportion of loans used for investment purposes. Repaid funds remained within the SHG federation to support continued internal lending, and hence provided the basis for a significant improvement in incomes. Though the central government set guidelines for the amount of CIFs to be provided to each state, the decentralised nature of the programme enables states to independently determine funding amounts. The variation in state funding is significant, ranging from INR 30,000 to INR 110,000.

We evaluate the impact of CIFs on an index of women's decision-making using a difference-in-difference methodology that exploits variation in the incidence of treatment at SHG level and in its intensity across states, comparing outcomes for SHGs that did and did not receive CIFs in high-CIF states relative to the difference between these two groups in low-CIF states. This controls for possible endogenous variation in programme intensity and incidence caused by factors such as the targeting of 'superior' SHGs or by the provision of larger CIF amounts in states in which programme implementation is better. Our ability to identify the impact of CIFs is enabled by the large number of states covered in our survey and by the extensive phasing of the programme across blocks and villages. The former ensures significant variation in CIF amounts per SHG, while the latter generates variation in the incidence of CIFs across SHGs, with variation across both dimensions being critical for identification.

Our approach follows Duflo (2001), Jacoby (2002) and others who similarly use cross-sectional variation in programme intensity to identify programme effects through difference-in-difference regressions.<sup>6</sup> In addition to tests of the identification assumptions underlying a difference-in-difference regression, we also subject our results to a broad set of falsification tests, including tests of whether the results merely reflect differences in socio-economic conditions across states. We find strong evidence that these large

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<sup>5</sup> Based on the current (2020) wage in India's national workfare programme, the Mahatma Gandhi National Rural Employment Guarantee.

<sup>6</sup> Duflo (2001) evaluates the effect of a school construction programme by comparing outcomes across cohorts in regions that vary in programme intensity. Jacoby (2002) similarly exploits cross-sectional variation in programme intensity to evaluate the effect of school meals, comparing outcomes observed on school and non-school days.

improvements in a woman's access to financial resources enhance her decision-making role within the household.

We extend our analysis to address a set of policy-relevant questions. Building on a large body of research that tests the unitary, or income-pooling, model, we confirm that household allocations depend not just on total household savings but also on women's financial access proxied by the determinants of CIFs in the previous set of regressions; that is, targeting women in financial inclusion programmes, rather than households, *does* affect household demands. We extend this literature by showing that these changes occur only when women access large loan amounts. We do this by contrasting the impact of the stipulated monthly saving requirement of SHG members on which internal lending in the initial years of the programme is based with that of CIFs.

Through reduced form regressions, we show that these stipulated amounts, and hence, by inference, the loans that are enabled through internal savings, do not impact women's decision-making index, even though they *do* increase total household savings and do not merely substitute for other saving mechanisms. Instrumenting total household savings by past income shocks, we find that SHGs' stipulated monthly savings impact household allocations only through their effect on total household savings; that is, providing women with access to small loans yields results that are similar to improvements in the overall financial position of the household, implying no benefit from targeting women. In contrast, access to large loans through CIFs continue to affect household allocations, even in savings-conditioned regressions. We also test and confirm a strong prediction of theoretical models of intra-household allocation that total household incomes (or savings) do not affect women's decision-making ability; what matters is the magnitude of the resources that women control.

Our research builds on theoretical models of inter-temporal household decision-making that illustrate how women's bargaining weights are updated over time as a consequence of changes in their reservation utility (Mazzocco 2007; Voena 2015). Within this context, Chiappori and Mazzocco (2017) forcibly make the point that improvements in women's bargaining weight will only result from interventions that are large enough to realise women's threat points. The small loan amounts provided by SHGs and other group-based approaches in the early years are unlikely to meet this threshold, providing one explanation for why several studies that evaluate SHGs even after a period of three years or so find their impact to be limited. Evidence of larger impacts primarily comes from programmes that combine the normal savings-and-lending function of SHGs with additional interventions that focus on changing social norms relating to gender and hence are more likely to meet the theoretical criterion required for the programme to affect women's decision-making (Bandiera et al 2020; Brody et al. 2017; Jejeebhoy et al. 2017).

As previously noted, our research is also related to the growing evidence on multifaceted graduation programmes that provide large grants, training and other complementary inputs to ultra-poor households (Banerjee et al. 2015b). In general, these studies report large and sustained improvements in asset ownership, income and expenditure, as do evaluations of other programmes that provide large cash transfers to households. For example, Egger and colleagues (2019) and Haushofer and Shapiro (2016) establish the effect of large cash transfers by the NGO GiveDirectly on Kenyan households; while

Angelucci and colleagues (2018) provide evidence that transfers in Mexico's Progresa programme enable improvements in investments in networks characterised by strong ties.

Whether these large transfers improve women's decision-making is an open question. The review of six 'Ultra Poor Graduation' programmes in Banerjee et al. (2015b) suggests no impact three years after programmes were introduced, though there appeared to be some early gains in a first endline study conducted two years after the baseline. The insignificant medium-run effect may reflect the extreme poverty of targeted beneficiaries. In Bangladesh, for example, targeted women were the sole income earners in 41 per cent of households, suggesting relatively high levels of involvement in household decisions prior to the programme. Haushofer and Shapiro (2016) also report an insignificant effect of cash transfers to Kenyan households, attributing this to spillover effects on women's decision-making from treatment to control households in the same villages.

Even if the effect of large cash transfer programmes on women's empowerment were positive, their cost suggests a limited potential to impact outcomes at scale. Though a BRAC programme covered 360,000 households by 2014, and was intended to reach 650,000 households by 2016 (Bandiera et al. 2016), these numbers are small relative to NRLP: by 2020, NRLP had reached over 72 million households through 7 million SHGs, suggesting the ability to transform women's status if successful features of the programme can be ensured and sustained in all SHGs.

This, of course, remains the challenge. Our analysis identifies the impact of CIFs by exploiting variation in their amount and timing across SHGs; that is, variation in how the programme was implemented across India's states. For example, in relatively poorer states, such as Bihar, the fact that CIF funds were approximately one third of the amount provided by the states that provided the most funding explains the lack of the programme's effects on women's empowerment revealed in earlier randomised control studies of the same programme (Joshi et al. 2015).<sup>7</sup> Thus, while we identify a feature of the programme that generated significant improvements in women's empowerment, the challenge to policy is to ensure that this feature of the programme is accessible, in a timely manner, to all SHGs.

The rest of this paper is organised as follows. Section 2 describes India's NRLP and its implementation. Section 3 describes our survey data and provides data definitions and summary statistics. The theoretical framework underlying the empirical analysis of this paper is sketched in section 4, and section 5 details the empirical framework. Section 6 contains the empirical results of this paper. Section 7 concludes.

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<sup>7</sup> This comparison is salient, despite Bihar's relative poverty, because our sample is from SHG members who come from the poorest households in each state. Thus, in our sample, per capita expenditure in Bihar (INR 114,164) is higher than the per capita expenditure in several states that provide greater CIF funding, such as Chhattisgarh, Madhya Pradesh and Uttar Pradesh. The variation in CIF funding across states is fully described later in this paper.

## 2. The programme and its implementation

The analysis of this paper is based on India's NRLP, a programme intended to enhance livelihoods through the formation of SHGs comprising women from amongst the country's poorest households.<sup>8</sup> The focus of these groups in the early stages of their development was savings and lending based on these internally accumulated funds. However, drawing on the country's experience with previous programmes of group lending, NRLP recognised that moving households out of poverty required significant resources and the development of the capabilities of SHG members, programme support staff and implementing agencies at all levels.

Thus, the programme envisaged working with SHGs over a period of 6–7 years, incrementally increasing the inputs provided to them as they matured and as the programme's own capabilities were enhanced. A distinguishing feature of the programme was its promotion of a federated structure, with SHGs being federated into village organisations (VOs) constituting 10–20 SHGs from the same village, and VOs in turn being federated into cluster-level federations. This federated structure was intended to help support and monitor SHGs and enhance their quality. The programme was implemented through a phased approach that staggered the development of SHGs across blocks and, within each block, across villages.

SHG groups were not formed by households: the project team responsible for forming an SHG did so by identifying hamlets or narrow residential groupings of women from relatively disadvantaged socio-economic backgrounds and then intensively working within the hamlet to form a group. Each group comprises approximately 10 women from the same residential neighbourhood. After group formation, the project team worked with group members over a two-week period to institutionalise a common set of five norms, or rules, referred to as *Panchsutras* (regular meetings, regular savings, regular lending, regular repayment and the maintenance of books of account), which formed the basis of the programme's evaluation and assessment of the quality of SHGs. The initial focus of each SHG was on internal savings and loans, with the objective of enhancing livelihoods.<sup>9</sup> Additional inputs or interventions were, however, 'layered' on over time as SHGs passed critical milestones and demonstrated continued adherence to the *Panchsutras*.

In the early months following formation, internal lending relied on each group's accumulated savings. Groups could select the amount that each member was required to save each month. These amounts were low: the mean amount across the approximately 4,700 SHGs we surveyed was INR 30 per month (US\$0.40), with the median amount being just INR 10. Not surprisingly, initial loans were small. SHGs formed in 2018 reported an average loan amount of just INR 2,415 (around US\$33 in 2020), with this amount being INR 7,015 for SHGs formed in 2015 and INR 6,998 for those formed in 2012.<sup>10</sup>

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<sup>8</sup> Details of the programme are available in Government of India (2017).

<sup>9</sup> In later stages, the programme expanded to other activities, including 'convergence' activities intended to better link SHGs to government welfare programmes, and to enhance their participation in ensuring the delivery and quality of local public goods.

<sup>10</sup> These amounts are based on data for all loans provided by SHGs and the total number of loans since SHG formation, collected in the SHG module.

The increase in loans over time was primarily a consequence of additional infusions of funds into the SHG. The first, in the form of a 'revolving fund' (RF) that constituted a grant to each SHG, was for the relatively small amount of INR 15,000 per SHG. This was intended to be given to an SHG after it had shown at least three months of success in maintaining the five principles of successful SHGs described above. The large increase in the SHGs' resource base followed receipt of CIFs. These constituted funds provided 'in perpetuity' to the SHG, intended to support the provision of loans to SHG members at the prescribed 24 per cent annual interest rate.

Programme guidelines developed by the Ministry of Rural Development, the implementing ministry, suggested that CIFs should be in the amount of INR 110,000 per SHG. However, states were given the flexibility to determine this amount. As a consequence, there is significant state-level variation in CIF amounts. Though CIFs were to be provided to SHGs through VOs, with loans being repaid to VOs for future on-lending to member SHGs, the programme allowed funds to be directly provided to SHGs to ensure access to these funds regardless of the status of federation.<sup>11</sup>

As noted above, programme guidelines required CIF funds to be disbursed to SHGs only after certain 'triggers' had been met. These required SHGs to demonstrate adherence to the *Panchsutras* for at least a six-month period and an 'A' grading in terms of the extent of compliance to *each* of these norms.<sup>12</sup> Additionally, receipt of CIF funds required SHGs to have been trained in the preparation of a micro-investment plan that evaluated the borrowing needs of each member relative to their resource base and to have submitted such a plan (Government of India 2017). Had these guidelines been adhered to, only high-quality SHGs would have been provided with CIFs. However, our data reveal that adherence to these principles was minimal. While 37 per cent of SHGs reported receiving CIF funds, only 12 per cent reported having prepared a micro-investment plan. Similarly, adherence to the *Panchsutras* was low: the aggregate score of all surveyed SHGs in terms of their adherence was just 2.5 out of 5.

Instead, our discussions with government officials and government reports suggest that delayed receipt of CIFs was primarily a consequence of implementation constraints; specifically the lack of administrative capacity caused by the slow growth in the number of programme staff relative to the number of SHGs. The programme included an innovative feature to develop capacity as it grew through the recruitment of a 'community cadre' of programme staff at cluster and village levels who were expected to monitor and support SHGs. Their duties encompassed the expansion of the programme to new SHGs and provision of training on various topics, including the training required for the formation of micro-investment plans. Community cadre members were to be drawn from SHG members with 8 or more years of schooling, depending on the position, and with at least 1–2 years of active membership. However, states' annual action plans reveal slower-

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<sup>11</sup> Following experience with larger loans enabled through CIFs, NRLP also provided institutional support to enable SHG members to access loans from commercial banks.

<sup>12</sup> An 'A' grade required SHGs to receive a minimum of a 90% score for each of these indicators: for example, a 90% score in terms of 'regular savings' implied that the SHG's savings should be at least 90% of the amount expected based on monthly savings rate and the total number of members; similarly, for internal lending, the requirement for an A-grade SHG was that at least 90% of internal savings should have been given in loans to members.

than-expected growth in SHGs in early years and hence a low rate of growth of the community cadre. This in turn slowed all aspects of implementation, including training of SHGs for the preparation of micro-investment plans and the disbursement of CIFs.<sup>13</sup>

### **3. Survey data, data definitions and sample statistics**

#### **3.1 Survey data**

Our survey data come from a large cross-sectional survey of SHG households and SHGs across eight states designed for an evaluation of NRLP.<sup>14</sup> The study was commissioned at the end of the project, and hence lacked baseline data on households or SHGs.<sup>15</sup> Instead, exploiting details of the implementation of the programme, it identified programme effects based on its phased introduction across blocks and, within each block, across villages.<sup>16</sup>

Specifically, it exploited the fact that NRLP was first introduced in a set of ‘early blocks’ identified from amongst targeted districts. Implementation in late blocks of the same districts generally followed after four years. Each block was divided into a programme-specific administrative unit, the cluster. The process of SHG formation was undertaken at the level of the cluster, with project teams moving from one village to another in the same cluster in a phased manner until a first round of SHG formation had been completed. Detailed guidelines on how long the team was to spend in each village (15 days) and the number of days of work in each round resulted in the first round of formation of SHGs in a cluster taking approximately 3–4 years.<sup>17</sup> This process sped up over time as the programme scaled geographically, due to the increased size of the community cadre. Programme guidelines also stipulated the determinants of the order of phasing across villages, with project teams initiating programmes in the largest villages within the cluster and moving across villages based on their population rank within the cluster.

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<sup>13</sup> For example, Rajasthan’s Annual Action Plan 2014–15 provides this explanation for the slow growth in the number of ‘internal resource persons’ responsible for forming new SHGs and institutions at higher levels of the federated structure: ‘The capacity building of internal CRP teams is process intensive and it takes lot of time and resources. Deployment of internal CRPs got delayed because of this in turn capacity building activities of community institutions could not be carried out as planned’. Similarly, Jharkhand’s 2015–16 Annual Action Plan identified ‘gaps in CRP rounds and shortage of community trainers’ as the primary reasons underlying the lack of training provided to SHGs, including training for the development of micro-investment plans. Uttar Pradesh’s Annual Action Plan of 2015–16 stated that ‘community cadres are desperately required for institutional development’.

<sup>14</sup> These states are Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Uttar Pradesh.

<sup>15</sup> Though baseline studies were conducted in each state, each of these studies was independently done. As a consequence, it was not possible to construct common baseline measures across surveys, even for basic outcomes such as measures of women’s empowerment, expenditure or even household demographics. These studies could therefore not be combined for an overall evaluation study.

<sup>16</sup> The study report provides extensive details of the survey design and the methodology (Kochar et al. 2020).

<sup>17</sup> Later rounds of SHG formation within the same cluster were undertaken to ensure universal coverage of households in each village. The programme strategy, which stated the number of days to be spent in each village, meant that additional rounds were required for universal coverage, particularly in large villages.

Exploiting the phasing of the project, the survey focused on districts with at least two early and two late blocks (identified by each state's implementing institution, the State Rural Livelihood Mission). Within each of these blocks, using MIS data that identified project clusters and provided information on the year of village entry and SHG formation for the census of all SHGs in the district, the study selected two clusters in each survey block. In each cluster, two 'early' and two 'late' villages were selected, with early SHGs being defined as those entered in the first year and late villages being those entered in the last year of SHG formation in the cluster.

Within each village, we randomly selected two SHGs from the set of those formed at the time of initial village entry for administration of the household survey to its members. An SHG module was also completed for four additional SHGs in the village, randomly drawn from SHGs listed in the MIS. The survey sample, therefore, does not constitute a random sample of SHGs, comprising instead SHGs in each cluster (and hence block) formed in early and late stages of the programme.

Thus, the limitations of a lack of baseline data or a randomised design are partially compensated for by the extensive variation in the data in terms of SHG age and, correspondingly, SHG characteristics, but also in terms of programme interventions, such as CIF amounts, which vary across states. This enables identification of programme features that might normally not be available in studies based on pilot projects in specific states, which generally offer limited variation in SHG age or features.

Additionally, the fact that the survey was designed close to the end of the project allowed us to focus on SHG members and link surveyed households to their associated SHGs. This eliminated the low take-up rate that normally affects evaluations that identify households prior to the implementation of the programme and hence prior to SHG formation (Banerjee et al. 2015c). Equally importantly, because we have data on the SHGs associated with each household, we are able to evaluate the impact of specific aspects of the programme, such as the provision of CIFs, on household outcomes, exploiting rich data on each SHG such as the year of its formation and the year of receipt of CIFs.

The sample for this paper is restricted to functioning SHGs and those formed after 2012, covering SHGs formed between 2012 and 2019.<sup>18</sup> Because of the focus of this paper on women's empowerment we exclude households without any adult male member, since women in these households, not unexpectedly, are generally the primary decision makers.<sup>19</sup> Our final sample size is 11,200 households, divided over 2,488 SHGs in 8 survey states.

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<sup>18</sup> In Madhya Pradesh, the normal pattern of phasing across blocks, clusters and villages was not observed for NRLP blocks, but was implemented for a set of blocks implementing an earlier World Bank programme (DPIP) that followed the same guidelines. This meant that the Madhya Pradesh sample included SHGs that were formed between 2009 and 2012 with different guidelines for the receipt of CIFs. Additionally, the older age of SHGs from this state also meant that it was characterised by a relatively high percentage of 'defunct' SHGs, which existed in MIS records but were not functioning at the time of the survey (as determined by field-level teams).

<sup>19</sup> Specifically, our study is restricted to households with at least one male member over the age of 15.

### 3.2 Survey modules and data definitions

Our survey instruments included a household survey, a women's survey administered to one prime-age (18–50 years) woman in the household, a village module and surveys of SHGs, VOs and cluster-level federations. The village module provides information on basic village infrastructure such as the distance to the nearest bank branch. The household and women's survey were intended to be administered to all members of the two SHGs in each village selected for inclusion in these surveys. However, budget constraints limited the amount of time that each survey team could spend in a village and hence limited their ability to interview households whose key members were unavailable at the time of the survey. In practice, our survey was administered to an average of five members per SHG, with three or more members being surveyed in approximately 80 per cent of SHGs.

The basic design of the household module followed that of other surveys, such as India's National Sample Surveys, providing information on household rosters and including a standard expenditure module. A distinguishing feature of our survey, however, is its collection of income data. This was probed in detail, providing information on all outputs (including crop by-products) and inputs, including on family labour, home-grown seeds and other 'home-provided' inputs. The depth of information gathered on income was intended to enable estimates of income, a variable that is generally not collected in household surveys in India due to the extensiveness of home production. Access to data on income enables the estimation of savings as the difference between savings and expenditures, and therefore enables regressions that correctly incorporate dynamics by conditioning on household savings.<sup>20</sup>

The household module also provides detailed information on all household loans that were outstanding at the time of the survey, as well as on all loans that had been fully repaid and hence closed in the three years prior to our survey. Loan details included information on the year in which the loan was taken out, as well as the source of the loan, allowing us to construct a pseudo-panel of loans from SHGs, for each household, extending back to 2012 and even earlier.

We follow the literature in measuring women's decision-making based on their answers to a series of questions related to their role in household decisions (Angelucci et al. 2015; Banerjee et al. 2015a; Karlan et al. 2017).<sup>21</sup> The survey asked a randomly selected woman in the 20–50 age group (or an older woman in households without women in their prime) about her role in decision-making in a set of 26 outcomes.<sup>22</sup> For each of these outcomes, a score of 1 was assigned if the woman stated that she was

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<sup>20</sup> The alternative of measuring savings using data on transactions in assets was not possible since this information is not available for all assets.

<sup>21</sup> Of 17 quantitative studies that analysed the impact of SHGs on decision-making reviewed in Brody et al. (2017), 11 used similarly constructed indices.

<sup>22</sup> These were expenditures on: food; kitchen items; fuel; household durables; clothing for men, women and children; and weddings and other ceremonies. Additionally, the items included questions on who made decisions regarding: choice of schools for children; types of healthcare providers (for women, men and children); home improvements, including construction of toilets; sale of land; stocks of food grains to maintain and sales from stocks; and the acquisition of loans from different sources (SHGs, formal institutions, informal institutions, and relatives and friends).

fully or primarily responsible for decisions.<sup>23</sup> Scores on individual items were then aggregated into a total percentage score, referred to as *dmindx*. In robustness checks, we also report results from alternative indices, including the construction of this index using principal components, as well as each woman's mean score across all questions.

As previously noted, a significant strength of the data comes from the SHG module that was completed for the SHGs that survey households were drawn from, as well as for four additional SHGs in the village. This survey included a roster of all SHG members, providing information on their schooling and other socio-economic characteristics.

Our empirical analysis is enabled by matching the survey data to the MIS, but also to other data on the programme and to census data. The division of states into groups based on state norms regarding CIF amounts utilises information from each state's annual action plans from 2013 to 2018. These plans stipulate state-specific targets for the number of SHGs to be provided with CIFs and the total amount of CIF to be disbursed in each year, and hence the amount of CIF to be provided to each SHG. These data demonstrate little variation, for any given state, within a year. Correspondingly, using state averages, we divide states into *high-* and *low-intensity* CIF states, based on the median CIF amount.

Matching villages, village governments – Gram Panchayats (GPs) – and blocks to the 2011 Indian census provides data on population totals for each of these geographic levels, as well as data on women's literacy rates, labour force participation and sex ratios for children under the age of six prior to the initiation of NRLP in 2011. The very small size of many of our survey villages generates a large range in these indicators, characterised by a high percentage of extreme values. For that reason, we aggregate some of these indicators, notably the under-six sex ratio, to the level of the GP and use these to validate our identification strategy and as controls in some regression specifications.

As noted in the preceding section, the receipt of CIFs was significantly affected by the scale of the programme at the time of SHG formation, given that programme scale determined the size of the programme's community cadre. The MIS data allow us to construct measures of scale specific to each SHG. Given that community cadre members were required to have completed a minimum of one year of active membership in an SHG, and that their training required an additional six months to a year,<sup>24</sup> we developed measures that reflect the scale of the programme two years prior to the formation of each SHG. These measures are: the number of SHGs in blocks of the

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<sup>23</sup> The question asked was: 'What do you think is your input into [DECISION]?' A value of 1 was assigned if the woman's response was either of the following two options: 'entirely my input' or 'mostly my input'. This choice was guided by the data: the median response to these questions was 'equal input', with this choice accounting for 67% of responses to individual questions; 20% of responses fell in the top two categories, while just 14% fell in the bottom two categories. Thus, redefining the index to include responses in the 'equal input' category resulted in very little variation in the data. As noted below, we also report results using each woman's mean score across all five possible choices.

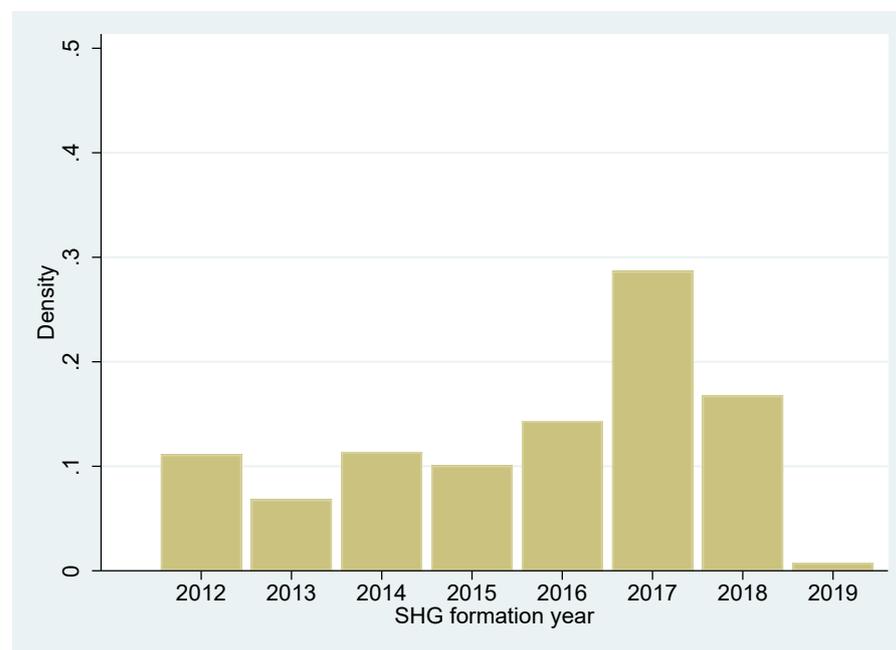
<sup>24</sup> In addition to the usual formal training, identified members were then included in the project teams charged with forming SHGs. This requirement explains the significant amount of time spent in training before being formally appointed.

district other than that in which the SHG was located, the number of villages entered in these blocks and the number of villages entered in other clusters of the same block. These measures thus all exclude data from the cluster and the block in which the SHG was located and, as already mentioned, relate to the scale of the programme two years prior to the formation of the SHG in question.<sup>25</sup>

### 3.3 Summary statistics

We commence this section with a set of figures that demonstrate the variation that we exploit in this paper. Figure 1, a histogram of SHGs by their year of formation, reveals the range in this variable amongst survey SHGs, with the year of formation varying from 2012 to 2019.

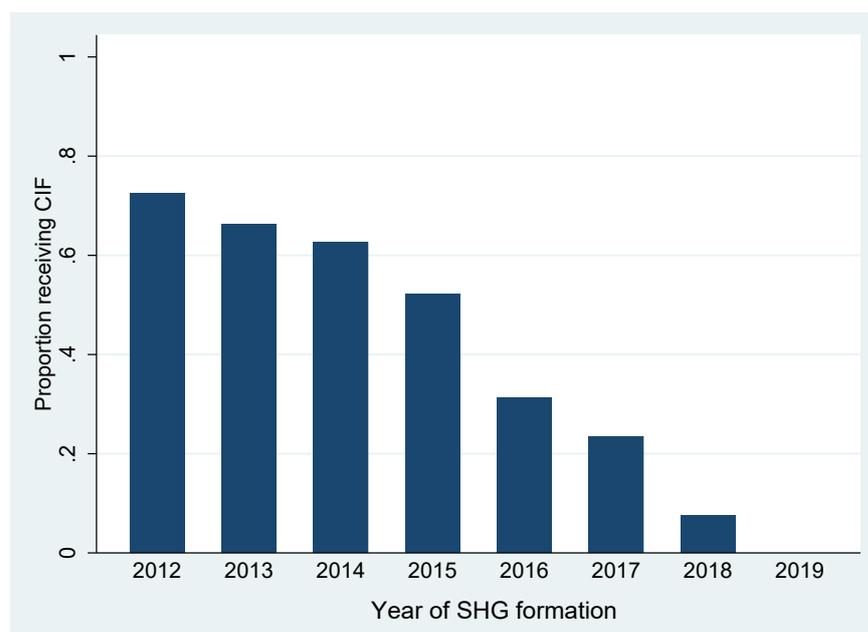
**Figure 1: SHGs by year of formation**



Figures 2 and 3 describe the variables that serve as the basis of our identification strategy, specifically the proportion of SHGs reporting receipt of CIFs and variation in the state-prescribed CIF amounts per SHG. Not surprisingly, the proportion of SHGs reporting receipt of CIF increases with the age of the SHG, being largest for SHGs formed in 2012 and falling for newer SHGs (Figure 2). However, this figure also reveals the significant variation in CIF receipt across SHGs of the same age. Thus, amongst SHGs formed in 2012, as many as 23 per cent report that they had yet to receive CIFs. This number increases to 44 per cent of SHGs formed in 2015.

<sup>25</sup> The emphasis on the number of villages entered is because the recruitment of community cadres was generally done at the level of the village, not the SHG. Within each village, one to two 'active women' were identified at the time of village entry, with recruitment of the community cadre being confined to this set of women.

**Figure 2: Proportion of SHGs receiving CIF by year of SHG formation**

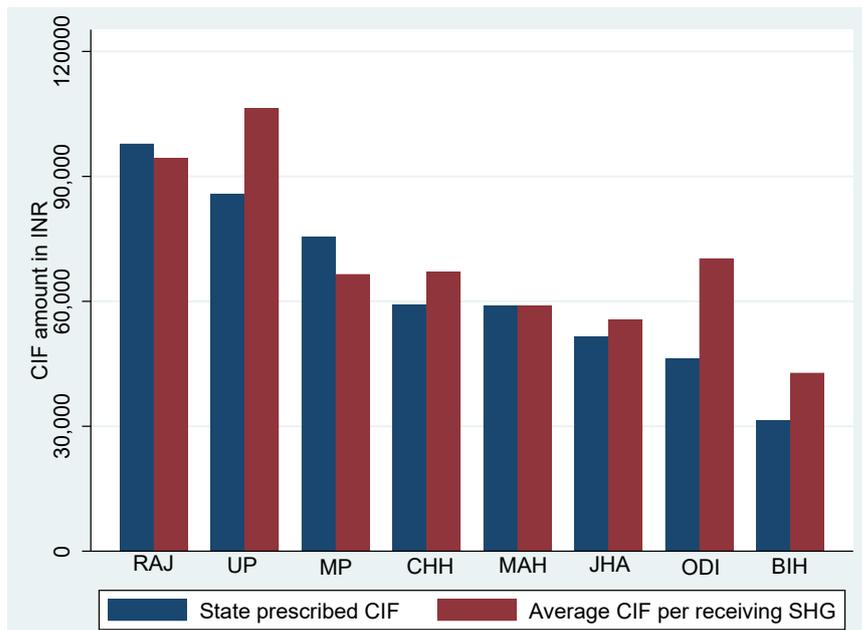


Sample: full sample of SHGs (n = 4,804).

Figure 3 documents the extensive variation in the CIF amounts per SHG prescribed by each state, and the close correlation between received amounts and prescribed amounts. States that prescribed relatively large amounts include Rajasthan, closely followed by Uttar Pradesh, and include the relatively poor state of Madhya Pradesh. In Rajasthan, the state dictated that each SHG should receive an average of INR 100,000 in CIF funds.<sup>26</sup> In contrast, Bihar recommended a CIF of only INR 30,000 per SHG. Maharashtra, a relatively wealthy state, is one of the four states with the least CIF funds. These four states (Bihar, Jharkhand, Maharashtra and Odisha) comprise the 'low-intensity' states – states with the average CIF amount per SHG being below the median for all states. Correspondingly, the states of Rajasthan, Uttar Pradesh, Chhattisgarh and Madhya Pradesh constitute the 'high-intensity' group. The variation in CIF funding across states does not closely correlate with measures of state development, a point that we substantiate in our regression analysis.

<sup>26</sup> This amount was INR 110,000 in the early years of the programme but fell slightly in 2018 and 2019.

**Figure 3: Average amount of CIF prescribed by states and average amounts reported per receiving SHG**



While we provide descriptive evidence of the impact of CIFs on the size of SHG loans later in this paper, Figure 4 graphs their impact on the use of loans. In SHGs that have not yet received CIFs, the vast majority of loans to members (60%) are used to finance daily consumption needs, with only 16 per cent of loans being used for productive investments in agriculture, livestock and other family enterprises. Following receipt of CIFs, this latter number jumps to 25 per cent, with loans for daily consumption needs falling to 46 per cent. There is little change in the proportion of loans used either for health purposes or for the purchase of consumer durables. This change towards productive loans suggests an impact of CIFs on household incomes.

**Figure 4: Purpose of SHG loans: SHGs with and without CIFs**

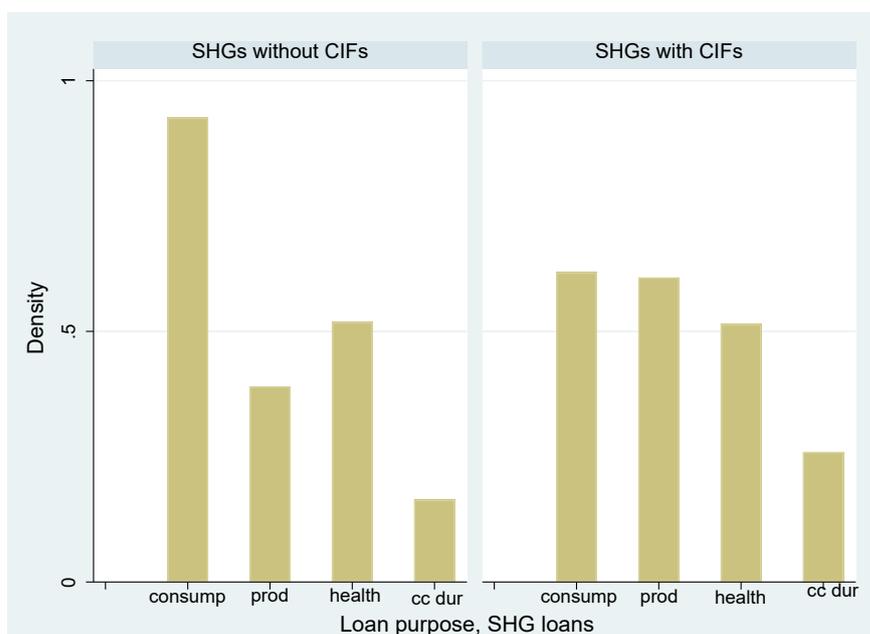


Table 1 provides summary statistics of the main variables used in our regression analysis, including the decision-making index (*dmindx*), characteristics of SHGs, and characteristics of the villages in which households are located. The data are provided for the full sample, and then separately by high- and low-intensity states, and by SHGs with and without CIFs within each of these state groupings.

**Table 1: Summary statistics**

Variable	Full sample	High-intensity states		Low-intensity states	
		With CIF	Without CIF	With CIF	Without CIF
<i>Household variables</i>					
Decision-making index (percentage)	16.27 (26.62)	15.34 (26.37)	14.26 (23.89)	19.82 (30.45)	16.86 (26.85)
Prop. SC/ST	0.33 (0.47)	0.31 (0.46)	0.28 (0.45)	0.48 (0.50)	0.30 (0.46)
Highest years education women	4.77 (4.91)	5.28 (5.10)	5.04 (4.96)	4.00 (4.70)	4.60 (4.80)
Household size	5.31 (2.04)	5.33 (1.94)	5.22 (1.93)	5.56 (2.04)	5.20 (2.05)
Mean agricultural land holding (acres)	1.19 (2.01)	1.03 (1.60)	1.18 (1.94)	0.84 (1.55)	1.44 (2.40)
Household savings (INR '000)	-44.39 (103.01)	-43.85 (101.21)	-48.04 (103.97)	-40.11 (102.81)	-43.61 (103.28)
Clothing share of annual expenditures (%)	6.77 (4.33)	6.81 (4.51)	6.56 (4.29)	6.52 (3.92)	7.03 (4.43)
<i>SHG and geographic variables</i>					
GP under-six sex ratio	0.94 (0.09)	0.93 (0.10)	0.95 (0.12)	0.94 (0.05)	0.95 (0.08)
Village population	2,579.07 (2,651.69)	2,167.21 (2,115.11)	1,506.23 (1,247.50)	3,845.01 (3,261.54)	2,368.35 (2,519.97)
Distance to block capital	17.21 (15.73)	15.25 (11.36)	17.42 (14.53)	15.40 (13.70)	19.22 (18.78)
SHG size	11.44 (1.44)	11.56 (1.44)	11.27 (1.42)	11.60 (1.37)	11.37 (1.50)
SHG prop. SC/ST	0.63 (0.43)	0.57 (0.44)	0.62 (0.44)	0.65 (0.41)	0.64 (0.43)
SHG monthly savings rate	26.13 (83.85)	20.32 (25.85)	19.98 (22.30)	23.07 (126.85)	33.84 (78.25)
Sample size – households	11,225	2,269	3,270	1,802	3,884
Sample size – SHGs	2,314	326	469	648	868

Note: SC = scheduled caste; ST = scheduled tribe.

The index of women's decision-making reveals the limited role that women have in decision-making within the household. For the sample as a whole, the average value is just 16 per cent. It is higher in low-intensity states (20%), and marginally higher in SHGs with a CIF than in those without. These differences are the basis of our identification of the effect of CIFs on women's decision-making, and we discuss their implication in greater detail below, following our discussion of the summary statistics in Table 1.

The data also reveal the relative poverty of sample households. An average of 33 per cent of households are from scheduled castes and tribes. The highest level of schooling reported by a prime-age woman in the household, at 4.8 years, is marginally short of the 5 years required to complete primary school. Approximately 66 per cent of households in our survey own some agricultural land, with mean agricultural holdings being just 1.19 acres.

For the average household, savings are negative, indicating a dependence on borrowing to finance the deficit in incomes relative to expenditures. Expenditures on items such as clothing and schooling are a relatively small proportion of total household expenditures (6%), primarily because of the primacy of food expenditures. The data reveal that 42 per cent of total household expenditures are on food. The data on SHGs reported at the bottom of the table come from the larger sample of SHGs covered in our survey (approximately six SHGs per village). These data reveal that the average SHG comprises 11 members, with 63 per cent of members being from scheduled castes and tribes. The mean monthly savings rate is INR 26.

### **3.4 Differences in decision-making across states and SHGs**

Table 1 also reveals the pitfalls in evaluating the impact of CIFs using either a simple difference estimator, which compares treatment and control SHGs or SHGs across high- and low-intensity states, or a difference-in-difference estimator that utilises both these differences. Simple difference estimators do not control for other factors that may differ across treatment and control SHGs, or across high- and low-intensity states. For example, reflecting the fact that programme implementation started in the largest villages within any cluster, treatment SHGs are located in larger villages that are closer to block capitals. These villages are characterised by lower scores on decision-making indices (Kochar et al. 2020), a finding that correlates with lower female labour force participation rates in urban relative to rural India.

Turning to simple difference-in-difference estimates, Table 1 shows that women's involvement in household decisions is lower in high-intensity states and that the difference in the decision-making index across treatment and control SHGs in these states is *lower* than this same difference in low-intensity states. If the programme is assessed just on the basis of these differences, it would lead to the conclusion that women's decision-making falls with access to large CIF funds.

However, such a comparison does not separate out the impact of access to CIFs from that of the duration of exposure to SHGs, the primary determinant of the phasing of CIFs. Nor does it control for other aspects of CIF phasing, specifically programme implementation or the programme's scale across blocks and districts. Such controls are necessary to separate out the impact of CIFs. Additionally, controls for the duration of

exposure to SHGs are also likely necessary to satisfy the difference-in-difference assumption of an equal difference in outcomes between treatment and control SHGs in high- and low-intensity states prior to the receipt of CIFs.

#### 4. Theoretical framework

The theoretical underpinnings for our analysis come from the literature on inter-temporal intra-household decisions under limited commitment (Chiappori and Mazzocco 2017; Kocherlakota 1996; Ligon 2002; Ligon et al. 2002; Mazzocco et al. 2014; Voena 2015). This framework is particularly well suited for evaluations of programmes that improve women’s access to credit and for understanding the conditions under which improved access affects a woman’s bargaining power or decision-making ability within the household.

We assume collective decision-making, with outcomes reflecting the maximisation of a weighted sum of the individual utility functions of husbands and wives. In a static setting, this model delivers efficient outcomes. In a dynamic framework with limited commitment in which partners are unable to commit to future plans, efficiency requires satisfaction of a set of participation constraints that ensure that each partner is at least as well off within the marriage as they would be should it break down. Improvements in the reservation utility of any partner, the utility obtained in the event of a breakdown of the marriage, require an updating and revision of bargaining weights, with corresponding changes in household outcomes, so as to ensure that the marriage sustains.

The relative Pareto weights ( $\mu$ ) that govern allocations are generally assumed to be a function of a set of distribution factors,  $z$ , such as relative incomes or local sex ratios, and represent each individual’s decision-making ability. Distribution factors are defined as variables that do not enter individual preferences or household budget constraints but nevertheless influence outcomes (Bourguignon et al. 2009).

Understanding household decision-making within this or any other framework requires a stipulation of the benefits of marriage and hence the determinants of each individual’s reservation utility. These benefits are most often taken to be economies of scale arising from public goods or from specialisation in market work and the production of household goods (Becker 1981).

For the sake of simplicity, we abstract from public goods and assume that the gains from marriage come from the home production of private goods,  $q_i$ ,  $i = w, h$ , with  $w$  denoting the wife and  $h$  the husband (Becker 1981). An example of  $h$  is the health of individual members, with health production requiring market inputs ( $x$ ) and time ( $t$ ).<sup>27</sup> The health production function is:  $q_i = q_i(x_i, \alpha t_i^w + t_i^h)$ ,  $\alpha > 1$ , where superscripts index the provider while subscripts index recipients. Thus,  $t_i^w$  represents the time contributions of the wife to the health of member  $i$ . Health can be produced by the time inputs of either husband or wife. For example, the wife can devote time to the health of the husband by washing his clothes, a task that can also be undertaken by the husband. Additionally, one could

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<sup>27</sup> We ignore public goods for purposes of simplicity, though health production will normally require some element of a public good, such as time devoted to home cleaning and ensuring a sanitary home environment.

think of the health of wives being broadened to include the health of children, while the health of husbands could include that of any of his resident relatives, such as his parents. The opportunity cost of this time is foregone earnings in wage labour markets at market wage rates  $w_m$  and  $w_f$ ,  $w_m > w_f$ . The woman is assumed to have comparative advantage in home production that, under the assumption of perfect substitutability of inputs, would generate specialisation by women in home production (Becker 1981). Individual utility functions of husbands and wives are given by:  $u^i(c_i, q_i, l_i)$ ,  $i = h, w$ , where  $c$  represents consumption of a composite market good (at unit price) and  $l$  is leisure.

While much of the literature takes divorce as the relevant threat point, in the Indian context it is more likely that the breakdown of marriage represents a retreat to a non-cooperative solution, with transfers between husbands and wives reflecting existing social norms regarding the minimum responsibilities of each partner in the marriage (Lundberg and Pollak 1993). We assume that social norms dictate a minimum level of care, or time inputs, that wives must devote to their husbands,  $\bar{t}_h^w$ , and, correspondingly, a minimum level of monetary contributions that a man must make to a woman for market purchases of her own consumption needs,  $\bar{l}_w^h$ .

Ignoring other credit sources, we assume that in each period  $t$ , a member  $i$  of SHG  $g$  has access to a loan amount that is a function of the total loanable funds available to the SHG,  $\bar{B}_g$ , and the characteristics of the SHG ( $Y$ ) in the form of the preference and endowments of other SHG members,  $B_{ig} = f(\bar{B}_g, Y_g)$ . These amounts are determined by the SHG and hence do not reflect a choice variable for the woman.<sup>28</sup> Improvements in the SHG's loanable funds take the form of an increase in  $\bar{B}_g$ .

Because SHG loans are provided directly to women, they form a component of her endowment in the event of the breakdown of her marriage. Assuming that husbands and wives also have non-earnings incomes of  $I_h$  and  $I_w$ , respectively, the non-cooperative outcomes derive from each partner maximising his or her own utility, subject to their own budget and time constraints, which include these socially mandated contributions as well as women's access to SHG loans. This generates a set of reaction functions and, correspondingly, reservation utilities of the form:  $\mathcal{V}^i(X) = \mathcal{V}^i(I^h, I^w, \Omega^h, \Omega^w, \bar{l}_w^h, \bar{t}_h^w, \bar{B}_g)$ ,  $i = h, w$

The household's optimisation problem is:

$$(1) \quad \max E_0[\mu(z) \sum_{t=0}^T \beta_w^t u^w(c_{wt}, q_{wt}, l_{wt})] + (1 - \mu(z)) E_0[\sum_{t=0}^T \beta_h^t u^h(c_{ht}, q_{ht}, l_{ht})]$$

subject to:

$$(2) \quad \sum_i (c_{it} + p_{xt} x_{it}) + s_t \leq \sum_i w_{it} h_{it} + R_t s_{t-1} + B_{it}(\bar{B}_t) - R_t^b B_{i,t-1}(\bar{B}_{t-1}) \quad \forall t, i = w, h$$

$$(3) \quad l_{it} + h_{it} + t_{it}^h + t_{it}^w = \Omega \quad \forall t, i = w, h$$

$$(4) \quad q_{it} = q_{it}(x_{it}, \alpha t_{it}^w + t_{it}^h), \quad \alpha > 1, \quad \forall t, i = w, h$$

<sup>28</sup> Depending on the needs of other women, this may imply a zero loan amount for any given woman in any period  $t$ .

$$(5) E_{\tau} \left[ \sum_{t=0}^{T-\tau} \beta_i^t u^i(c_{i,t+\tau}, q_{i,t+\tau}, l_{i,t+\tau}) \right] \geq \bar{V}_{i,\tau}(X) \quad \forall \tau > 0, i = w, h$$

$$(6) s_T \geq 0, t_{it}^w \geq 0, t_{it}^h \geq 0, h_{it} \geq 0 \quad \forall t, i = w, h \forall$$

Following Marcet and Marimon (2019), the effect of participation constraints on bargaining weights is best seen by incorporating these constraints (5) into the household's objective function using their associated Kuhn-Tucker multipliers ( $\eta^i$ ). With this, the weight on each individual's utility function is given by  $M_{i,t}(z, X)$ , where  $M_{i,0} = \mu_i$ ,  $M_{i,t} = M_{i,t-1} + \eta_{i,t}$ .

As discussed by Mazzocco (2007), Chiappori and Mazzocco (2017), and others, this framework allows for the evolution of bargaining weights over time and hence provides a framework for understanding how policies implemented after marriage can change a woman's initial bargaining position determined at the start of her married life. At the start of the marriage, bargaining weights are determined by distribution factors  $z$ , aggregated into the Pareto weights  $\mu^i$ . These distribution factors represent variables that were known at the time of marriage, such as a woman's education, age and other measures of social standing relative to her husband. They also include existing social norms and any impact of them on policies implemented prior to the woman's marriage. Following the initial period, changes in economic opportunities for each partner affect their reservation utilities and hence the multipliers  $\eta_{i,t}$ , causing corresponding changes in each individual's bargaining weight.

This framework has implications for the set of policies that can affect women's bargaining weights and those that cannot. Policies or transfers will affect a woman's bargaining position within the marriage only if they remain with her should the marriage break down. Membership in an SHG, and the loan amounts that the members have the potential to access, belong in the set of policies that can affect a woman's position, since membership is not tied to marriage. In contrast, policies that provide women with transfers or income at stages of their life cycle *within* a marriage, such as grants to women in India for the institutional delivery of a child or grants in cash or kind for lactating and pregnant women, will not have such an effect. They will enhance income but will not enhance a woman's bargaining weight or intra-household decision-making ability.

Second, a woman does not need to borrow to realise the effect of her improved access to financial resources. It is the possibility of access to large loans that enhances her position within the household. However, for women who *do* borrow from the SHG, the impact of SHG membership appears through its effect on household savings, as well as through any effect on the woman's participation constraint and hence on her bargaining position.

A third implication of this framework is that updates in (initial) bargaining weights will occur only if changes in individual reservation utilities are large enough to cause participation constraints to bind; in other words, to make an individual's threat point viable (Chiappori and Mazzocco 2017). Small improvements in access to credit are unlikely to have this effect. While small loan amounts that are provided against the SHG internal resources will enhance the savings of member households, and hence household consumption, these loan amounts are unlikely to affect a woman's intra-

household bargaining power. Though an expectation of continued access over several years may affect reservation utilities, the duration of access required to cause participation constraints to bind would depend on the one-period increase in loan amounts. Lise and Yamada (2019) provide empirical support for the hypothesis that only large changes will affect bargaining weights.

This framework also suggests that the amount of the transfer required to affect bargaining weights will vary depending on a woman's initial bargaining position, and hence her distance from her reservation utility or threat point. If women from a higher socio-economic background are more empowered, then this model suggests that these women may benefit more from large infusions of cash – not because they have a higher rate of return on their investment, but because they are more likely to experience improvements in bargaining power. Thus, the impact of the policy on women's bargaining power will differentially affect women depending on their pre-existing situation.

Finally, the assumption that the gains from marriage reflect, in part, the benefits of specialisation in labour provides insights into the impact of improvements in women's bargaining position on labour outcomes. Under this framework, improvements in a woman's bargaining power must be reflected in increased consumption of the goods that she cares about. This implies that outcomes must reflect a reallocation of women's labour time away from the market and towards goods that enhance her utility; that is, to leisure and to the production of her own health (and that of her children), at the expense of time devoted to caring for her husband.

The model suggests that improvements in women's access to credit, unless accompanied by investments that change her comparative advantage in home production, will reduce the time women devote to market production and increase time spent on home production. This accords with empirical evidence from the US (Voena 2015), which finds that the enactment of laws that allowed for unilateral divorce, and hence reduced commitment to a marriage, lowered the likelihood of a woman working in states where women benefitted more from divorce (due to laws that enforced equal distribution of assets following divorce).

## **5. Empirical methodology**

### **5.1 Establishing the impact of CIFs on SHG loans**

The hypothesis we test in this paper is premised on the assumption that CIFs provided a large infusion of funds into SHGs, increasing average loan sizes and providing the basis for significant improvements in women's decision-making and other outcomes. We therefore start our empirical analysis by providing evidence of the impact of CIFs on the amount of SHG loans. We do so by using survey data on all current outstanding loans and on all loans that were closed or fully repaid in the three years preceding the survey. Using data on the year in which each of these loans originated, we construct a panel data set that, for each household, provides data on the total amount borrowed from SHGs and other sources in each year, commencing in 2012. This enables a graphical representation of mean loan amounts in the years preceding and following the receipt of CIFs. To implement this regression, we normalise each loan year by the year of CIF receipt ( $year - cif\_year$ ). We then run a standard 'normalise and pool' regression of loan

amounts on indicator variables for the number of years from receipt of CIFs, with the coefficients on each year representing the mean borrowing in that year.<sup>29</sup>

The intent of this exercise is to graphically describe mean loan amounts in periods before and after the receipt of CIFs; due to data limitations, these regressions are not intended to estimate the causal impact of CIFs on loan amounts. The data are obtained by recall and restricted to loans that were either received or closed in the three years before the survey. Additionally, causal identification would require dealing with the sample selection issues that arise because the set of SHGs used in the estimate of each parameter value varies: the full sample of SHGs informs estimates of loan amounts for loans received in the [-1, 1] interval; that is, for loans received in the same year as the CIF and those received either one year prior or one year following receipt.<sup>30</sup> However, despite these limitations, this exercise is still useful in establishing the variation in loan amounts in years around the receipt of the CIF, and is particularly informative on variations in loan amounts immediately around the time of receipt of CIFs.

The regression we estimate for the amount borrowed by household  $i$  associated with SHG  $g$  in state  $s$  and year  $t$  is:

$$(7) \text{ Loan } amt_{igt} = \delta_0 + \sum_{j=-4}^4 \delta_j 1(\tau_{gst} = j) * high_{st} + u_{igt}$$

This regression is run on the same sample of SHGs we utilise for the main results of this paper; that is, for SHGs that were formed on or after 2012. In this regression,  $\tau_{gt}$  identifies the event year, equalling zero for loans received in the same year as the CIF, 1 for loans received one year after the CIF, -1 for loans received one year before the CIF, and so on. As previously described,  $high$  is an indicator variable for states with large CIF loan amounts. The regression therefore allows us to examine variation in SHG loans, in years just before and after receipt of CIFs, across states that differ in the amount of CIF funds that they provided to each SHG. We also provide graphical evidence from the same regression, but on loans from the formal sector, informal sector, and relatives and friends.

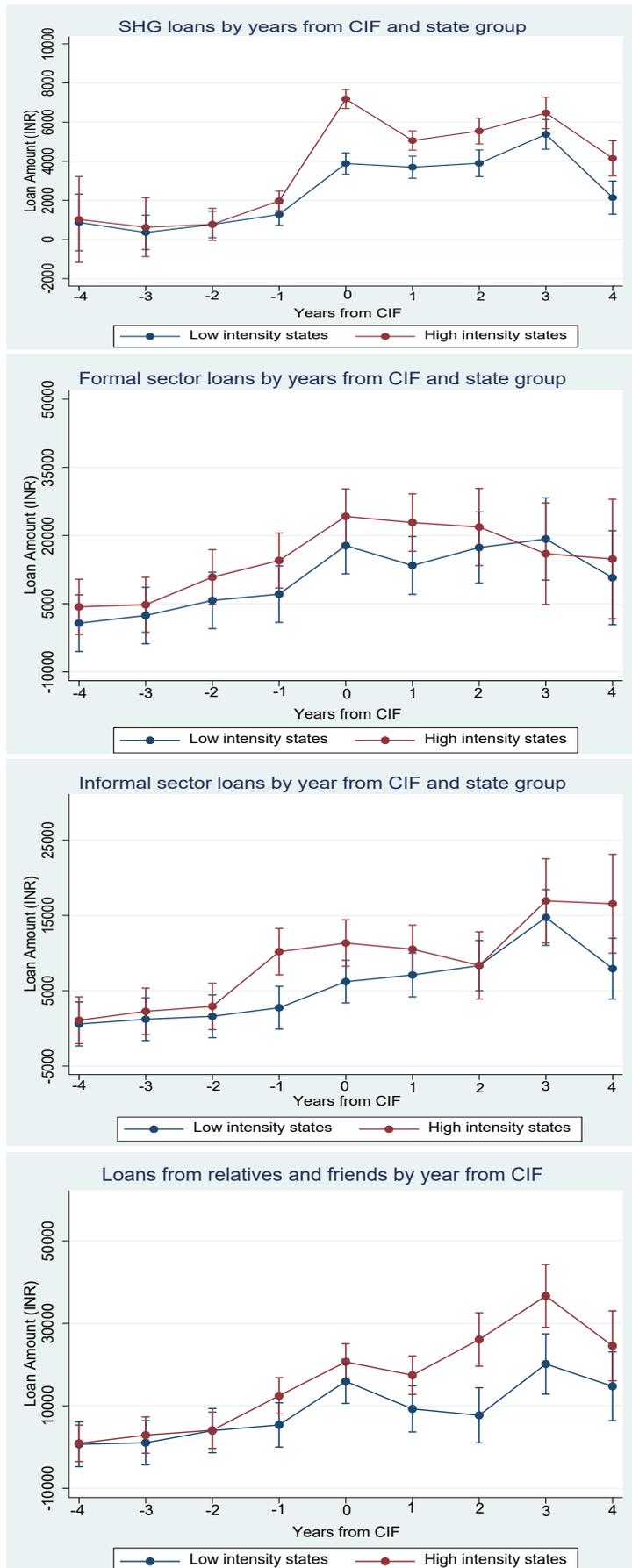
The results from the estimation of equation (7) are in Figure 5. The first panel of this figure provides results for SHG loans. We then replicate this regression for loans from the formal and informal sectors, and for those received from relatives and friends.

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<sup>29</sup> Cattaneo and colleagues (2016) show that estimates from this regression represent a weighted average across cut-offs of local average treatment effects, with higher weights on those values of the cut-off with the most observations.

<sup>30</sup> Observations of loans three years after receipt of CIFs come from CIFs received in 2016 or earlier, while observations for loans received three years before CIFs come from CIFs that were received in 2015 or later.

**Figure 5: Loan amounts by source, years from CIF and state groups**



The data reveal a sharp increase in the amount of SHG loans immediately following the receipt of CIFs, with the loan amounts increasing by approximately INR 2,500 in low-intensity states, and by approximately INR 5,500 in high-intensity states. The data also suggest little difference in SHG loan amounts between high- and low-intensity states prior to receipt of CIFs. Following this event, loan amounts remain higher in high-intensity states, though the difference is less than that in the year in which the CIF was received. This same pattern is not evident for loans from the three alternative loan sources, suggesting that our subsequent estimates of the impact of CIFs are unlikely to reflect any spurious correlation with loans from these other sectors.

## **5.2 Identifying the effect of CIFs on women's decision-making**

We identify the effect of CIFs on women's bargaining power by exploiting the variation in the receipt of CIFs across SHGs. As in other studies that exploit variation in the phasing of treatment over units, a primary concern is the endogeneity of phasing: SHGs that received CIFs differ from those that do not. As noted above, a primary reason for this difference is the age of SHGs: older SHGs were more likely to have received CIFs. Firstly, the data reveal an average difference of approximately two years between SHGs with and without CIFs. Secondly, as previously discussed, variation in the receipt of CIFs reflects variation in resource constraints and in implementation as the programme scaled. Thirdly, possible source of variation is at the SHG level, reflecting the intent of the programme to provide CIFs only to SHGs that were functioning well.

Our first approach to the endogeneity of treatment is to condition on observable factors determining access to CIFs, as in matching methods. We include SHG age in all regressions, reporting results from specifications with a quadratic in SHG age, but also from specifications with indicator variables for the year of formation of the SHG. In these specifications, the variation between SHGs with and without CIFs reflects variation within SHGs of the same age, and hence represents either differences in implementation or differences in SHG attributes. To address the former, we include a number of controls for variation in the scale of the programme across districts and blocks, recognising that resource constraints arise as the programme scales. As previously described, these variables are the number of SHGs in other blocks of the district, as well as the number of villages with programme entry in other blocks of the district and in other clusters of the block prior to the formation of the SHG in question. These scale variables vary across geographies and over time, picking up the effect of variation that arises as a consequence of geographic and time variation in programme implementation.

To eliminate residual differences between SHGs with and without CIFs, we implement a difference-in-difference regression that removes unobservable differences between SHGs with and without CIFs by comparing the difference in outcomes across treatment and control SHGs in states that disbursed large amounts of CIF (high-intensity states) to this same difference in low-intensity states. This approach follows Duflo (2001), Jacoby (2002) and others in using cross-sectional variation in the intensity of the programme combined with cross-sectional variation in its incidence as the basis of a difference-in-difference strategy.

### 5.3 Basic regression equation and sample

Define  $high_s = 1$  if state  $s$  falls in the high CIF group, and let  $CIF_g$  be an indicator variable for a ‘treatment’ SHG; that is, for an SHG that had received a CIF at the time of our survey. Let  $W_{kg}$  be a vector of scale variables  $k$ ,  $k \in \{1, K\}$  that, as previously described, reflects the scale of the programme in the district and block at the time of formation of the SHG in question, and that hence varies across SHG groups (indexed by  $g$ ). The basic regression we estimate for the decision-making index for a woman in household  $i$ , member of SHG  $g$  in states, is:

$$(8) \text{dmindx}_{igs} = \beta_0 + \beta_1(CIF_{gs} * high_s) + \beta_2 CIF_{gs} + \beta_3 high_s + \sum_s \beta_{4s} shgyrs_{gs} high_s \\ + \sum_{k=1}^K \beta_{5k} (W_{kg} * high_s) + \beta_6 shgyrs_{gs} + \sum_{k=1}^K \beta_{7k} W_{kg} + S_s + u_{igs}$$

In this regression,  $S$  is a set of indicator variables for the eight states in the survey, while  $shgyrs$  is the number of years since SHG formation.  $W$  is a vector of scale variables, with the regression including interactions of these variables with  $high$ . All regressions also include a set of geographical control variables, specifically the population of the block, GP and village, and the distance of the village from the block capital. Standard errors in all regressions are robust to general forms of heteroscedasticity. The coefficient on the interaction term  $CIF * high$ ,  $\beta_1$ , identifies the effect of CIFs on the index of women’s empowerment. The regression is run on all households with at least one adult male and female.

The high correlation of CIF years with SHG age raises the concern that any identified effect of CIFs on women’s empowerment may merely reflect a non-linear effect of SHG age that is not being picked up with the linear controls in equation (8). We therefore also report results that include a quadratic in SHG age and from regressions that include indicator variables for the year of formation of the SHG, including interactions with  $high$  in both cases.

Finally, we also test the robustness of results with alternative ways of measuring women’s decision-making. For this, we provide estimates based on women’s mean score across all questions and drawing on an alternative weighting index using principal components.

### 5.4 Testing common trends utilising the phasing of the programme

In programmes in which treatment is phased over time, and the order of the phased roll-out is known, the difference-in-difference common trends assumption can be tested utilising the proposed phasing plan across yet-to-be-treated samples. In our context, such a test could be implemented if data were available on three groups of SHGs: those that have already been treated, those that will receive CIFs next and a third group that will receive treatment last. The common trends assumption could then be tested by comparing differences between the last two groups, in high- versus low-intensity states, both of which are observed prior to the receipt of CIFs. We mimic this approach utilising the sample of SHGs that received CIFs in the year preceding our survey (2018 and the

first few months of 2019).<sup>31</sup> Under the realistic assumption that behavioural change takes time and that the receipt of just one loan in the first year of the programme is unlikely to change a woman's position within the household, this group of recent recipients can be treated as equivalent to a control sample that is just about to receive CIFs. The common trends assumption can then be tested by comparing SHGs in this sample with those in an older sample of control SHGs without CIFs.

This test is not informative if the estimated coefficient is statistically significant: in this case it is not possible to separate out the effect of pre-trends from a violation of the underlying assumption of this test that the benefits of CIF in the first year were negligible. However, a statistically insignificant coefficient on the interacted term *cif\_new \* high* will obtain only if both conditions, no pre-trends and no initial effect of CIF, are met.

We support the results of this test with additional regressions using alternative measures of women's decision-making determined prior to the formation of SHGs. These measures include the woman's age at marriage, a variable widely believed to determine her bargaining power within the marriage, and the age difference between the household head and his wife. Given that our analysis focuses on the impact of an aggregate instrument for women's decision-making, the provision of CIFs to the SHG, we also use a set of measures that reflect women's bargaining position in the GP. These are the GP under-six sex ratio, and the difference in literacy rates between men and women.

Additional support comes from regressions based on the one variable for which we do have baseline data available at the village level; specifically, data on women's labour force participation rates. The 2011 census provides data on this variable for each census village. Since NRLP commenced in 2012, the data from the 2011 census provide an effective baseline measure. We therefore re-run equation (1) using the village female labour force participation rate as the outcome variable and consider the statistical significance of the interacted term *CIF \* high*. If the identifying assumption is valid, then this term should not be statistically significant.

## 5.5 Falsification tests

We support our interpretation of the regression results through a series of falsification tests. Following Rosenbaum (2005), we report estimates from two types of falsification tests. The first exploits 'ineffective treatments', treatments that should not affect outcomes. In this group, we examine the impact of other SHG treatments or interventions, as well as the impact of alternative groupings of states. For example, states that provided large amounts of CIFs (our *high* states) may also be states that differ in terms of other development indicators, calling into question our interpretation of *high* as an indicator of programme intensity. To test this, we report regressions that interact *CIF* with indicators derived by grouping states by female literacy rates and the state's proportion of households from scheduled castes and tribes, using data from the 2011 census. We also assess whether our results are merely picking up the effects of other SHG interventions, focusing on the first infusion of funds into SHGs, the RFs. RFs averaged about INR 15,000 per SHG with little variation across states. Because of this

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<sup>31</sup> This requires data on the year of receipt of CIFs. This information was collected in our survey.

lack of variation, an interaction of receipt of RFs with the indicator for high-intensity states should have no effect on women's decision-making, unless this latter indicator is also picking up the effect of other differences across states that, combined with other SHG interventions, may also affect outcomes.

A second set of falsification tests focuses on 'unaffected outcomes', testing whether the coefficient on *CIF \* high* is statistically insignificant for outcomes that should not be affected by the availability of CIFs. A first set of results examines the effect of this interaction term on household variables: the highest level of schooling of adult males and females in the household, the amount of agricultural land owned, and the number of adult males and females. We also report similar regressions that consider the effect of *CIF \* high* on a broad set of SHG attributes (size or total membership, the proportion of members from scheduled castes and tribes, members' mean years of schooling, the amount of monthly savings).

## **5.6 Testing the importance of women's access to large loans**

The section above examines the impact of CIFs on women's decision-making. However, regressions based on equation (8) do not rule out the possibility that women's bargaining weights can also be enhanced by the small incremental changes in their resources enabled through monthly savings of minor amounts with SHGs and the aggregation of these amounts into (internal) loanable funds. Nor do they rule out the possibility that improvements in women's decision-making could result from policies that target households and improve household resources without paying attention to the share of resources controlled by women. In this section we provide evidence on these hypotheses, and on an additional strong prediction of the theoretical framework that women's intra-household bargaining weight is unaffected by total household savings, depending only on the share that is controlled by women.

The regressions we implement correspond to standard tests of the unitary household that examine whether the resources controlled by women affect consumption allocations in regressions that control for total household income (Bourguignon et al. 1993; Thomas 1990). Using this framework, we examine whether CIFs act as a distributive factor, changing household allocations in regressions that condition on total household resources. We then extend the literature by asking whether other components of savings, specifically the small improvements in women's resource position enabled through internal loans based on SHG savings, also constitute a distributive factor. While research has previously considered multiple distribution factors, this has been in the context of testing whether distributive factors affect allocations only through their effect on women's bargaining weights. Such tests require at least two distributive factors (Attanasio and Lechene 2014; Browning and Chiappori 2006). In contrast, our focus is on whether all policies that enhance women's financial access affect women's bargaining weights. This requires multiple instruments for household savings.

Given our focus on savings and hence on dynamic outcomes, we frame our analysis within the context of the empirical literature on life cycle models that use Frisch or marginal-utility-of-wealth-held-constant demand functions to incorporate inter-temporal decisions (MaCurdy 1981). Blundell and Walker (1986) and MaCurdy (1983) adapt this framework to cross-sectional data, showing that the marginal utility of wealth can be

replaced by the (negative) of household savings, with the endogeneity of savings being recognised. Implementing this regression requires data on household savings, or on household income and expenditures, data that are available in our survey. Household savings incorporate the effect of current income and income shocks, as well as all out-of-period shocks. Conditioning on savings, demand functions are only affected by current prices, taste shifters, current preference shocks, distribution factors that affect intra-household bargaining weights and updates to these weights (if participation constraints bind).

CIFs, to the extent that they enable a revision of a woman's role within the household, should be significant determinants of outcomes even in regressions that include household savings. The same holds true of women's small savings if they, too, constitute distribution factors that affect women's bargaining weight and hence intra-household allocations. To test this, we expand the set of regressors to include the monthly savings of the SHG, *SHG monthly savings*, the product of the SHG's required monthly savings amount and the number of members of the SHG. This amount represents the funds that would be available to an SHG in its first year of operation, prior to the receipt of CIF funds.

Implementing these regressions requires an instrument for savings other than CIFs and SHG monthly savings, one that is uncorrelated with women's bargaining weight. The empirical literature has most commonly used wages or determinants of wages (education, age) as instruments for income (and hence savings), on the assumption that the consumption goods in question are separable from leisure (Attanasio and Lechene 2014). We base identification, instead, on past income shocks, recognising that current savings reflect past income and past income shocks, and that these variables will affect current outcomes only through savings. More importantly, shocks to income in any given year or season are unlikely to affect a woman's bargaining weight because of their transitory nature, and also because they affect the totality of household income, not the relative resource position of women.

A measure of income shocks is available through survey questions that asked farm households about their expected and realised crop output in the three main agricultural seasons of the previous agricultural year. Because the survey was conducted at the last stages of the rabi harvest of 2019, this means that we have data on income shocks for the kharif season of 2018, but also for the *previous* rabi season of 2017–18, the year prior to the reference year for our survey.<sup>32</sup> We use these data to construct an indicator variable for whether output was less than expected in that season.<sup>33</sup> Combined with

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<sup>32</sup> Because we measure savings as the difference between income and expenditure, this also means that our measure of savings uses income data from the rabi season of 2017–18, rather than from 2018–19. Thus, while savings always reflect past income, in our case the measure of savings is explicitly based on income from the previous rabi season. On the assumption that seasonal income follows a random walk, income in the current rabi season equals income in the previous season and an expectational error, which is then a component of the regression residual.

<sup>33</sup> The use of determinants of agricultural incomes as instruments implies that we identify agricultural incomes and not the incomes of non-agricultural households. The strength of this instrument derives from the fact that 66 per cent of farmers report ownership of agricultural land.

SHG monthly savings, the availability of two instrumental variables (IVs) allows us to not only examine their effect in reduced form regressions, but also to implement standard over-identification tests that support their validity as instruments.

Several qualifications need to be kept in mind. A primary concern is that identification assumes that current prices, wages and wage shocks (for this rabi season) are uncorrelated with individual farmers' expectations of output and expectational errors from the previous rabi season.<sup>34</sup> This condition will be satisfied if prices are determined in larger regional markets and are exogenous for any given farmer. They will, however, be violated if labour markets function imperfectly so that farm households value their time at an endogenously determined shadow or virtual wage that equates the (household) demand and supply for labour. If so, identification requires either the conventional assumption of separability between the sets of goods we consider and leisure, or assumptions regarding the correlation between shocks and expectations (conditional on the set of controls) across years.

Our analysis follows the former approach, with attention restricted to purchased goods that are likely to be separable from leisure. This excludes an analysis of food expenditures given the importance of home production in food preparation. Following the literature, we confine our attention to the share of clothing in household expenditures (Browning et al. 1994). The primacy of food in the budget of rural households and the infrequency of expenditures on other items such as furniture, bedding, utensils and minor durables limits the other goods that we can consider; aggregating such goods into a composite will generate results that are difficult to interpret, since the conditions required for aggregation are unlikely to be met.

A second concern, common to other research that implements similar tests of the income-pooling model, is that evidence of the statistical significance of *CIF \*high* in regressions on household demand, while suggestive of a role for bargaining weights, may also be consistent with other interpretations, such as binding labour or credit constraints. However, the availability of an index of women's decision-making and evidence of an effect of *CIF \*high* on this index suggests that an effect through bargaining weights must exist, even if this does not rule out additional pathways. Thus, we provide supportive evidence on the determinants of women's bargaining weights through reduced form regressions on the index of women's decision-making.

The availability of a measure of women's bargaining power, specifically the index of women's decision-making, and of instruments for household savings significantly extends our exploration of the determinants of women's decision-making in that it enables a test of a strong prediction of the theoretical framework of section 4. This is the hypothesis that bargaining weights are determined by pre-marriage factors and are updated only by variables that significantly shift the woman's bargaining strength. That is, the savings that a household accumulates over its life cycle will not affect women's bargaining position.

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<sup>34</sup> Actual output, including any expectation error, will affect current rabi output. This is included in savings and hence is not a concern. The concern, instead, is that previous shocks affect other determinants of savings-conditioned demand equations; that is, prices, wages and preference shocks.

The regressions of this section therefore estimate equation (8), using the share of clothing in household expenditure and the index of women’s decision-making as dependent variables. We report reduced form regressions that include *CIF \* high*, *SHG monthly savings* and *rabi shock* amongst the regressors. The set of controls is expanded to include preference shifters: measures of the demographic profile of the household, captured by the number of household members in seven gender-age groupings, and the highest level of schooling of adult male and female household members. We then report results from IV regressions that condition on savings, instrumenting it with *rabi shock*. These regressions allow us to test whether *CIF \* high* and *SHG monthly savings* affect allocations, even in regressions that condition on household savings. That is, they provide a test of whether all increments to women’s resources have distributive consequences, or whether it is only the policies that generate large improvements that matter.

## 6. Results

### 6.1 Effect of CIFs on women’s decision-making index

Table 2 provides the basic set of results of this paper, reporting coefficients from regressions of the interaction variable *CIF \* high* in regressions that vary in the set of controls, including those for SHG year. The first regression is the simplest, including just the interaction variable, its individual components and SHG years (age) along with its interaction with *high*. The second regression represents a far more flexible approach to the incorporation of controls for SHG age, using indicator variables for the year of formation and their interaction with *high*. There is little effect of such non-parametric controls on the coefficient on *CIF \* high*. Regression 3 replaces the indicator variables for SHG age with a quadratic, while the last regression includes the set of controls discussed in the previous section. There is no statistically significant variation in the coefficient on *CIF \* high* across these specifications.

**Table 2: Basic OLS regressions on women's decision-making index**

	Full sample			
	(1)	(2)	(3)	(4)
<i>CIF * high</i>	3.49*** (1.23)	3.31*** (1.25)	2.93** (1.24)	2.69** (1.26)
CIF	-3.22*** (0.98)	-3.21*** (0.99)	-3.11*** (0.99)	-2.83*** (1.01)
<i>high</i>	3.13*** (1.27)	-4.85** (2.25)	-6.82** (3.19)	4.56 (4.20)
Additional controls	shgyrs shgyrs * high	Indicator variables for year of formation, interactions with <i>high</i>	Quadratic in SHG years, interactions with <i>high</i>	Quadratic in SHG years, interactions with <i>high</i> , additional controls
Sample size	12,548	12,548	12,548	11,763
Regression F (Prob. > F)	28.94 (0.00)	15.93 (0.00)	25.23 (0.00)	16.40 (0.00)

Note: state fixed effects included in all regressions. Robust standard errors in parentheses. Additional controls in the last three regressions are: block population, GP population, village population, distance of village from block capital, distance from bank, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

We utilise the last specification (which yields the smallest coefficient) for the remaining results of this paper. This estimate suggests that the provision of CIF raises women's decision-making by 2.7 percentage points. Thus, the incremental provision of INR 33,000 in CIF to SHGs in *high* states (with a CIF average of INR 81,000) relative to *low* states (CIF average of INR 48,000) increases the index of women's decision-making by 2.7 percentage points. Given a sample mean of 17, this is a 16 per cent improvement in women's bargaining weight.

To ensure the robustness of our results compared to alternative ways of constructing the decision-making index, Appendix A reports results based on alternative indices for both the basic and preferred specifications. The first set of results calculates the index using principal components. The second uses the woman's mean score across the five possible responses to each question. In both cases, the coefficient on *CIF \* high* remains statistically significant.

Appendix B reports the results from a disaggregation of the original index across different types of items, reporting results from sub-indices that measure women's decision-making in decisions regarding loans, food, expenditures on children, and expenditures on household durables and home improvements. The regressions are from our 'preferred' specification, including a full set of controls. The coefficient on *CIF \* high* is statistically significant for each of these sub-indices.

## 6.2 Support for common trends

Table 3 provides support for the common trends assumption underlying the difference-in-difference regressions of the previous table, both through a regression analysis on SHGs that vary in their exposure to CIFs, as well as through regressions on alternative 'baseline' measures of women's empowerment.

**Table 3: Tests for common trends**

	Dependent variable: DM index		Female labour force participation rate, survey	Village female labour force participation rate, 2011	Women's age at marriage
	(1)	(2)	(3)	(4)	(5)
CIF <= 2017	6.82***	6.70***	–	–	–
* <i>high</i>	(1.70)	(1.31)			
CIF >= 2018	-1.19	-1.44	–	–	–
* <i>high</i> group	(1.59)	(1.60)			
<i>CIF * high</i>	–	–	-0.04***	0.007	0.18
			(0.02)	(0.01)	(0.20)
CIF <= 2017	-5.72***	-5.73***	–	–	–
	(1.24)	(1.36)			
CIF >= 2018	0.55	0.64	–	–	–
	(1.35)	(1.36)			
CIF	–	–	0.05***	0.02***	-0.54***
			(0.01)	(0.005)	(0.15)
<i>high</i>	8.72***	4.83	0.03	-0.01	-0.09
	(2.13)	(4.23)	(0.05)	(0.02)	(0.67)
Controls	SHG years, SHG years * <i>high</i> , and additional controls	Quadratic in SHG years, interaction with <i>high</i> + additional controls			
Sample size	11,763	11,763	11,587	11,779	11,651
Regression F	16.73	15.51	48.47	325.95	42.00
(Prob. > F)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: state fixed effects included in all regressions. Robust standard errors in parentheses. Additional controls are: block population, GP population, village population, distance of village from block capital, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

The first two columns report results from regressions that divide the sample of SHGs with CIFs into two: those that received CIFs in the last year (*CIF >= 2018*); and those that received CIFs in 2017 or earlier (that is, two years prior to the survey year). On the assumption that the effect of CIFs on women's bargaining weight will appear only over time, the coefficient on *CIF >= 2018 x high* provides a test for the common trends

assumption. The first column reports the results of this test with the set of controls including a linear combination of SHG years and SHG years interaction with *high*, while the second column replaces this with a quadratic in SHG age. Both regressions support the common trends assumption: for SHGs that have only received CIFs, the coefficient on *CIF \* high* is statistically insignificant at conventional levels.

This disaggregation by age significantly increases the estimated impact of CIFs on older SHGs: the coefficient on *CIF \* high* for this group is approximately 7, suggesting that the incremental increase of INR 33,000 improves decision-making by 34 per cent, calculated over the average value of the decision-making index for this older group of SHGs (20.69).

The remaining three columns test the common trends assumption using alternative measures of women's decision-making. The first measure is women's labour force participation rate, the one variable for which we have survey data as well as (village-level) information from 2011, prior to the onset of the programme. Column (3) reveals an effect of CIFs on survey data: the provision of CIFs reduces female labour force participation rates, with the estimated coefficient being statistically significant at the 1 per cent level. In contrast, utilising village female labour force participation rates from the 2011 census, column (4) suggests no impact of CIFs on baseline values of female labour force participation. Similarly, the last regression, on the age of the woman at the time of marriage, also implies that CIFs had no impact on measures of women's bargaining weights at the time of marriage.

### **6.3 Additional falsification tests**

While the results highlighted in the previous table support the identification of CIF effects, regressions reported in Table 4 validate the interpretation of estimates as indicative of the effect of CIFs. The first regression replaces the indicator for receipt of CIFs with one for the receipt of the smaller funds provided to SHGs in the form of RFs. The regression reveals that the indicator variable *RF \* high* has no significant effect on women's decision-making. This is a strong result – one that suggests that the estimated impact of CIFs is not picking up the effect of other earlier SHG inputs or interventions.

**Table 4: Falsification tests, household variables**

	Dependent variable: women's decision-making index			Maximum years of schooling, adult males	Maximum years of schooling, adult females	Agricultural land (acres)	Adult males	Adult females	MNREGA job card
	Replace CIF with RF, states grouped by CIF amount	Group states by female literacy rate	Group states by state proportion SC/ST	CIF, states grouped by CIF amount					
RF * state group	0.05 (1.23)	-	-	-	-	-			
CIF * state group	-	0.94 (1.27)	0.08 (1.22)	0.18 (0.20)	-0.03 (0.22)	-0.04 (0.09)	0.03 (0.04)	0.03 (0.04)	-0.027 (0.022)
State group	3.70 (4.18)	-4.93 (3.82)	-11.07*** (4.12)	1.29* (0.71)	-1.01 (0.76)	-1.55*** (0.38)	-0.13 (0.13)	-0.12 (0.13)	0.23*** (0.08)
CIF	-	-1.76* (1.02)	-1.39* (0.84)	0.33** (0.15)	0.12 (0.15)	0.05 (0.07)	0.03 (0.03)	-0.01 (0.03)	0.02 (0.02)
RF	-1.35 (0.90)	-	-						
Sample size	11,763	11,763	11,763	11,779	11,779	11,779	11,779	11,779	11,779
Regression	16.43 (0.00)	16.67 (0.00)	17.09 (0.00)	24.78 (0.00)	28.25 (0.00)	125.52 (0.00)	7.54 (0.00)	6.59 (0.00)	44.13 (0.00)

Note: MNREGA = Mahatma Gandhi National Rural Employment Guarantee Act; SC = scheduled caste; ST = scheduled tribe. State fixed effects included in all regressions. Robust standard errors in parentheses. Additional controls are: block population, GP population, village population, distance of village from block capital, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

The next two regressions address a primary concern with our methodology: that state groupings may just be reflecting broad state-level differences in economic conditions and are not reflective of variations in the magnitude of CIF funding and hence of the intensity of the CIF input. These regressions reveal that replacing the indicator *high* with alternative indicators based on the state's female literacy rate or the state's proportion of the population from scheduled castes and tribes does not have a similar effect. As with the regression on RFs, this provides strong support that *CIF \* high* does, in fact, capture variation in the intensity and incidence of the programme.

The remaining six columns test the effect of this interaction on 'unaffected outcomes', those that should not be affected by the provision of CIFs. Conversely, if the interaction variable *CIF \* high* merely reflects geographic variation in socio-economic conditions, one would expect it to affect at least some of these household attributes. The results of the estimation of our basic regression, with controls, on this broad range of outcomes provides further support for our results: the provision of CIFs does not determine any of these outcomes.

Finally, regressions reported in Table 5 repeat this last set of tests on SHG attributes. These attributes were measured at the time of the endline survey, and hence are less conclusive; that is, attributes such as SHG size and member characteristics may change over time as some women exit the SHG and are replaced by other women. By and large, the results reveal no effect of *CIF \* high* on SHG attributes, with one exception. This is the proportion of members from scheduled castes and tribes, for which the coefficient on the interaction term is just significant at the 10 per cent level. The last regression examines the effect of *CIF \* high* on the under-six sex ratio in the GP, a variable that we later use in instrumental variable regressions. Here, too, we find no statistically significant impact of CIFs.

**Table 5: Falsification tests, SHG and geographic attributes**

	SHG size	Prop. SC/ST members	Member's mean years of schooling	Amount of monthly savings (INR)	GP under-six sex ratio
<i>CIF * high</i>	0.21 (0.14)	-0.07* (0.04)	0.22 (0.20)	0.02 (5.29)	-0.01 (0.01)
CIF	0.01 (0.09)	-0.05* (0.04)	0.05 (0.12)	-2.34 (4.84)	-0.013*** (0.004)
<i>high</i>	-0.71 (0.59)	0.04 (0.17)	-1.15 (0.72)	8.07 (18.88)	-0.06 (0.04)
Sample size	2,160	2,160	2,169	2,160	2,160
Regression	14.07	6.37	39.17	31.78	11.87
F	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: SC = scheduled caste; ST = scheduled tribe. State fixed effects included in all regressions. Robust standard errors in parentheses. Additional controls are: block population, GP population, village population, distance of village from block capital, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

Taken together, the results of our regression test for common trends as well as this extensive set of falsification tests suggest strong support for our empirical methodology and for our interpretation of the coefficient on *CIF \* high* as indicative of the effect of CIFs on women's intra-household bargaining weight.

## 6.4 Results from instrumental variables savings-conditioned regressions

In this section, we report results from regressions that implement the instrumental variable methodology described in the previous section to test the effect of household savings and the relative importance of small versus large increments in women's financial resources on decision-making and household demands.

Initial evidence comes from reduced form regressions on household savings and the index of women's decision-making on *rabi shock*, *SHG monthly savings*, *CIF \* high* and the individual components of this interaction (Table 6). All regressions include the set of controls used in the previous regressions, as well as the preference shifters described in section 5.

**Table 6: First-stage and reduced form regressions on household savings and decision-making index**

	Household savings (INR '000)	Decision-making index
Rabi shock (previous season)	-27.46*** (2.42)	-0.65 (0.63)
SHG monthly savings	-0.01*** (0.003)	0.0004 (0.0004)
<i>CIF * high</i>	10.56*** (4.38)	2.50** (1.26)
CIF	-7.77*** (3.27)	-2.50*** (1.01)
<i>high</i>	1.80 (15.46)	2.47 (4.18)
Regression F	28.62 (0.00)	14.04 (0.00)
Sample size	11,240	11,225

Note: Robust standard errors in parentheses. In addition to regressors listed in the table, all regressions include the following: highest adult male and female education years; indicator for ownership of land; 12 gender-age demographic categories; indicator for scheduled caste and tribes; interactions of *high* with a quadratic in SHG age and with a set of scale variables; block, GP and village population; distance of village from block capital and from nearest bank and state dummy variables.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

These regressions reveal that all three variables have a statistically significant effect on household savings. Savings are lower in households affiliated with SHGs with higher monthly savings, consistent with the hypothesis that increases in an SHG's internal savings improve access to loans and hence household expenditures. Savings also fall with negative income shocks. However, these variables differ in their effect on the index of women's decision-making. Consistent with the results of earlier sub-sections, *CIF \* high* has a strong statistically significant effect. In contrast, supporting the hypothesis that small changes in savings will not impact women's bargaining weights, SHGs' monthly savings are not a significant determinant of this index despite their impact on savings. Similarly, consistent with the predictions of the previous section, transitory shocks to household income that significantly reduce household savings also have no impact on intra-household decision-making.

Table 7 reports results from instrumental variable regressions on clothing shares and decision-making.<sup>35</sup> The first panel (*Regression 1*) provides results from regressions that instrument savings with *rabi shock*, with SHGs' monthly savings and *CIF \* high* included as regressors. The regression on clothing shares reveals that SHGs' monthly savings have an insignificant effect on clothing shares in regressions that condition on savings, suggesting that any impact on household allocations comes only through its impact on total household resources. In contrast, the statistically significant coefficient on *CIF \* high* suggests that CIFs affect household allocations independently of their effect on savings, confirming that large improvements in women's financial access have effects on households that differ from those that would result from a general improvement of the household due to financial resources. These differences suggest that who controls household resources only matters if the amounts in question are relatively large.

**Table 7: IV regressions of household consumption and decision-making on savings**

	Clothing share	Decision-making index
<i>Regression 1</i>		
Household savings (INR '000)	0.02*** (0.003)	0.02 (0.02)
SHG monthly savings	-0.0001 (0.0001)	0.0006 (0.0005)
<i>CIF * high</i>	0.43** (0.20)	2.25* (1.28)
<i>Regression 2</i>		
Household savings (INR '000)	0.02*** (0.008)	-0.06 (0.06)
Rabi shock	0.17 (0.24)	-2.24 (1.75)
<i>CIF * high</i>	0.36* (0.21)	3.10** (1.44)
<i>Regression 3</i>		
Household savings (INR '000)	0.02*** (0.003)	0.01 (0.02)
<i>CIF * high</i>	0.42** (0.19)	2.38* (1.28)
Sample size	11,240	11,225
Dependent variable sample mean (standard deviation)	6.77 (4.33)	16.27 (26.62)

Note: Robust standard errors in parentheses. Sample size is 11,019 for the first three regressions and 7,715 for the regression on schooling expenditures. Shares are a percentage of annual household expenditure. Instruments for savings and decision-making are rabi shock, expected rabi output and *CIF \* high*. Additional regressors: *CIF, high*, highest male and female education years; indicator for ownership of land; 12 gender-age demographic categories; indicator for scheduled caste and tribes; interactions of *high* with a quadratic in SHG age and with a set of scale variables; block, GP and village population; distance of village from block capital and from nearest bank and state dummy variables. Regression 1 instruments household savings with rabi shock, while Regression 2 uses SHG monthly savings as an instrument. Both variables are used as instruments in Regression 3.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

<sup>35</sup> Clothing shares are expressed as percentages of expenditure rather than as shares to enhance exposition in the tables.

The insignificant effect of *SHG monthly savings* on clothing shares in this regression, combined with its positive effect on total household savings (Table 6), allows us to validate our identification of household savings, using a standard over-identification test. We therefore instrument household savings by *SHG savings amount* and include *rabi shock* amongst the regressors. The results, reported in the panel titled *Regression 2*, confirm the validity of *rabi shock* as an instrument for savings. This specification yields coefficients on household savings and *CIF \* high* that are statistically equivalent to those reported in the top panel, with the robustness of the results providing additional support for the regression specifications.

Finally, the third panel uses both *SHG monthly savings* and *rabi shock* as instruments for household savings, reporting coefficients on total household savings and *CIF \* high*. As in other specifications, the results reveal that household allocations reflect both total household savings and women's access to large financial resources.

In contrast to results on clothing shares, the regression results on decision-making reported in the last column of Table 7 reveal that the index of women's decision-making is unaffected by household savings (using each instrument independently in the first two specifications and both instruments in the last). This supports the prediction of the theoretical framework that women's bargaining weights do not improve with additions to total household resources, but are significantly enhanced by resources that can be controlled by women even should the marriage break down; that is, women's bargaining power is increased by programmes that target the financial inclusion of women, but only by those that provide funds of significant magnitude.

## **6.5 Alternative explanations**

One concern regarding the regressions reported above relates to the variable measuring SHG monthly savings. This amount was agreed upon at the time of SHG formation, under the guidance of the team responsible for the development of SHGs. It is, however, possible that the variation in this amount across SHGs may merely be reflecting socio-economic characteristics of SHG members, particularly their levels of wealth. This change in interpretation does not affect results, but it raises the concern that what we are interpreting as a measure of women's access to relatively small loan amounts may just be a measure of the socio-economic conditions of the SHG.

While we cannot definitively rule out this possibility, we provide support for our interpretation through regressions that include variables that closely reflect the socio-economic conditions of SHG members, specifically their mean years of schooling and the proportion of members from scheduled castes and tribes. The results are reported in the first regression in Table 8. Including characteristics of the SHG does not affect the results: monthly SHG savings amounts are a statistically insignificant determinant of clothing shares, while the effect of *CIF \* high* remains significant.

**Table 8: Testing additional explanations**

	Clothing share IV regression	First stage and reduced form		Clothing share IV regression	Clothing share IV regression
	(1)	Household savings (2)	Decision-making index (3)	(4)	(5)
Household savings (INR '000)	0.02*** (0.004)			0.02*** (0.003)	0.02*** (0.003)
SHG monthly savings	-0.00004 (0.00006)	-0.01** (0.003)	0.0004 (0.0005)	-0.00005 (0.00006)	-
<i>CIF * high</i>	0.44** (0.20)	10.21*** (4.37)	2.53 (1.00)***	0.42** (0.19)	0.42*** (0.19)
Rabi shock	-	-27.35*** (2.42)	-0.80 (0.63)	-	-
SHG medium schooling years	0.03 (0.02)	-	-	-	-
SHG prop. SC/ST	0.02 (0.13)	-	-	-	-
Max. male schooling * head age square	-	0.003*** (0.001)	0.0001 (0.0003)	-0.00001 (0.00004)	-
Wald $\chi^2$	650.25	26.50	13.32	626.62	627.39
Regression F (Prob. > $\chi^2$ , F)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sample size	11,240	11,240	11,225	11,240	11,240

Note: SC = scheduled caste; ST = scheduled tribe. Robust standard errors in parentheses. Regressions in columns (2) through (5) include head's age, age square and interactions of the max. male schooling in the household with head's age. Additional controls are identical to the regressions of previous tables.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

An additional concern is that our instruments for household savings identify only the effect of small increments as compared to savings caused by transitory shocks and access to marginal loan amounts. This suggests that *CIF \* high* may be identifying the impact of large enhancements to savings; that is, its significance may be a consequence of a non-linear effect of savings in household allocations. To address this possibility, we follow a conventional approach of identifying the effect of men's incomes, and hence household savings, through interactions of measures of education with a quadratic in age. For this, we interact the highest level of education of a male member of the household with a quadratic in the age of the (male) head of the household,<sup>36</sup> using the interaction as an instrument for household savings.

First stage and reduced form regressions on household savings and the decision-making index, respectively, are reported in columns (2) and (3) of Table 8. The table

<sup>36</sup> For female-headed households, we use the age of her spouse.

reports the coefficient on the interacted term: *max male schooling x head's age x head's age*. The independent components of this term, as well as the interactions *max male schooling x head's age* and *head's age x head's age*, are included in the set of regressors. As expected, the interaction of education and (a quadratic in) age is a significant determinant of household savings, but not of women's decision-making. These regressions therefore verify the validity of using *max male schooling x head's age x head's age* as an additional instrument for savings, one that is likely to incorporate the effect of large sources of household savings.

The IV regression in column (4) reveals, however, that this addition to the set of instruments does not affect the results. *CIF \* high* remains a significant determinant of the share of expenditure on clothing in savings-conditioned regressions, while the effect of SHGs' monthly savings amount is statistically insignificant. The last regression of this table includes *max male schooling x head's age x head's age* amongst the instruments, again without any change in the remaining regression coefficients. While this does not rule out the possibility that the coefficient on *CIF \* high* may represent a non-linear effect of savings, it does provide additional regression support for our interpretation.

A final concern, as previously noted, is that the statistically significant coefficient on *CIF \* high* in clothing shares, even in regressions that condition on household savings, may also be a consequence of the impact of large changes in women's financial access on other constraints that affect household behaviour. The fact that this variable also affects decision-making implies, however, that an impact through bargaining weights is part of the story.

## 7. Conclusion

This paper provides empirical evidence in support of the hypothesis that providing women with access to large loans significantly enhances their decision-making ability within the household. We build on a rich theoretical literature on intra-household decision-making that explores the determinants of women's bargaining weights. This literature suggests that changes in women's bargaining weights over the course of a marriage will only be possible if policies significantly affect her reservation utility. Unless a woman is close to her reservation utility, such improvements will likely necessitate large improvements in her access to resources.

Our analysis is based on an analysis of SHGs supported by India's National Rural Livelihoods Mission. The programme supported the development of SHGs comprising women members. As is typically the case, SHGs provided a means for women to aggregate small monthly savings into amounts that formed the basis for internal loans. These loans are typically small. However, the programme provided the means for significantly enhancing loan amounts through the provision of CIFs.

Utilising variation in the phased delivery of CIFs and in CIF amounts across states, we identify the effect of CIFs using a difference-in-difference methodology. We subject our results to several specification and robustness tests. All regressions document a large effect of CIFs on women's decision-making, suggesting that one explanation for the mixed evidence in the existing literature regarding the impact of SHGs and microfinance institutions on measures of women's decision-making relates to the magnitude of funds available to these groups.

We then extend the existing literature by comparing the effect of small improvements in a woman's financial position enabled through the SHG's internal savings to those facilitated by access to CIFs. Our results confirm that it is the large amounts that affect decision-making and that shift intra-household allocations. Conversely, though access to small loans affects household savings, the effect on household allocations occurs only through household savings. Put differently, financial inclusion policies that target women produce results that differ from those that target households only if they provide women with access to relatively large loans.

Our results have significant implications for policy, highlighting the need to pay attention to quantities, rather than to implement financial inclusion policies without regard to the loan amounts that are available through them.

## Appendix A: Robustness to alternative methods of calculating the decision-making index

	Principal components analysis		Mean score	
	(1)	(2)	(3)	(4)
CIF * <i>high</i>	0.55*** (0.16)	0.45*** (0.16)	0.07*** (0.03)	0.06** (0.03)
CIF	-0.44*** (0.13)	-0.38*** (0.13)	-0.03 (0.02)	-0.02 (0.02)
<i>high</i>	0.44*** (0.16)	0.60*** (0.53)	-0.09*** (0.03)	0.002 (0.002)
Regression type	Basic	Preferred	Basic	Preferred
Sample size	12,555	11,770	12,548	11,763
Regression F (Prob. > F)	29.44 (0.00)	16.49 (0.00)	41.81 (0.00)	21.13 (0.00)

Note: state fixed effects included in all regressions. Robust standard errors in parentheses. The 'basic' equation is the first regression reported in Table 2 of the paper, with only SHG years and its interaction with *high* as additional regressors. The 'preferred' regression is the last regression in Table 2, with a full set of control variables: block population, GP population, village population, distance of village from block capital, distance from bank, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

## Appendix B: Effect of CIF on sub-indices of women's decision-making

	Loans, all sources	Loans from banks	Food	Children's expenses	Expenditure on durables and home improvements
	(1)		(2)	(3)	(4)
CIF * <i>high</i>	0.02*** (0.01)	0.05*** (0.01)	0.48*** (2.21)	0.04*** (0.01)	0.05*** (0.01)
CIF	-0.02*** (0.01)	-0.03*** (0.01)	-0.04*** (0.01)	-0.04*** (0.01)	-0.03*** (0.01)
<i>high</i>	0.07*** (0.05)	0.04 (0.05)	0.06*** (0.06)	0.08*** (0.05)	0.05 (0.05)
Sample size	11,553	11,770	11,757	11,540	11,770
Regression F (Prob. > F)	13.65 (0.00)	10.42 (0.00)	19.34 (0.00)	15.62 (0.00)	10.42 (0.00)

Note: state fixed effects included in all regressions. Robust standard errors in parentheses. All regressions include a full set of control variables: block population, GP population, village population, distance of village from block capital, distance from bank, number of SHGs in the district (omitting block of SHG location) two years prior to SHG formation year, number of villages entered in the district and the block (omitting cluster of SHG location) two years prior to SHG formation year, and interactions of the last three variables with *high*.

\*\*\* Significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

## References

- Alesina, A, Baqir, R and Easterly, W, 1999. Public goods and ethnic divisions. *The Quarterly Journal of Economics*, 114(4), pp.1243–84.
- Angelucci, M, de Giorgi, G and Rasul, I, 2018. Consumption and investment in resource pooling family networks. *The Economic Journal*, 128(615), pp.2613–51.
- Angelucci, M, Karlan, D and Zinman, J, 2015. Microcredit impacts: evidence from a randomized microcredit program placement experiment by Compartamos Banco. *American Economic Journal: Applied Economics*, 7(1), pp.151–82.
- Attanasio, OP, and Lechene, V, 2014. Efficient responses to targeted cash transfers. *Journal of Political Economy*, 122(1), pp.178–222.
- Azariadis, C, 1996. The economics of poverty traps part one: complete markets. *Journal of Economic Growth*, 1(4), pp.449–86.
- Bandiera, O, Buehren, N, Burgess, R, Goldstein, M, Gulesci, S, Rasul, I and Sulaiman, M, 2020. Women’s empowerment in action: evidence from a randomized control trial in Africa. *American Economic Journal: Applied Economics*, 12(1), pp.210–59.
- Bandiera, O, Burgess, R, Das, N, Gulesci, S, Rasul, I and Sulaiman, M, 2017. Labor markets and poverty in village economies. *The Quarterly Journal of Economics*, 132(2), 811–70.
- Banerjee, A, 2003. Contracting constraints, credit markets, and economic development. In: M Dewatripont, LP Hansen and SJ Turnovsky, eds. *Advances in economics and econometrics: theory and applications*. Eighth World Congress of the Econometric Society, Volume III, Cambridge: Cambridge University Press.
- Banerjee, A, Breza, E, Duflo, E and Kinnan, C, 2019. *Can microfinance unlock a poverty trap for some entrepreneurs?* National Bureau of Economic Research: No. w26346.
- Banerjee, A, Duflo, E, Glennerster, R and Kinnan, C, 2015a. The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, 7(1), pp.22–53.
- Banerjee, A, Duflo, E, Goldberg, N, Karlan, D, Osei, R, Pariente, W, Shapiro, J, Thuysbaert, B and Udry, C, 2015b. A multifaceted program causes lasting progress for the very poor: evidence from six countries. *Science*, 348(6236).
- Banerjee, A, Karlan, D and Zinman, J, 2015c. Six randomized evaluations of microcredit: introduction and further steps. *American Economic Journal: Applied Economics*, 7(1), pp.1–21.
- Becker, GS, 1981. *A treatise on the family*. Cambridge: Harvard University Press.
- Blundell, R, Chiappori, P-A and Meghir, C, 2005. Collective labor supply with children. *Journal of Political Economy*, 113, pp.1277–306.

- Blundell, R and Walker, I, 1986. A life-cycle consistent empirical model of family labour supply using cross-section data. *Review of Economic Studies*, LIII, pp.539–58.
- Bourguignon, F, Browning, M and Chiappori, P-A, 2009. Efficient intra-household allocations and distribution factors: implications and identification. *The Review of Economic Studies*, 76(2), pp.503–28.
- Bourguignon, F, Browning, M, Chiappori, P-A and Lechene, V, 1993. Intra-household allocation of consumption: a model with some evidence from French data. *Annales d'Economie et de Statistique*, 29, pp.138–56.
- Brody, C, de Hoop, T, Vojtkova, M, Warnock, R, Dunbar, M, Murthy, P and Dworkin, SL, 2017. Can self-help group programs improve women's empowerment? A systematic review. *Journal of Development Effectiveness*, 9(1), pp.15–40.
- Browning, M, 2000. The saving behaviour of a two-person household. *The Scandinavian Journal of Economics*, 102(2), pp.235–51.
- Browning, M., Bourguignon, F., Chiappori, P-A and Lechene, V, 1994. Incomes and outcomes: a structural model of intrahousehold allocation. *Journal of Political Economy*, 102(6), pp.1067–96.
- Browning, M and Chiappori, P-A, 2006. Efficient intra-household allocations: a general characterization and empirical tests. *Econometrica*, 66, pp.1241–78.
- Browning, M., Chiappori, P-A and Lechene, V, 2010. Distributional effects in household models: separate spheres and income pooling. *Economic Journal*, 120(545), pp.786–99.
- Cattaneo, MD, Keele, L, Titiunik, R and Vazquez-Bare, G, 2016. Interpreting regression discontinuity designs with multiple cutoffs. *The Journal of Politics*, 78(4), pp.1229–48.
- Chiappori, P-A and Mazzocco, M, 2017. Static and Intertemporal Household Decisions. *Journal of Economic Literature*, 55(3), pp.985–1045.
- Duflo, E, 2003. Grandmothers and granddaughters: old-age pensions and intrahousehold allocation in South Africa. *The World Bank Economic Review*, 17(1), pp.1–25.
- Duflo, E, 2001. Schooling and labor market consequences of school construction in Indonesia: evidence from an unusual policy experiment. *American Economic Review*, 91(4), pp.795–813.
- Egger, D, Haushofer, J, Miguel, E, Niehaus, P and Walker, M, 2019. General equilibrium effects of cash transfers: experimental evidence from Kenya. Manuscript. Government of India Ministry of Rural Development, 2017. Deendayal Antyodaya Yojana National Rural Livelihoods Mission. Part 1: master circular. Guidance for mission implementation.
- Granovetter, M, 1983. The strength of weak ties: a network theory revisited. *Sociological Theory*, 1, pp.201–33.
- Haushofer, J. and Shapiro, J, 2016. The short-term impact of unconditional cash transfers to the poor: experimental evidence from Kenya. *The Quarterly Journal of Economics*, 131(4), pp.1973–2042.

- Jacoby, HG, 2002. Is there an intrahousehold 'flypaper effect'? Evidence from a school feeding programme. *The Economic Journal*, 112(476), pp.196–221.
- Jayachandran, S, Guarnieri, E, Diaz-Martin, L and Gopalan, A, 2020. Greater than the sum of the parts? Evidence on mechanisms operating in women's groups. J-PAL: Manuscript.
- Jejeebhoy, SJ, Santhya, K, Acharya, R, Francis Xavier, AJ, Pandey, N, Kumar Singh, S, Saxena, K, Basu, S and Gogoi, A, 2017. *Empowering women and addressing violence against them through self-help groups (SHGs)*. New Delhi.
- Joshi, S, Palaniswamy, N and Rao, V, 2015. How do self-help groups empower women and reduce poverty—and by how much do they do so? Evidence from Odisha. Available at: <<http://pubdocs.worldbank.org/en/462521477331602676/ResearchPaper6-Orissa-Core-RDD.pdf>>.
- Karlan, D, Thuysbaert, B and Gray, B, 2017. Credit with health education in Benin: A cluster randomized trial examining impacts on knowledge and behavior. *American Journal of Tropical Medicine and Hygiene*, 96(2), pp.501–10.
- Kochar, A, Barooah, B, Gupta, R, Jain, C, Singh, G, Closepet, N, Narayanan, R, Sarkar, R and Shah, R, 2020. Impact evaluation of the National Rural Livelihoods Program. New Delhi: International Initiative for Impact Evaluation (3ie).
- Kocherlakota, NR, 1996. Implications of efficient risk sharing without commitment. *Review of Economic Studies*, 63, pp.595–609.
- Ligon, E, 2002. *Dynamic bargaining in households (with an application to Bangladesh)*. Giannini Foundation Working Paper.
- Ligon, E, Thomas, JP and Worrall, T, 2002. Informal insurance arrangements with limited commitment: theory and evidence from village economies. *Review of Economic Studies*, 69, pp.209–44.
- Lise, J and Yamada, K, 2019. Household sharing and commitment: evidence from panel data on individual expenditures and time use. *The Review of Economic Studies*, 86(5), pp.2184–219.
- Lundberg, SJ and Pollak, RA, 1993. Separate spheres bargaining and the marriage market. *Journal of Political Economy*, 101(6), pp.988–1010 (December).
- Marcet, A and Marimon, R, 2019. Recursive contracts. *Econometrica*, 87(5), pp.1589–1631.
- Mazzocco, M, 2007. Household intertemporal behaviour: a collective characterization and a test of commitment. *Review of Economic Studies*, 74, pp.857–95.
- MaCurdy, TE, 1983. A simple scheme for estimating an intertemporal model of labor supply and consumption in the presence of taxes and uncertainty. *International Economic Review*, 24(2), pp.265–89.

MaCurdy, TE, 1981. An empirical model of labor supply in a life-cycle setting. *Journal of Political Economy*, 89(6), pp.1059–85.

Olsen, M, 1982. *The rise and decline of nations*. New Haven: Yale University Press.

Piketty, T, 2000. Theories of persistent inequality and intergenerational mobility. In: AB Atkinson and F Bourguignon, eds. *Handbook of income distribution*. Vol. 1, pp.429–76. Elsevier.

Rosenbaum, PR, 2005. Observational study. In: BS Everitt and DC Howell, eds. *Encyclopedia of statistics in behavioral science*. Vol. 3, pp.1451–62. Chichester: John Wiley & Sons, Ltd.

Tarozzi, A, Desai, J and Johnson, K, 2015. The impacts of microcredit: evidence from Ethiopia. *American Economic Journal: Applied Economics*, 7(1), pp.54–89.

Thomas, D, 1990. Intra-household resource allocation: an inferential approach. *The Journal of Human Resources*, XXV(4), pp.635–64.

Voena, A, 2015. Yours, mine and ours: do divorce laws affect the intertemporal behaviour of married couples? *American Economic Review*, 105(8), pp.2295–332.

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