The Return on Investment of Self-Help Groups in India: Evidence from the JEEViKA Program in Bihar

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Abstract

This paper estimates the costs and Return on Investment of JEEViKA – a government-implemented rural livelihoods program that works with women's self-help groups (SHGs) to promote financial inclusion, collective action, and livelihoods for rural women in Bihar, India. We estimate program costs using annual audit reports and combine the estimated costs with data from a randomized controlled trial that examined impacts on high-cost informal loans and consumption at two points – two years post, and seven years post program start. We further simulate long-term program impacts to estimate a range of ROIs based on different assumptions about costs and impact trajectories, because the original control sample had been exposed to the program by the seventh year. We find that 1 INR invested in the program increased consumption by 0.75 INR under the most conservative assumption, and by 4.9 INR under the least conservative assumption. Our estimation also indicates that the most conservative assumption can be reasonably ruled out because it does not align with the observed outcomes. In other words, we can reasonably but cautiously conclude that the program had a positive ROI after seven years.

Section 1. Introduction

Women's groups with economic objectives, such as self-help groups (SHGs) in South Asia or savings groups in sub-Saharan Africa, are an increasingly popular strategy to promote women's livelihoods and empowerment and improve women's long-term economic outcomes in low- and middle-income countries (LMICs). These groups aim to enhance women's economic outcomes by first promoting financial inclusion through group savings and access to formal credit, followed by linking group members to income-generating and livelihoods activities with a goal to achieve women's economic empowerment. While overall evidence remains mixed, various studies have shown positive effects of SHGs and savings groups on women's economic outcomes and empowerment (e.g., Brody et al., 2017; Diaz-Martin et al., 2022). Given the growing policy interest in expanding SHGs and savings groups in South-Asia and Africa (e.g., Ministry of Rural Development, 2011; World Bank, 2018), it is critical to learn more about the costs, cost-effectiveness, and return on investment (ROI) of these group-based programs in addition to their impacts.

Several studies have examined the costs and cost-effectiveness of women's groups implementing health interventions (Tan-Torres Edejer et al., 2003; Tripathy et al. 2010, Manham-Jefferies et al., 2013; Prost et al., 2013, Roy et al. 2013, Colbourn et al., 2015; Sinha et al., 2017, Subramanyam et al. 2017, Nair et al. 2017, Chadrasekhar et al. 2019); yet only very few studies have examined the cost-effectiveness of SHGs and savings groups. The few studies that looked into the costs and cost-effectiveness of SHGs and savings groups either showed aggregate costs without differentiating between cost categories (Deininger & Liu, 2015; Karlan, et al., 2017), or presented cost-effectiveness ratios for a small number of outcomes (Grantham-McGregor et al., 2020; Siwach, Paul, & de Hoop, 2022). A recent study examined how the costs of SHGs changed over time after the scale-up of the JEEViKA program (Siwach et al., 2022), but other studies examining the costs and cost-effectiveness of women's economic groups only used impact estimates at one point in time. The theory of change of SHGs and savings groups indicates that effects may differ depending on the intervention period, however, with larger impacts on credit and savings in the short term, and potential longer-term impacts on consumption and women's income and economic empowerment that do not appear in the short term.

This study contributes to the literature on the cost-effectiveness of SHGs by presenting an analysis of the ROI of the JEEViKA program in Bihar using information on costs and impacts at different points in time. In 2007, the Government of Bihar (with support from the World Bank) launched the Bihar Rural Livelihoods Project (BRLP) or JEEViKA as a community-driven development project in six priority districts to mobilise poor households into SHGs. Siwach et al. (2022) show that since the launch, the program costs declined from $34 per program participant when the program covered approximately 60,000 members to $3 per program participant when it reached over 11 million members after expanding services and scaling up to cover the entire state of Bihar. This study combines these cost data with estimates of program impacts after 2 years based on a randomized controlled trial (RCT) by Hoffmann et al. (2018; 2021) and after 7 years based on an update of the same RCT by Kochar (2020).

Estimating the cost-effectiveness and ROI of group-based programs is particularly important because group-based programs can deliver livelihoods and health interventions at a lower cost per member than programs targeting individuals. Diaz-Martin et al. (2022) hypothesized that by providing resources, services, information, and training to many women at once, group-based programs could operate at a lower cost per member than programs targeting individuals. Grantham-McGregor et al. (2020) provide empirical evidence for this claim by showing that training SHG members in a group setting leads to similar improvements in early childhood outcomes as training SHG members individually, but at a lower cost (Grantham-McGregor et al., 2020).

Cost savings may increase further after the scale-up of group-based programs as shown in an analysis demonstrating large decreases in costs per group member because of economies of scale after the scale-up of the JEEViKA program (Siwach et al., 2022). Although SHG programs such as JEEViKA and other group-based programs may benefit from economies of scale, implementation challenges may limit their impacts, cost-effectiveness, and ROI. While costs per group member of the JEEViKA program decreased considerably following the scale-up, cost-effectiveness ratios for reductions in high-cost debt were approximately the same during the pilot and after the program scale-up because implementation challenges limited the impact of the program (Hoffmann et al., 2021; Majumdar, Rao, and Sanyal, 2017; Siwach et al., 2022). In addition, the program only showed positive average effects on women's intra-household decision-making power during the pilot phase and not after the scale-up of the program (Datta, 2015; Hoffmann et al., 2021).[1] Implementation challenges may thus limit the cost-effectiveness of SHGs operating at scale.

SHGs may also show different impacts at different points in time. For example, SHGs may show larger impacts on financial inclusion (e.g., credit and savings) in the short term, and generate impacts on consumption and women's empowerment in the longer term.[2] These longer-term impacts may only happen after SHG members have had the chance to invest some of their short-term savings in income-generating activities. A comprehensive cost-effectiveness analysis of SHG programming at scale thus requires the use of impact evaluations at different points in time to capture both short-term and longer-term impact estimates of SHG programs.

This paper analyzes the cost-effectiveness and ROI of the JEEViKA program using information about program costs and benefits from studies that evaluated the impact of JEEVIKA at two different stages. First, Hoffman et al. (2018; 2021) evaluated the program in the early stages of the scale-up, comparing households exposed to the program from 2012 to 2014 with households with no program exposure. Second, Kochar et al. (2020) updated the evaluation in 2018 by looking at longer-term outcomes using the same sample as in Hoffman et al. (2018; 2021). To examine the program's cost-effectiveness and ROI, we combined the impact

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[1] We should exercise some caution in comparing results from the pilot evaluation, which employed a propensity score matching design (Datta, 2015) and the evaluation of the scaled-up program which employed a more rigorous RCT (Hoffman et al., 2021).
[2] Impacts on women's empowerment will plausibly only increase over time in the absence of significant implementation challenges. Findings from impact and process evaluations of JEEViKA suggest that the impacts of the program on women's empowerment and economic outcomes reduced after expansion in the pace and scale of implementation because of a lighter program touch, however (Hoffman et al., 2018; Majumdar et al., 2017).

estimates on consumption and access to formal and informal credit from these studies with cost data from the audit/annual report of JEEViKA used by Siwach et al. (2022).

In addition, we simulate different counterfactual scenarios to account for some of the challenges in estimating longer-term impacts since the original control sample selected by Hoffmann et al. (2018; 2021) had been exposed to the JEEViKA program at the time of the follow-up evaluation by Kochar et al. (2020). Therefore, the follow-up study of Kochar et al. (2020) compared outcomes of households that had a longer exposure to the program, from 2012 to 2018, against households with a shorter duration of exposure, from 2014 to 2018. In other words, the study used a counterfactual of households with some exposure to the program, which may have led to an underestimate of the program impacts. To account for this limitation, we applied a theory of change to simulate different counterfactuals for the outcomes of the comparison group when they would not have been exposed to the program. We combine estimates of the benefits from increased consumption and interest savings with program costs, to present a range of benefit-costs ratio of JEEViKA.

For the most part, our results suggest a positive ROI, though with considerable variation in the estimated benefit-cost ratios and varying degrees of statistical confidence depending on the assumptions. The most conservative estimate on economic benefits suggests a return of 75% after seven years of program exposure, while the return is as high as 490% under the least conservative assumption. We find that exposure to JEEViKA program for seven years generates positive economic benefits due to reduced cost of borrowing and increased consumption (though not statistically significant) against a comparison group of no program exposure. While economic benefits from reduced costs of borrowing are realized within the first two years of the program, impacts on consumption take longer to show up. Specifically, the impacts on consumption are realized after 4 to 7 years of program exposure, indicating that longer duration of SHG participation is more likely to benefit participants in terms of their overall livelihoods. Therefore, evaluations with short follow-ups likely do not fully capture the impacts of SHGs, limiting the ability of these studies to provide a comprehensive overview of the costs and benefits of SHG programming.

We finalize the paper with some additional analyses to place the study within the wider literature on the costs, cost-effectiveness, and ROI of social protection programs. First, we triangulate the results with findings from impact evaluations and costing analyses of additional health and nutrition interventions that were delivered to JEEViKA SHG members. Second, we present analyses comparing the cost-effectiveness and ROI of SHGs with cash transfer programs and graduation approaches alongside some reflections on the strengths and limitations of these comparative cost-effectiveness analyses.

The rest of the paper is organized as follows. We first present the conceptual framework, followed by a discussion of the data and methods. Then we present the results related to the impact, costs, cost-effectiveness, and ROI of the program. We finalize the paper with a conclusion summarizing the cost-effectiveness and ROI of the JEEViKA program, and its implications for policy and practice.

Section 2. Conceptual Framework

To generate hypotheses on JEEViKA's impacts and cost-effectiveness, it is critical to understand the program implementation processes and the evolution of SHG activities over time. Started in 2006 with funding from the World Bank and Government of Bihar, JEEViKA – the Bihar Rural Livelihoods Promotion Society – was set up with the goal of mobilizing rural women into SHGs to enhance their access to credit and livelihoods initiatives. A typical SHG under JEEViKA includes 10 to 15 women. In the initial months after SHG formation, group members meet regularly (usually weekly) and engage in regular savings and intragroup lending. The SHGs are then gradually linked to the formal banking system through SHG bank accounts that are facilitated by community mobilizers. In addition to the formal banking system, SHGs may receive revolving funds from JEEViKA for meeting members' credit needs. Therefore, we hypothesize a direct and immediate impact of SHG membership on access to formal credit (see Figure 1). Indeed, evaluations of JEEViKA showed that program exposure increased households' access to credit from SHGs and other formal sources and decreased the dependency of SHG members and their households on high-cost informal loans (Hoffmann et al., 2021; Kochar et al., 2020). As a result, JEEViKA members can access credit at considerably lower interest rates, leading to higher interest savings (Siwach et al., 2022).

A unique feature of JEEViKA and India's National Rural Livelihoods Mission (NRLM) implemented nationwide is the focus on building and strengthening women's community institutions, which it achieves by building SHG federations. SHGs under JEEViKA are federated at the village level into Village Organizations (VOs) and VOs are further federated at the block level into cluster-level federations (CLFs). These higher-level federations oversee a larger area to implement and operate various livelihoods, social, or health interventions. After federating into VOs and CLFs, SHGs may also receive Community Investment Funds (CIF), based on plans for setting up individual or collective farm or non-farm enterprises or to address other vulnerabilities such as health and food security risks. While VOs are typically formed after 24 months of SHG formation, empirical findings by Kochar et al. (2020) indicate that the average time to formation of federation and to receipt of CIFs by SHGs in Bihar was about 3 years. Therefore, over time, as federations are strengthened and as they provide members with access to improved livelihoods options, JEEViKA may improve women's participation in income generating activities, and eventually household income and consumption. Increases in economic participation combined with strong community institutions could in turn lead to downstream impacts on women's economic empowerment.

For our cost-effectiveness analysis, we considered two mechanisms that could lead to improvements in women's economic outcomes. The first mechanism suggests that SHGs can lead to increased bank linkages and access to formal credit. As a result, the program could result in reductions in dependence on high-cost informal loans as well as informal interest rates, and lead to "interest savings" arising from lower interest payments. The second mechanism indicates that SHGs can lead to impacts on consumption after the disbursement of community investment funds and setting up of federations, which usually happens after the third year of program implementation. We summarize these mechanisms and the hypothesized impacts in a theory of change depicted in Figure 1.

We do not consider mechanisms leading to positive impacts on women's intra-household decision-making power and other women's economic empowerment indicators in this paper. Both Hoffmann et al. (2021) and Kochar et al. (2020) do not find positive effects on women's intra-household decision-making power most likely because of implementation challenges after the program scale-up (Hoffmann et al., 2018; Majumdar et al., 2017; Siwach et al., 2022). Kochar et al. (2022) suggest that SHG programs may show positive effects on women's intra-household decision-making power after SHG members gain access to larger loans through CIFs, however. We do not analyze this mechanism because it only applies to a sub-sample of our study and neither Hoffmann et al. (2021) nor Kochar et al. (2020) show positive average impacts on women's intra-household decision-making power.

Figure 1. Theory of Change
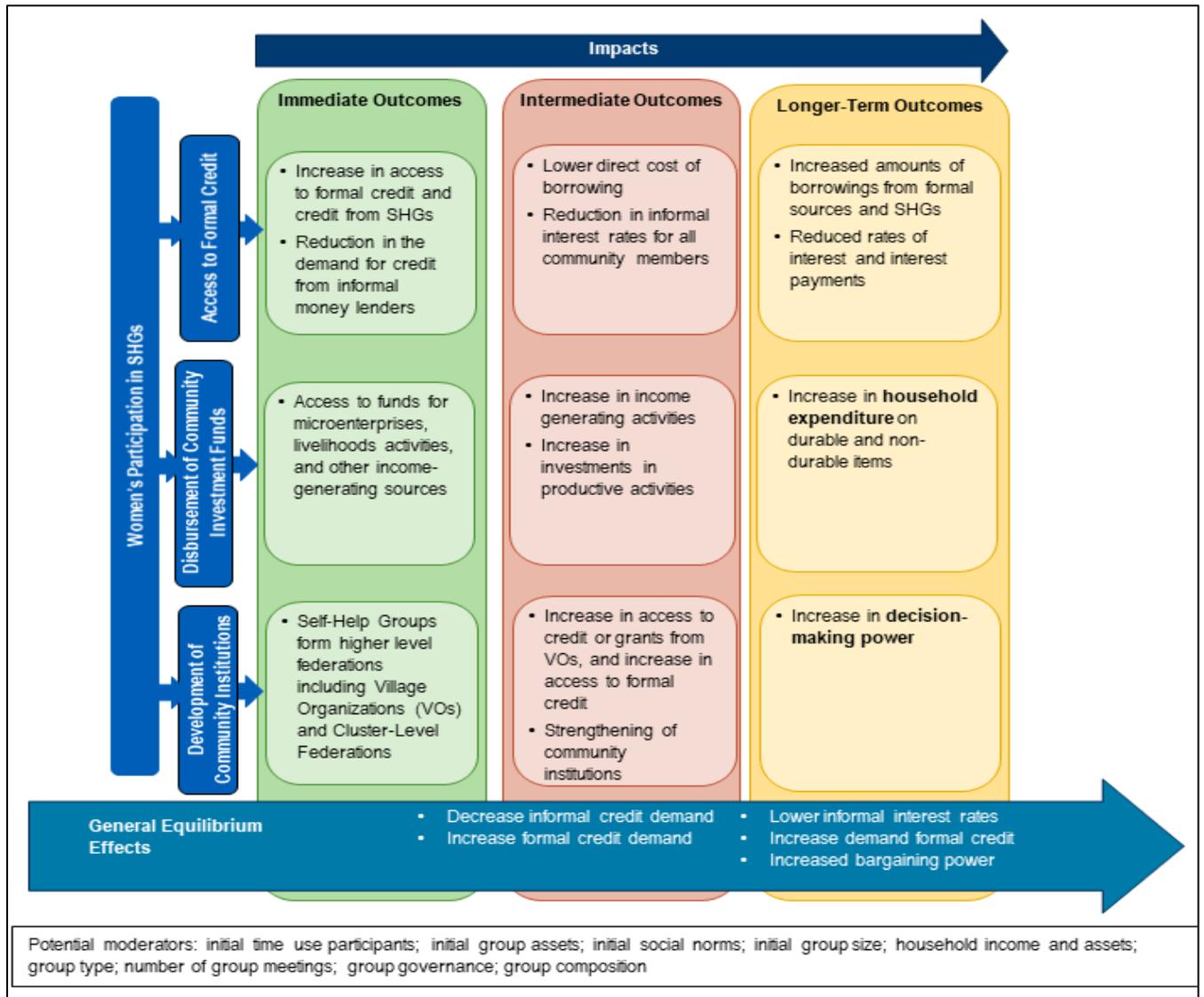
Section 3. Data & Methods

3.1. Data

We used data from three sources. To assess program impacts, we used data from two existing impact evaluations. The first study, by Hoffman et al. (2018; 2021), estimated the impact of JEEViKA after 2.5 years of program participation. In 2020, Kochar et al. (2020), conducted a follow-up study on the same sample to estimate longer-term effects after seven years of program implementation. The first study collected household data from 180 Gram Panchayats of sixteen blocks in seven districts – Gaya, Nalanda, Madhubani, Muzzaffarpore, Sharsa, Supaul and Madhepura. We accessed survey data posted on Harvard Dataverse from this evaluation (Datta & Rao, 2018a; 2018b), and directly accessed data from Kochar et al. (2020) for the second evaluation, which gathered data from 137 out of the 180 original Gram Panchayats. The first dataset included 8,988 households, 50% of whom belonged to treatment areas. The second evaluation successfully followed up with 5,825 households (again, with 50% from treatment areas), and was able to maintain balance in observable characteristics at baseline. The sample for the second evaluation is representative of the larger sample of the first evaluation (Kochar et al., 2020).

For the costing analysis, we collected annual cost data from JEEViKA annual reports and audit statements from 2011 through 2019. Cost data include four broad components of program expenditures – Community Institution Development (CID), CIF, Special Technical Assistance Fund (STAF) and Project Management (PM). The CID component supports building community institutions, including SHGs and higher-level federations. The CIF component supports financial and technical resources to SHGs and federations on a demand-driven basis through a participatory microplanning process. The fund supports direct grants to the community through the Revolving Funds (RFs) and Vulnerability Reduction Funds (VRFs) to support livelihoods activities and other non-financial components like health and nutrition security. The STAF include costs of technical assistance to the formal financial sector and public, cooperative, community and private services providers. PM costs include other operating expenses related to overall project management, operations, and implementation expenditures.[3] We treat all costs under the four buckets as operational or marginal costs and exclude costs of fixed assets from this analysis. The costs of fixed assets are less than 1% of total program costs over ten years, so they are very unlikely to alter the key findings significantly. Fixed costs will also continue to decrease in importance when the program continues to move to scale.

Finally, to estimate per capita costs, we collected information on the number of households mobilized into SHGs from JEEViKA annual reports. In 2011-12, JEEViKA took over the expansion of SHGs under the NRLM and received additional financing from the World Bank for the second phase of the BRLP. The pace of mobilization increased steadily post expansion after 2012-13; by 2019 over 11.4 million women had been mobilized into about half a million SHGs.

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[3] JEEViKA also implements other livelihoods and social protection programs in Bihar. For the purpose of this study, we only included costs and benefits of the three SHG-based programs (the Bihar Rural Livelihoods Project, National Rural Livelihoods Project, and National Rural Livelihoods Mission) and not the costs of other programs (e.g., the Bihar Kosi Flood Recovery Project).

3.2. Methodology

3.2.1. Measuring costs

We first estimated state-wide total annual costs of the program using data from JEEViKA annual audit reports. We then estimated an average cost per household, equivalent to an "Intent to Treat" cost for treatment and the control groups – that is, expenditure per SHG member with access to potential program services. Our cost estimation follows a program perspective, i.e., we include all accounting costs reflected in program expenditure paid for by JEEViKA. We do not include costs borne by households for the current exercise, which may be non-trivial if women spend considerable time on group meetings and bear real costs, such as transportation, etc. We exclude costs borne by households, however, to avoid double counting, which may happen if monetary costs paid by households are reflected in impacts on household expenditures. The cost estimation also excludes costs not directly paid for by the program, for example, volunteer hours or donated items.[4]

We defined the target population for the different cost components as the cumulative number of women mobilized into SHGs up to any given year following Siwach et al. (2022) and Kochar et al. (2020). We assume that every SHG member under JEEViKA is eligible for all services, irrespective of when they joined the program. We divided all expenditure components (CID, CIF, STAF, and PM) in each year among the cumulative number of women mobilized into SHGs up to that year.

As a sensitivity test to our primary estimates, we also estimated costs assuming that members who have been in the program for less than three years are not eligible for the CIFs because our main approach may underestimate the true average costs if not all SHG households are eligible for all program components. Activities covered under community investments are usually initiated after an initial period of savings, intra-group lending and bank linkage. These activities include income generation and livelihood improvements, fulfilling food security and health needs, skills development to increase employment and employability, and developing productive community-level infrastructure facilities (World Bank, 2018). CIFs are disbursed based on a microplanning process, and our data suggest that most SHGs (over 53%) received CIF funding in the third year after formation.

For each of the two analyses, we completed the following steps for estimating the average household cost of program participation for treatment and control households:

1. Using statewide annual costs each year and the outreach number based on the above assumptions, we estimated the annual per member cost of program participants each year.

2. We converted the annual per-member costs to 2018 INR by adjusting for Rupee Inflation. We used the Consumer Price Index approach for adjusting the cost estimates to 2018 INR values.

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[4] At the same time, we also do not include social benefits (e.g., new friends and solidarity among group members) that group members may gain from the SHG meetings.

3. For each year of membership, we estimated a per-member participation cost up to the latest year by aggregating annual costs across all membership years. Specifically, for households that became a program member in year *y,* we estimated the total membership cost at the time of the evaluation as the sum of annual costs from year *y* to the year 2018-19. That is, Equation (1) shows that the total per member cost of program participation up to the latest year is estimated as the total of average annual costs from the year of joining to the latest year.

$$Cost_{year\,joined} = \sum_{y=year\,joined}^{y=2019} AC_y \tag{1}$$

4. Finally, we aggregated costs across years of membership to estimate total costs of participation for an average treatment household and an average control household. We estimated the Present Discounted Value of all costs at the beginning of the project (2012) by discounting the future streams of costs at a rate of 10%, which is consistent with the discount rates used by Dhaliwal et al. (2012) and the median discount rate used by countries that use the concept of social opportunity costs in cost-effectiveness analyses.[5]

3.2.2. Measuring impacts

For our primary cost-benefit analysis, we used two outcomes signifying the economic benefits of the program. Specifically, following the conceptual framework described in Section 2, we estimated the impact on interest savings and household consumption from the study by Hoffmann et al. (2021), who estimated the effects of the program after 2.5 years of implementation, and the study by Kochar et al. (2020), who estimated the effects of the program after seven years of implementation.

For both studies we combined the extraction of impact estimates from the studies with our own analyses from publicly available data to determine the impact on interest savings. Hoffmann et al. (2021) found that JEEViKA lowered the average monthly interest rate on household loans by 0.95 percentage points. Using publicly available data posted by the program authors, we estimated the effects on total interest savings as the effects on the total annual interest payments by households. We estimated these interest savings based on the outstanding loan amount at baseline (prior to program implementation) and the interest rates reported by households at endline.[6] Kochar et al. (2020) did not measure impacts on average interest rates. For this reason, we extracted information about interest rates from the JEEViKA Management Information System (MIS). Combining data on average interest rates in treatment and control households from the MIS with data on baseline household loan amounts from Kochar et al. (2020), we estimated program effects on annual interest amounts for the 7-year evaluation.

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[5] The social opportunity cost of capital measures the total amount of other goods, which would be foregone when using resources for the activity on hand. Social opportunity costs therefore take account of any externalities as well as direct costs to the producer or the government.
[6] We used outstanding loan amount at baseline instead of endline because endline loan amounts may have been impacted by the program, and are therefore endogenous.

To estimate impacts on consumption, we directly borrowed the estimates from the two studies. While the early evaluation found no impact on consumption, the later evaluation found effects of sizeable magnitude even with 5.5 years of program exposure for the control group (though statistically insignificant, possibly because of limited statistical power).

The estimation of total benefit-cost ratios requires us to make assumptions about the impacts in the years between the study of Hoffmann et al. (2021) and Kochar et al. (2020) and the impact of seven years of implementation relative to a control group without exposure to the program. We used two strategies to estimate the trajectory of impacts on annual interest savings and consumption based on the theory of change.

First, to estimate impacts on annual interest savings, we considered the theory of change, which suggested that the program would have immediate effects on access to formal credit, limiting the dependency of SHG members on informal credit. Impact on annual interest savings were already evident after 2.5 years (Hoffman et al., 2021), which is consistent with the theory of change. Second, to estimate impacts on consumption, we needed to consider that any impact estimates on consumption after seven years from Kochar et al. (2020) underestimate the true program effects if control households had also benefited from increased consumption after five years of implementation.

The key challenge here is that we do not observe a counterfactual without any program implementation after seven years. Because we did not find effects on consumption after three years and sizeable (yet statistically insignificant) impacts after seven years, it is plausible that the program started achieving consumption effects somewhere after three years (after the early evaluation) and before seven years (the late evaluation). This assumption aligns with the theory of change which suggests that a focus on activities like livelihoods and promotion of income-generating sources usually begins after formation of higher-level federations and disbursement of CIFs, which happens after three years.

Based on these observations, we made the following assumptions to estimate the total ROI on JEEViKA for seven years of exposure, compared to no exposure:

1. Impacts on interest savings emerge in year two, as shown in Hoffmann et al. (2021), and the annual effects continue with the same effect size every year up to year 7. While these effects may decrease in later years (because of increases in formal interest rates), we assume that similar market forces would lead to an increase in informal interest rates. Hence, we assume the same annual effects on interest savings in all subsequent years between year 2 and year 7, as the effects observed in year 2.

2. We assume that consumption effects start somewhere after year 3 (when the evaluation found no impacts) and year 7 (when the evaluation observed a sizeable impact). We assume a range of periods ranging from least to most conservative. Specifically, we assume that effects start showing up in year 4 (so total effects are realized for four years from year 4 to year 7); in year 5 (total effects realized for three years from year 5 to year 7); in year 6 (total effects realized for two years from year 6 to year 7); and in year 7 (total effects realized only in year 7). These estimates cover all possible scenarios for the timeline on consumption effects.

To estimate the consumption effects against no treatment, we impute the counterfactual endline consumption value for the control group assuming that the change in control group's consumption between baseline and midline is equivalent to the change in control group's consumption between midline and endline in the absence of the intervention. The estimated impact for seven years of JEEVIKA would then be as follows:

$$Impact = T - \left(M + \left(\left(\frac{M - B}{2.5} \right) \times 5 \right) \right)$$

Here T is the endline annual consumption for the treatment group, M is the midline annual consumption for the control group, and B is the baseline annual consumption for the control group. The time between midline and baseline was approximately 2.5 years, while the time between midline and end line was approximately five years.

We also estimate impacts using a scenario where we account for differences in growth rates between baseline and midline (2012 to 2014), and midline and endline (2014 to 2018). Using data on the state GDP of Bihar, we found that the annual increase in state GDP between 2014 and 2018 was 1.22 times the annual increase between 2012 and 2014. We use the 1.22 factor to impute a more conservative impact estimate.

3.2.3. Estimating returns on investment using benefit to cost ratios

We estimated the program's Return on Investment as the ratio of benefits to costs:

$$ROI = \frac{\Delta \; in \; economic \; outcomes \; between \; treatment \; and \; control \; household}{\Delta \; in \; cost \; of \; services \; between \; treatment \; and \; control \; household}$$

We first estimated the ROI based on impact estimates by Hoffman et al. (2021), showing the cost-effectiveness of the program after 2.5 years of program implementation. For this measure, the treatment group refers to households that received the program for 2.5 years, and the control group refers to households that did not receive the program. We then estimated the ROI based on impact estimates of Kochar et al. (2020), showing the cost-effectiveness of an additional one year and seven months of program implementation, where the treatment households received the program for an average of 7 years and the control households received the program for an average of five years and five months. These two measures come directly from the impact evaluations and do not require additional assumptions about impacts between the two impact evaluation rounds. However, these two impact estimates ultimately do not enable us to estimate the full benefit-cost ratio of the JEEViKA program, which is likely the benefit-cost ratio that is most meaningful for policymakers. Therefore, we also estimate the full benefit-cost ratio using impact estimates summarized above in Section 3.2.2, where the treatment group refers to households that received the program for seven years, and the control group refers to households that did not receive the program.

We report two separate benefit-cost ratios for each counterfactual type – (1) We estimate the ratio of total economic benefits to total costs; and (2) We estimate the ratio of interest savings to all non-CIF costs since the goal of the CIF is to provide a resource in perpetuity to finance SHGs based on a micro-planning process for community investments. Interest savings, on the

other hand, are a result of formal financial linkage, which is part of the Community Institution Development and expenditures under the Special Technical Assistance Fund. By excluding CIF costs when looking at the impact on interest savings, we can separate the proportions of a program's costs responsible for different impacts, namely impacts from interest savings. All benefits and costs were converted to 2018 INR using the Consumer Price Index. Table 1 summarizes the different approaches and assumptions used in the analysis.

Table 1. Assumptions & Approaches for full cost-benefit analysis

Costs	*Assumptions & Approaches for full cost-benefit analysis*
Average cost – primary analysis	Average costs = Sum of annual CID, CIF, STAF, and PM costs, divided by total number of program participants
Average cost – sensitivity analysis	Average costs = Sum of annual CIF, STAF, and PM costs, divided by total number of program participants; **plus,** CIF costs divided by participants who have been in the program for at least 3 years
Benefits	
Interest savings – primary analysis	Assumed to last for 1, 2, 3, 4, or 5 years. Estimated based on Hoffman et al. (2018).
Consumption benefits – primary analysis	Assumed to last for 1, 2, 3, 4, or 5 years. Within each assumed period, further assume two scenarios – Scenario 1 – rate of change in consumption between midline and endline for control group similar to the rate of change between baseline and midline; Scenario 2 – rate of change in consumption between midline and endline for control group similar to the rate of change in state GDP between midline and endline
BCR (Benefit-Cost Ratio)	
BCR for interest savings	Only non-CIF costs included because benefits started before CIF disbursement (within 2 years of program start)
BCR for consumption benefits	Costs include CIF

Section 4: Results

4.1. Cost estimates

We start by comparing average costs for treatment and comparison households for the two evaluation phases – (1) the early phase where the treatment group received the program for 2.5 years while the comparison group received no program; and (2) the late phase where the treatment group received the program for seven years and the comparison group received the program for five years and five months. Based on these estimates, we then calculate the net costs of the intervention for seven years compared to no intervention. We present these results in Table 2.

In the early phase, the cost per treatment household was INR 5,311 (USD 68), while the control households had zero costs because they had not yet been exposed to the program. In the late phase, treatment households were exposed to the program for almost seven years, and the cost per treatment household was INR 8,715 (USD 112). Control households were exposed to the

program for five years and five months, and the cost per control household was INR 4,938 (USD 64). In contrast, control households had zero costs in the complete model which assumes no program exposure for them.

Table 2. Cost per Household (2018 INR).

	(1) Early phase	(2) Late phase	(3) Complete model
Treatment exposure			
Start to end	2012-14	2012-18	2012-18
No. of years	2.5 years	7 years	7 years
Control exposure			
Start to end	None	2014 to 2018	None
No. of years	0 years	5 years	0 years
Net period of intervention	*2.5 years*	*1 year, 7 months*	*7 years*
Expenditure (INR)			
Treatment non-CIF expenditure per capita	1,502	2,712	2,712
Treatment CIF expenditure per capita	3,809	6,003	6,003
Total treatment expenditure per capita	5,311	8,715	8,715
Control non-CIF expenditure per capita	0	1,650	0
Control CIF expenditure per capita	0	3,288	0
Total control expenditure per capita	0	4,938	0
Net cost per capita (all costs) (INR)	*5,311*	*3,777*	*8,715*
Net cost per capita excluding CIF (INR)	*1,502*	*1,062*	*2,712*

4.2. Impact estimates

Using data from Hoffman et al. (2021), we first estimated impacts on household consumption expenditure and interest savings (Table 3), demonstrating that exposure to the program for the first 2.5 years did not have any significant impact on consumption. Treatment households had Rs. 645 (USD 8) lower annual expenditure than control households, on average. The estimate is neither statistically significant nor empirically meaningful (less than 1.5% lower consumption). Further, treatment households saved INR 1,742 (USD 22) on interest payments, owing to the lower rates of interest on outstanding loans. Column (1) in Table 3 shows these impact estimates.

Next, we used data from Kochar et al. (2020) to estimate impacts on household consumption expenditure and interest savings of seven years of program exposure against program exposure for five years and three months, showing that exposure to the program for the additional one year and seven months led to an average increase in annual household expenditure of INR 9,942 (USD 128) (p=0.136). While empirically meaningful, this estimate was not statistically significant at conventional levels of statistical significance, possibly because of limited statistical power. Nonetheless, we include it in our ROI estimations because the value is likely an underestimate and because it is recommended to include sizeable yet statistically

insignificant findings in cost-effectiveness and cost-benefit analyses (Johnston et al., 2003). In addition to the outcomes studied by Kochar et al. (2020), we estimate the per household benefits from lower interest payments on loans. These benefits amounted to INR. 876 (USD 11) (statistically significant at 5%) per annum. Column (2) of Table 3 shows these estimates.

Table 3. JEEViKA Impact Estimates: Early v/s. Late Phase 2

Impacts on	(1) Early phase	(2) Late phase
Net expenditure/consumption benefit per capita (INR)	-645.44	9,942.48
	(1,001.42)	(6,633.17)
Net interest savings per capita (INR)	1,741.49***	875.84***
	(183.84)	(200.47)
N	8,987	11,591

***$p<0.01$. All estimates are based on authors' calculations. For Early phase 2 estimates, the authors used data posted by Hoffman et al. (2018) on Harvard Dataverse. For Late phase 2 estimates, the authors partnered directly with the impact evaluation team at 3ie to access the data and estimate the impacts. Following the estimation models in the original papers, the early phase impact estimation uses an ANCOVA model controlling for baseline values, while the late phase evaluation follows a panel data structure.

The observed trend in the change in impacts on the two outcomes aligns with the theory of change presented in Section 2. By the time of the late evaluation phase, both treatment and control households realized lower costs of borrowing. The first evaluation showed that treatment households started borrowing at lower costs after 2.5 years of program exposure, suggesting that the impact on interest savings started to show up after the second year of treatment. Since the control households had been exposed to the program for 5.5 years by the endline, they likely also benefited from lower costs of borrowing, pushing the net difference down. This is consistent with JEEViKA's planned operations, where financial inclusion and credit linkage were the initial focus of the program.

4.3. Return on Investment

Benefit-Cost Ratio for First 2.5 Years of Program Participation

Combining the impact estimates in column (1) of Table 3 with cost estimates in column (1) of Table 2, we found that the program generated a positive return on investment in terms of increased interest savings. We considered five periods for the annual benefits, assuming that benefits last one, two, three, four, and five years.[7]

Our findings suggest that the program returns Rs. 1.16 (USD 0.015) for every 1 Rupee invested in the first year when considering interest savings against non-CIF costs. However, the program is not cost-effective when we would only consider consumption impacts in the first 2.5 years of program implementation. As shown in Table 3, participation in program for 2.5 years generated no increase in individual consumption. Hence the benefit-to-cost ratios were less than 1 (indeed they were negative), though very imprecisely estimated. Figure 2 depicts these estimates.

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[7] When adding benefits into the future, we estimate a present discounted value using a 10% discount rate consistent with recommendations by Dhaliwal et al. (2012).

Figure 2. Benefit-cost ratios – Based on early phase effects from Hoffman et al. (2018)
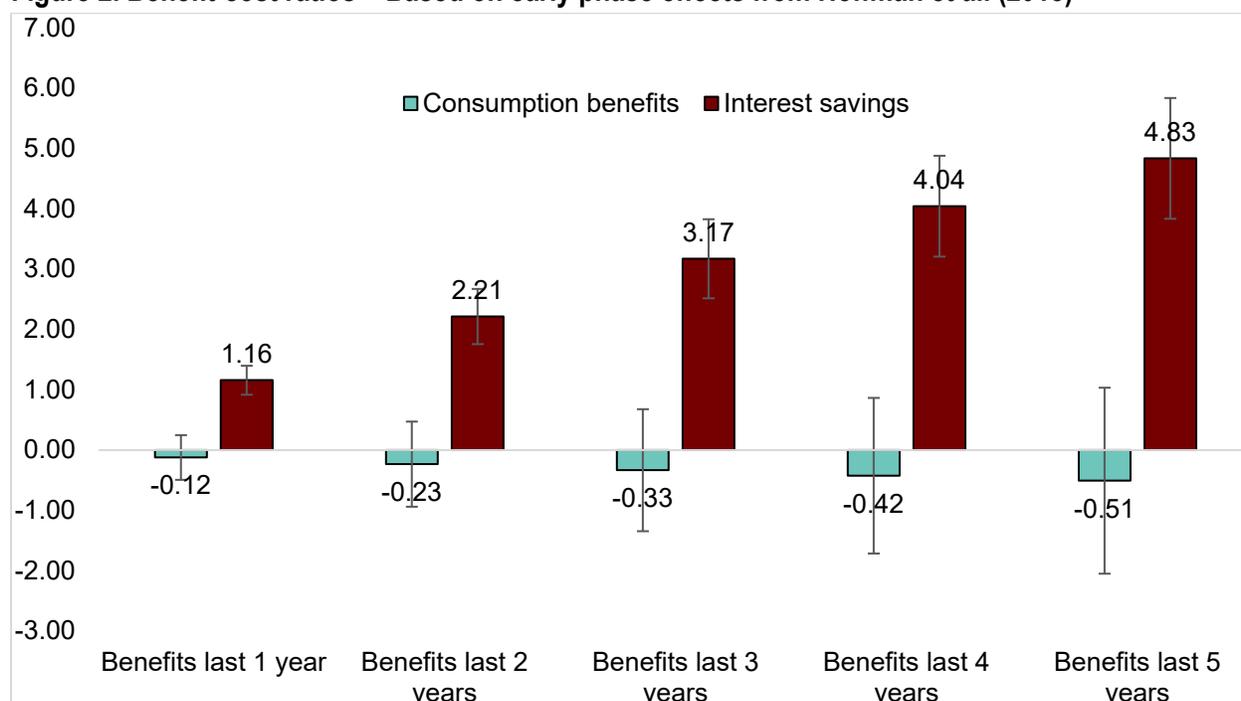

Benefit-Cost Ratio for Additional 1 Year and 7 Months of Program Participation after 7 Years

Figure 3 shows the benefit-cost ratios for an additional one year and seven months of program participation after 7 years, combining impact estimates from column (2) of Table 3 with cost estimates from column (1) of Table 2. When considering cost-effectiveness in terms of consumption expenditure and assuming that benefits last for one year, every Rupee invested in an average household under JEEViKA led to an additional benefit of Rs. 2.63 (USD 0.034). While the ratios are statistically insignificant as earlier, the benefits are more likely to be positive now, as shown by the 95% confidence interval ranging from -0.8 to +6.1. Assuming that program benefits last up to 5 years, every Rupee invested generates additional benefits of INR. 10.98 (USD 0.14). Again, the estimates are not statistically significant but imply a large economic significance with a positive ROI.

We continue to find that the program was generally cost-effective when aiming to increase interest savings, especially when we assume that benefits last longer than one year. Assuming that benefits last one year, the program leads to a return of INR 0.82 (USD 0.011) on every Rupee invested, but the program can break even if benefits last at least two years. If benefits last up to five years, the program returns INR 3.44 (USD 0.044) for every Rupee invested in financial inclusion, generating a statistically significant positive return. In general, we expect that benefits specifically accruing to lower interest rates will last beyond one year since JEEViKA supports the SHG-bank linkage, enabling its members to open a bank account and access credit at lower interest rates. Once members have a formal bank account, it is unlikely that they will return to informal credit, even if credit sourced from SHGs declines over time. The 7-year impact evaluation also points to a higher increase in access to credit from formal sources (like

banks, Microfinance Institutions, cooperative societies, and chit funds) than SHG loans and a clear decline in the share of informal loans.

Figure 3. Benefit-cost ratios – Based on later phase effects from Kochar et al. (2020)
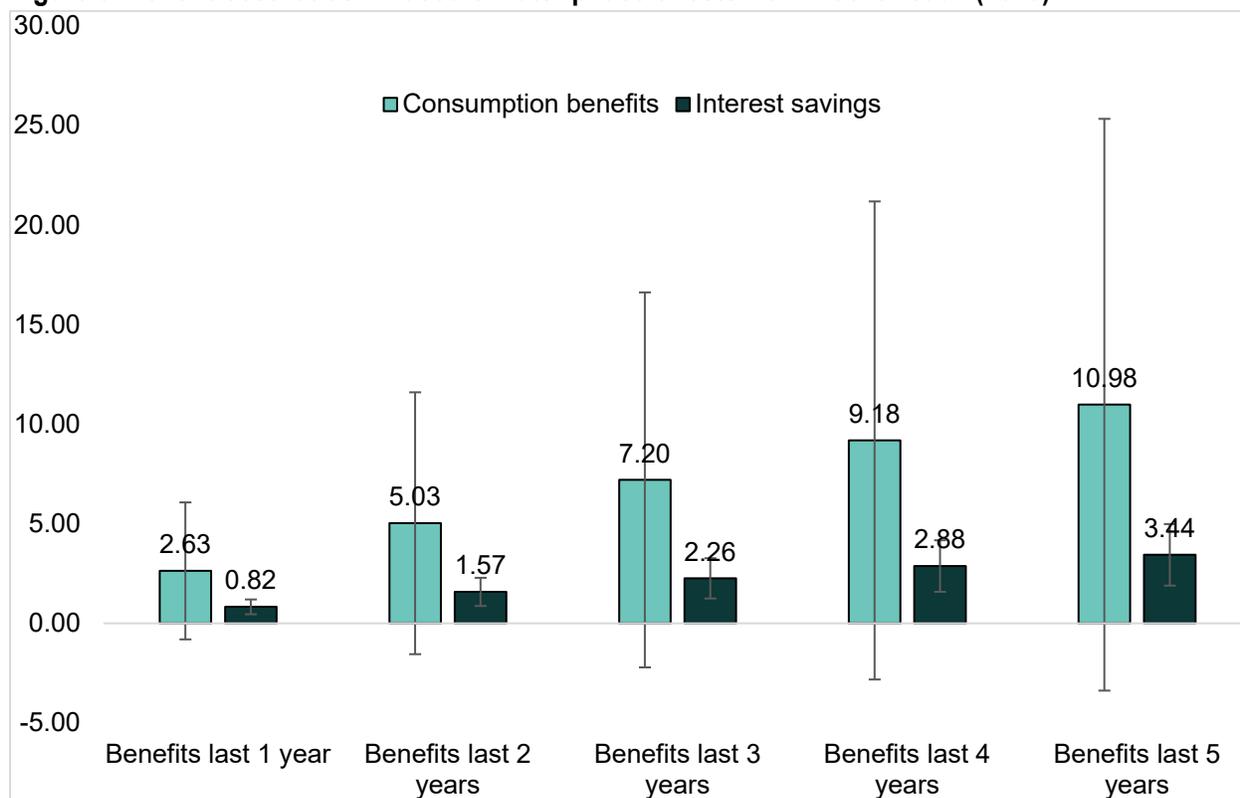
Cost-Effectiveness and Return on Investment Estimates for Consumption Benefits of the Program

We now turn to the cost-effectiveness and ROI of the program for full seven years of participation. We only show consumption effects for the full ROI for two reasons – (1) The benefit in terms of lower interest payment could translate to higher household expenditures, and therefore examining both outcomes could result in double counting; and (2) We already showed that the ROI on interest savings was greater than 1 with just 2.5 years of program participation, compared to no program participation (Figure 2). Comparing the impact estimates from the previous two evaluations suggests that the net benefit per household from a lower cost of credit is smaller, and the benefit from larger consumption expenditures is larger in the second evaluation compared to the first evaluation. As noted earlier, the key difference between the two phases of evaluation (early and late) is that the control group was also exposed to the program by the time of the second evaluation. Therefore, both treatment and control households experienced a lower cost of borrowing at the time of the second evaluation.

While the early evaluation found no impact on consumption, the later evaluation found sizeable point estimates indicating positive effects on consumption (though statistically insignificant). The point estimates may underestimate the true program effects if control households also benefited from increased consumption by the endline. As discussed in the Methods section, we therefore

estimated the total ROI on JEEViKA for seven years of exposure, compared to no exposure, assuming that the impact on interest savings shows up in year two and lasts for all five years after that.

For consumption effects, we assume four scenarios – ranging from least conservative (effects start showing up in year four and last for all four years after that) to most conservative (effects are realized only in year 7). Further, as discussed in the Methods section, we estimate two measures of impact based on the imputed values of the endline consumption for the control group – an upper bound (assuming annual growth between the Midline and the Endline is the same as annual growth between baseline and Midline), and a lower bound (assuming annual growth between the midline and the endline is 1.22 times the annual growth between baseline and Midline).

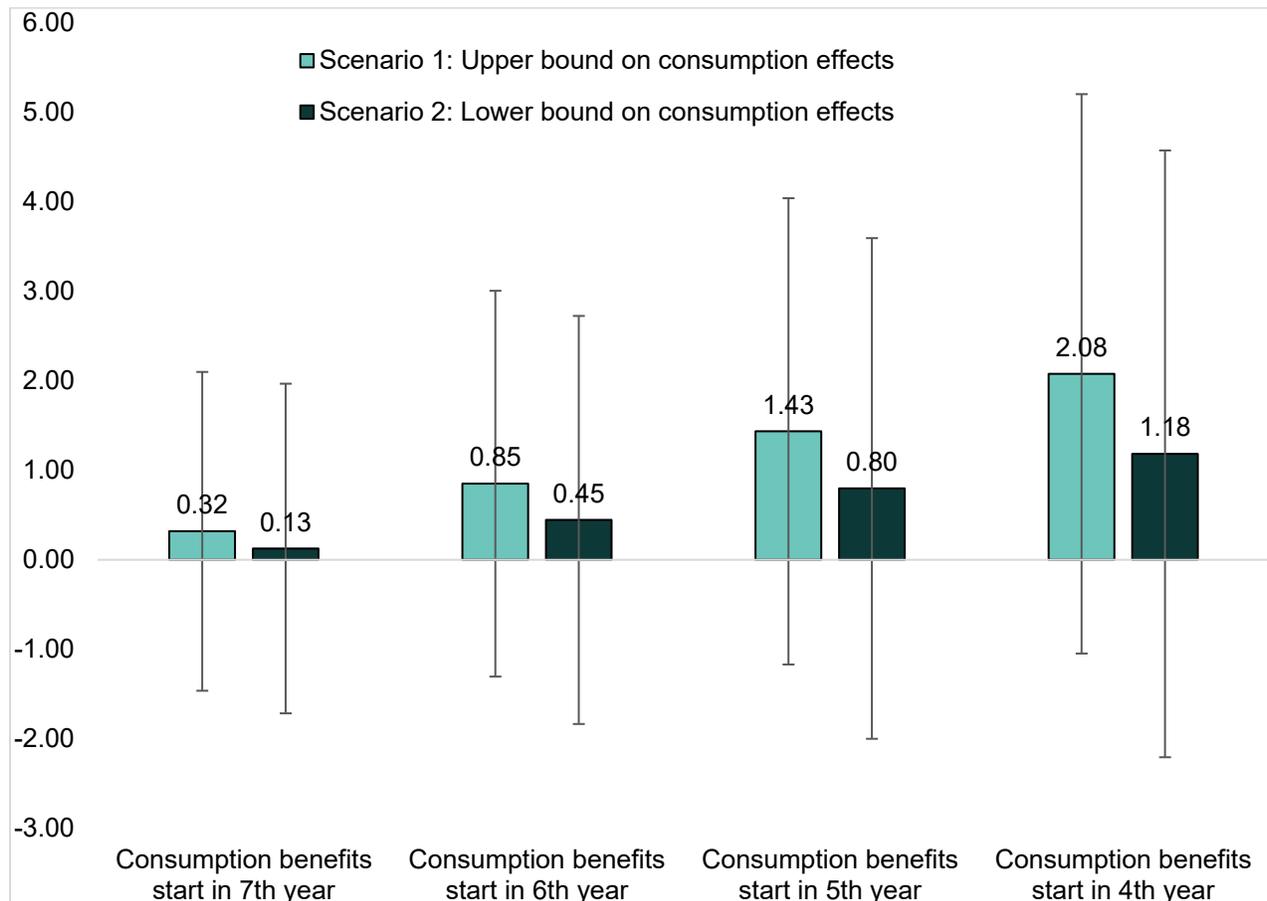**Figure 4. Program ROI for 7 years of exposure – Consumption expenditure / Costs**
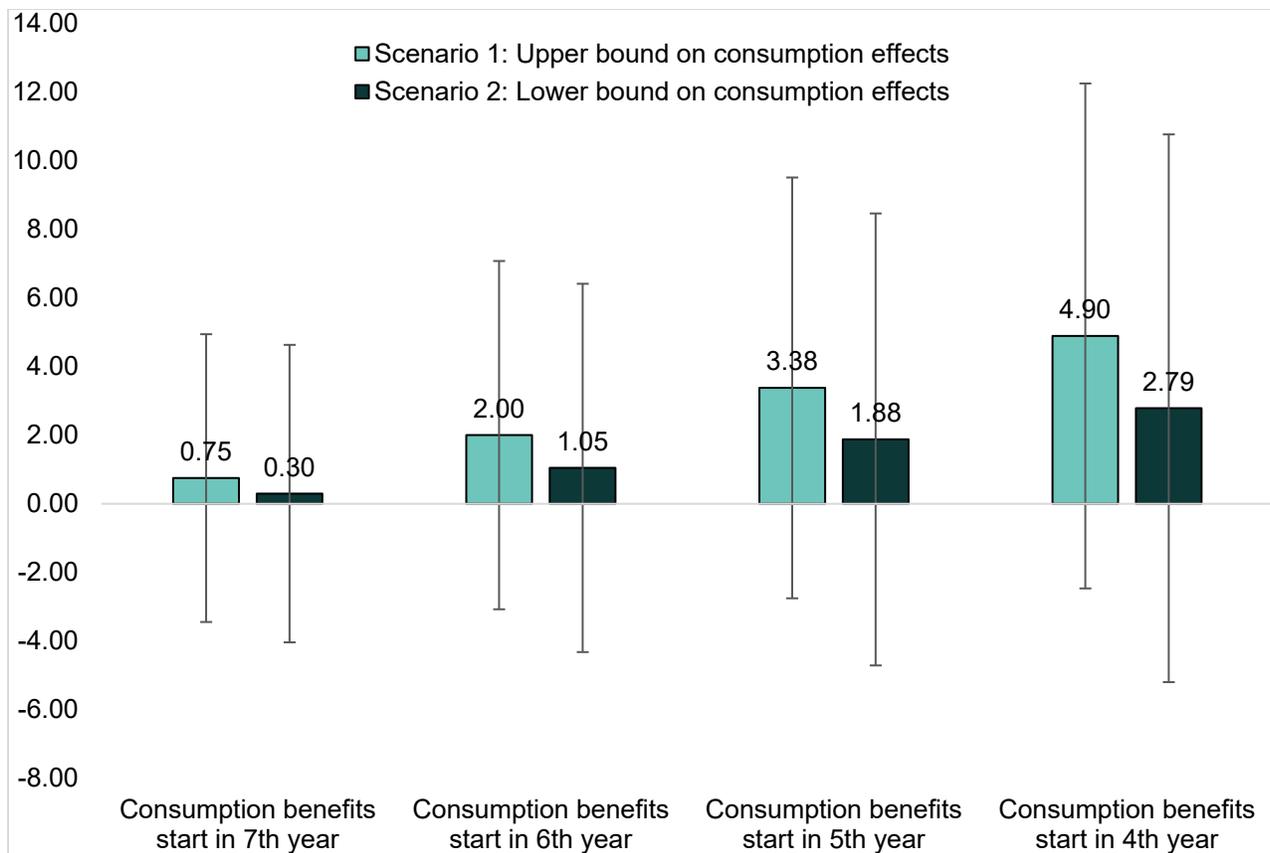
Under scenario 1, we estimate a counterfactual endline consumption value for the control group assuming that the unobserved annual growth in consumption between midline and endline is same as the annual growth in consumption between baseline and midline. Under scenario 2, we assume that the unobserved annual growth in consumption between midline and endline is 1.22 times the annual growth in consumption (based on growth trends of the state GDP) between baseline and midline. Per member costs are estimated based on cumulative exposure assumption.

Figure 4 shows that over seven years, every 1 Rupee invested in the program generates between INR 0.3 (USD 0.004) and INR 0.75 (USD 0.010) in consumption benefits under the most conservative assumption that consumption effects only show up in year 7. On the other

hand, assuming that consumption effects show up in year four and last up to year 7, the program has an ROI of INR 2.8 (USD 0.036) to INR 4.9 (USD 0.063). However, the 95% confidence intervals cover zero because the initial effects (at midline) were statistically insignificant, although the consumption effects after 7 years compared to no exposure to program were statistically significant at a 10% level of significance.

We also show the sensitivity of these estimates using a more conservative approach of estimating program costs, where CIF costs per member are estimated by dividing overall CIF expenditure by the number of members who were exposed to the program for at least three years. Figure 5 presents the findings. Although costs increase significantly in this scenario, the ROI becomes positive (greater than 1) if we assume that consumption effects were achieved before the 6th year of participation. We believe this scenario is credible, because we observed increased consumption for the control group at endline, when the control group was exposed to the program for 5.5 years.

Figure 5. Sensitivity Tests – Overall program ROI for 7 years of exposure – Consumption expenditure / Costs; with more conservative cost assumptions.

Under scenario 1, we estimate a counterfactual endline consumption value for the control group assuming that the unobserved annual growth in consumption between midline and endline is same as the annual growth in consumption between baseline and midline. Under scenario 2, we assume that the unobserved annual growth in consumption between midline and endline is 1.22 times the annual growth in consumption (based on the growth

trends of the state GDP) between baseline and midline. Per member costs are estimated assuming that households become eligible for receiving CIF only in and after year 3.

Overall, the results indicate that the program's focus on financial inclusion can generate a positive ROI in a relatively short period of time. Activities promoting livelihoods, however, take longer to create a discernible positive impact. Livelihoods activities also have higher costs than the initial bank-linkage component and thus take longer to break even.

4.4. Costs and returns of additional components

Other studies show evidence of additional impacts of different JEEViKA components, that are not directly measured in the studies by Hoffmann et al. (2021) and Kochar et al. (2020). For example, studies show additional benefits in terms of access to social protection schemes like the Mahatma Gandhi National Rural Employment Guarantee Scheme (De Hoop et al., 2021) and positive impacts of secondary layers, or more specifically health and nutrition interventions targeted to JEEViKA members. The Parivartan program in Bihar focused on increasing the adoption of crucial family health and sanitation behavior[8] through participatory learning in a group framework and improving access to health care services by strengthening linkages with front line health workers (Chandrasekhar et al., 2019). Another program delivered health and nutrition behavior change communication (BCC) to enhance women's knowledge and household practices and improve service access through convergence (Gupta et al., 2019).

Both interventions may have produced statistically significant effects on health and nutrition outcomes though the study of the effects of the participatory learning in a group framework and improving access to health care services had a high risk of bias (Desai et al., 2020). A cluster-RCT of the BCC intervention showed small yet positive effects on dietary diversity, knowledge on health, hygiene, and nutrition, and health and hygiene practices but no statistically significant effects on anthropometric outcomes, food security, and morbidity among children (Gupta et al., 2019). Further, Mehta et al. (2020) report positive impacts of participatory learning in a group framework and improving access to health care services on health behaviors such as pregnancy registration, skin-to-skin care, dry-cord care, and immediate breastfeeding, but Desai et al. (2020) indicate that the nonexperimental study had a high risk of bias.

While the secondary layers likely generated benefits, they also increased the average program costs by varying degrees. Chandrasekhar et al. (2019) estimated the average cost of adding participatory learning in a group framework at $11 per member, while Gupta et al. (2019) estimate the costs of the BCC intervention to improve women's anthropometry and dietary diversity of women and children at $62 to $110 per member (for two years of delivery).[9] Costing analyses of these interventions suggest that the costs of adding participatory learning in a group framework are about 61% of the average annual program cost, and the cost of adding a comprehensive BCC intervention for two years is about 340% of the average annual program cost (see Table 4). We can, unfortunately, not distinguish these cost estimates from the total

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[8] The critical behavior promoted included antenatal care, birth preparedness, post-partum and newborn care, exclusive breastfeeding, complementary feeding, immunization, family planning and sanitation.
[9] The lower end of the range reflects operational costs that exclude program fixed costs, while the higher end includes fixed costs during the feasibility phase.

program costs in our earlier analyses. This is because the average cost estimates we present in our earlier analyses are statewide figures that include groups with and without these layers.

Table 4. Cost estimates of financial inclusion and layering of secondary activities

Study	Cost Item	Cost per beneficiary (USD)
Our study	Average statewide cost of JEEViKA participation for 7 years	127
Chandrasekhar et al. (2019)	Cost of forming groups	19
	Cost of health intervention layering	11
Gupta et al. (2019)	Cost of health layering (Accounting for total feasibility phase costs)	110
	Cost of health intervention layering (Not accounting for the feasibility phase costs)	62

Section 5. Conclusion

This study presents evidence on the cost-effectiveness and ROI of the JEEViKA program, a scaled-up multicomponent economic inclusion program that uses women's SHGs as the primary vehicle of program delivery in Bihar, India. The program focuses on mobilizing women into SHGs, promoting savings and intragroup lending, linking SHGs with formal banking, and promoting a range of agricultural and non-agricultural livelihoods. We find that the JEEViKA program achieved a positive return on investment in the short run by generating positive impacts on savings from average interest payment on household loans because of a significant decrease in high-cost informal loans and an increase in the availability of low-cost formal credit. The program returned INR 4.8 (USD 0.062) for every Rupee invested in financial inclusion, when we assume that the annual interest savings last five years.

Our results show a positive return on investment because of positive impacts on consumption expenditures (statistically significant at 10% level of significance), with benefits-cost ratios ranging from 30% to 279% under the most conservative assumption and 75% to 490% under the least conservative assumption depending on when consumption benefits start and how long they last. as SHGs generate these benefits as they mature over time and form higher-level federations, due to a shift in the program focus towards promoting livelihoods. Benefit-cost ratios may be as high as 490% under the least conservative assumption and 279% under the most conservative assumption that consumption benefits show up in the 4th year and last up to 7 years. The most conservative scenario can likely be ruled out because it does not align with our imputed annual average consumption values of INR 104,664 (USD 1,350) for the control group at endline. Our imputation suggests that in the absence of any treatment, the control group would have had annual consumption between INR 93,000 (USD 1,199) and INR 99,885 (USD 1,288) – suggesting that the control group also realized increased consumption from participating in the program for five years and five months. Based on this finding, we anticipate

that JEEViKA started generating positive impacts on consumption at least before the sixth year of program implementation.

Our study has some limitations. First, our cost data were sourced from state audit and implementation reports, precluding us from estimating disaggregated costs aligned with the district location of the treatment and comparison samples used in the impact evaluations. Second, we were unable to access data on income and savings, and therefore impacts observed on consumption alone may underestimate the overall impact on household income. Third, because the control group also received the program by the endline survey after seven years, our cost-effectiveness estimates rely on simulations and assumptions about the counterfactual growth in outcomes over time. To the extent possible, we addressed these challenges by informing our assumptions based on the program's theory of change, which was supported by the observed findings. By providing a range of scenarios and corresponding cost-effectiveness estimates, we were able to produce consistent findings – that the program's focus on financial inclusion alone can generate substantial positive returns on investment after two years. While the benefits of livelihoods and CIF take longer to generate, we find that SHGs shifting their focus from financial inclusion to livelihoods interventions can produce positive returns within seven years of investment.

While more research is needed to compare the longer-term cost-effectiveness of JEEViKA with other scaled-up economic inclusion programs, evidence suggests that the range of benefit-cost ratios we present are within the range of benefit-cost ratios of graduation programs in LMICs. The graduation approach provides members with a productive asset grant, training and support, life skills coaching, temporary cash consumption support, and access to saving accounts. Evidence indicates that the graduation program generated lasting improvement in household consumption, resulting in a benefit-cost ratio of 433% in India by the third year (Banerjee et al., 2015).[10] However, the scale of implementation of the evaluated graduation program in India from Banerjee et al. (2015) was significantly smaller than the scale of the JEEViKA program, which had reached over 10 million households by the time of the endline evaluation. More recent evidence from Niger indicates that graduation programs can achieve positive impacts with positive benefit-cost ratios at scale as well (Bosseroy et al., 2022). The study finds benefit-cost ratios ranging from 74 percent to 348 percent after two years of implementation.[11] While the study finds benefit-cost ratios of 205% by the second year even with relatively conservative assumptions of a 25% annual dissipation and a 5% discount rate, the context of the study is very different from India, making it challenging to compare the ROI of scaled-up SHG programs with the ROI of graduation programs operating at scale.

Evidence on the ROI of lumpsum cash transfers is similarly hard to compare with the ROI of SHGs, especially because of the different time horizon of the evaluations. While a previous evidence synthesis indicates that lumpsum cash transfers are more cost-effective than livelihood programs which are more cost-effective than the graduation approach (Sulaiman et al., 2016), the evidence on the longer-term effects of lumpsum cash transfers is less robust. For

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[10]The corresponding Benefit-to-Cost ratios were 260%, 179%, 146% and 133% in Ethiopia, Pakistan, Peru and Ghana respectively.

[11] The value of the benefit-cost ratio depends on assumptions about the discount rate and the dissipation.

example, Blattman et al. (2020) show that the control group for a $400 one-time cash grant in Uganda converged to the outcomes of the treatment group nine years after the start of the program. On the contrary, unconditional regular monthly cash transfers may have the potential to improve the living standards of the poor in the long run by addressing liquidity and insurance constraints. For example, Handa et al. (2018) show that two unconditional cash transfers implemented by the government of Zambia show strong effects on consumption and agricultural production resulting in income multipliers that average 1.67 across the two cash transfer programs. Again, however, it is challenging to compare the ROI of scaled-up cash transfer programs with the ROI of scaled-up SHGs because of differences in contextual characteristics, including differences in the economic profile of the program participants. Such comparisons will likely require more standardized measurement instruments and cost-effectiveness tools as well.

JEEViKA and other SHG programs differ from other rigorously evaluation social protection and livelihoods programs in three ways that have important implications for the benefits and costs of SHG programs. These three key factors include 1) a strong focus on targeting women in groups rather than providing individual services, 2) the large implementation scale of SHG programs, and 3) SHG's focus on women from the missing middle who have an income close to the poverty line but are not generally considered the poorest of the poor. First, leveraging groups as a platform to deliver additional program components to many women at once may result in significantly lower costs per program outcome (Diaz-Martin et al., 2022). Indeed, previous evidence suggests that the program benefits from large economies of scale with an earlier study demonstrating that the annual per capita expenditures on basic JEEViKA activities (including group mobilization and financial inclusion) declined from $29 when the program covered 100,000 members to $5 when it reached 10 million members. Combined with the evidence on positive effects on economic outcomes lasting at least seven years after initial program participation, the program may create even more cost-effective results in the longer term, with costs per program participant reducing because of scale economies and benefits amplifying because of the shift towards livelihoods. At the same time, however, an increase in benefits would require limited implementation challenges, and evidence from various studies indicates that JEEViKA faced considerable implementation challenges resulting in smaller impacts on financial inclusion and an absence of average impacts of women's decision-making power and household-level asset ownership when the program was implemented at scale (Hoffmann et al., 2018; Majuumdar et al., 2017; Siwach et al., 2022). Third, as discussed above the ROI of SHG programs such as JEEViKA is hard to compare with the ROI of graduation approaches and cash transfer programs because cash transfers and graduation programs often target ultra-poor households, while the JEEViKA program primarily targets women in households from the missing middle who live close to the poverty line but are not generally considered the poorest of the poor. On the one hand, this makes it easier to contribute to financial inclusion because women in households from the missing middle often have the ability to save and borrow to invest in small businesses. On the other hand, this makes it more challenging to break poverty traps, because many of the program participants do not live below the poverty line.

Our analysis shows that the JEEViKA program primarily contributes to the successful financial inclusion of poor women from the missing middle who have limited livelihood resources by linking them with the formal banking system and providing them with access to lower-cost

formal credit. We find a positive ROI of the scaled-up version of the program because the program generates savings from substituting away from high-cost informal debt to lower-cost formal credit and because of consumption benefits. Therefore, from a policy perspective, we recommend the Government of India to continue making large-scale investments in SHGs to contribute to the financial inclusion of poor women. However, evidence from Hoffmann et al. (2021) and Kochar et al. (2020) indicates that the scaled-up version of the JEEViKA program did not generate significant average effects on women's intra-household decision-making power (Kochar et al., 2020). Generating additional impacts on women's intra-household decision-making power may require greater access to larger loans as indicated by Kochar et al. (2022). To address this challenge, the Government could focus on increasing the availability and accessibility of larger loans through the Community Investment Fund. Alternatively, the JEEViKA program could increase its cost-effectiveness by prioritizing program elements that evaluations of pilot programs identified as critical for positive impacts on women's economic empowerment. This includes gathering of contextual information and adapting messaging for mobilization. As discussed by Siwach et al. (2022) strengthening these program elements could increase the cost-effectiveness of JEEViKA even with an increase in costs.

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