

# **Enhancing Productive Firm Assets: A Field Experiment on an Innovative Savings-Loan Product for Female Entrepreneurs in Ghana**

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## INTRODUCTION

Many in the West are used to hearing academics and policy makers extolling the virtues and benefits of entrepreneurship. A listing of the world's top hotspots of entrepreneurship therefore comes, quite often, as a surprise. Entrepreneurship, defined as the activities associated with the starting and owning of one's own business, is in fact much more prevalent along the alleyways of a developing country than along the highways of Silicon Valley (Global Entrepreneurship Monitor 2011). Indeed, of the two billion people living on less than \$2 per day, roughly half run a business (Collins et al. 2009). As such, most scholars agree that substantial economic growth in developing countries can occur if significant numbers of micro entrepreneurs scale their businesses and transition into small or medium enterprises (SMEs). Yet, the reality is that few developing country firms manage to grow and scale-up (Ardagna and Lusardi 2008; Banerjee and Duflo 2011; Schoar 2010). We ask if this 'missing middle' problem is more pronounced for female entrepreneurs and, if so, how can it be overcome?

One reason for a lack of SME development is that the markets in which these developing country entrepreneurs operate may not offer financial products that increase access to capital or ensure it is invested optimally. Even in markets with substantial 'micro' financing options, recent evidence suggests that micro entrepreneurs do not take up formal loans, or if they do then such loans only contribute a small proportion of their financial portfolios (Collins et al. 2009; de Mel, McKenzie and Woodruff 2008). For female entrepreneurs, credit issues may be exacerbated due to discrimination (PEP-Theme 6) or due to reduced risk appetites given household constraints (PEP-Theme 5). Our proposed study therefore aims to address financial capital constraints to female micro enterprise growth from not only the supply-side (e.g. financial institution: availability, marketing, collateral, financial history), but also the demand-side (e.g. entrepreneur: present-bias, risk-aversion, lack of self-control, small and volatile incomes, external pressures from family and friends, business characteristics).

This project focuses on the role of product design by examining the economic and social impact of an innovative savings-loan solution for female micro entrepreneurs in developing countries. Specifically, we ask whether marketing an *unlocked savings-loan product* (no restrictions on how capital from savings deposits and loan proceeds is invested) or a *locked savings-loan product* (capital investment is dedicated ex ante to a productive firm asset) leads to better productivity and growth outcomes for female-led micro enterprises. We also study which product design results in greater market penetration, lower default and higher customer retention for the financial institution offering the "combined savings account and loan" products. Empirically, we design and implement a randomized-controlled trial with a financial services company in Ghana. In this field experiment, we randomize whether micro entrepreneurs are offered a locked or an unlocked savings-loan product. We then measure the impact of this intervention on product take-up and investment in firm assets, as well as on the female entrepreneur's savings behavior, loan repayment behavior, business performance and household welfare. Our approach also helps to shed light on the mechanisms through which these behavioral changes may occur, such as overcoming self-control problems of entrepreneurs or the diversion of cash-flow into non-business uses.

Insights from this research should assist policy makers in designing and marketing new financial products that can enhance the productive assets of female-led micro enterprises and, in turn, increase their ability to scale operations and fill in the 'missing middle' of small and medium enterprises (SMEs).

## RELATED RESEARCH

Few developing country firms manage to grow and scale-up, especially those run by female entrepreneurs (Ardagna and Lusardi 2008; Banerjee and Duflo 2011; Schoar 2010). Many researchers believe this is due to the inability of female micro entrepreneurs to obtain the capital necessary to make lumpy investments in productive assets (Agier and Szafarz 2012; Banerjee and Duflo 2008; Beck and Demirguc-Kunt 2006, 2008; Beck, Demirguc-Kunt and Maksimovic 2005; Klapper and Parker 2011). Perhaps most surprisingly, even when given access to appropriate capital they often fail to apply it to productive firm investments (Banerjee et al. 2010; Karlan and Zinman 2010). This failure is especially striking when one considers that returns to such capital investments (if they can be made) have been shown to be 50-60% per year on average, and as high as 250-360% per year for some micro entrepreneurs (e.g. Ghana, see Fafchamps et al. 2011; e.g. Sri Lanka, see de Mel, McKenzie and Woodruff 2008; e.g. Mexico, see McKenzie and Woodruff 2008).

Prior research suggests a variety of reasons for this failure, which we group into the following three categories: individual, organizational, and environmental. Some factors that hinder investment in business assets reside at the *individual level*, such as present bias, fear of debt, lack of self-control, financial illiteracy, or insufficient risk-taking when making investment decisions (Banerjee and Mullanaithan 2010; Bertrand, Mullainathan and Shafir 2004; Karlan, Morduch and Mullainathan 2010; Field, Pande and Papp 2009; Minnit and Naude 2010). Other factors arise at the *organizational level*. Certain business characteristics, such as operating in a sector that requires greater liquidity or one with high degrees of seasonal variation, may force the entrepreneur to under invest in long-term business projects in order to maintain higher levels of working capital in the short-term (Fafchamps et al. 2011). *Environmental level* factors are also likely to play a role in reducing the amount of money a micro entrepreneur invests in her business. For instance, the income shocks and high uncertainty faced by female micro entrepreneurs in developing countries might lead them to divert capital for needs outside their business, e.g. household items, education fees, or health expenditures (Banerjee and Duflo 2007, 2011; Collins et al. 2009; de Mel, McKenzie and Woodruff 2010).

From the point of view of a financial institution marketing savings and loan products to these micro entrepreneurs, customers who invest in productive business assets might have lower odds of default. These customers may also achieve potentially greater profitability than those who apply the capital toward other uses. The prospects of such outcomes might, in turn, encourage greater financial access for female micro entrepreneurs in developing countries – many of whom are starved for capital.<sup>1</sup>

However, overcoming the challenge of ensuring micro entrepreneurs utilize capital for productive business investments has proved elusive so far. Financial institutions typically give the micro entrepreneur an unlocked savings account or loan that is not committed (at least not contractually) to the purchase of a specific productive asset, thereby allowing reallocation of the capital to non-business purposes. Standard economic theory suggests that an unlocked savings or loan product should be superior because it allows the micro entrepreneur to determine the optimal use of the money. Such unconstrained use might produce superior outcomes compared to a financial product that forces a female micro entrepreneur to use the money for a specified asset (see de Mel, McKenzie and Woodruff 2008). This view, however, assumes that micro entrepreneurs are fully rational actors who can (and will) make utility maximizing choices. In reality, given the individual, organizational and

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<sup>1</sup> See Appendix A for additional discussion on the credit constraints faced by micro entrepreneurs in developing countries.

environmental factors noted above, many female micro entrepreneurs are unable to commit to using a savings account or loan for optimal business investments. Instead they divert the capital to other purposes (Karlán and Zinman 2010). As a result, constraining the investment choices of female micro entrepreneurs – by locking savings and loan funds into investments in specific productive assets – *may* lead to better outcomes (see Fafchamps et al. 2011).

## Potential Contributions

Extant research does not offer conclusive evidence on whether marketing unlocked or locked financial products yields superior outcomes, particularly as it relates to the acquisition of productive firm assets by female entrepreneurs. The literature on commitment devices provides some general guidance on this topic, but has yet to address our proposed research questions (Bryan, Karlán and Nelson 2010). Field experiments (to date) have tended to focus on the adoption and usage of *savings accounts* or on methods for improving the total amount saved (Ashraf, Karlán and Yin 2006; Dupas and Robinson 2012a, 2012b). Little attention has been given to marketing loan-based commitment products or to designing products in which capital (from savings and loan funds) are channeled into business investments. In addition, the literature on returns to capital for micro enterprises also falls short of addressing the role of marketing in promoting take-up of unlocked versus locked financial products to entrepreneurs. While researchers have examined the returns to providing ‘*free*’ capital grants (cash or in-kind) to female and male micro entrepreneurs (de Mel, McKenzie and Woodruff 2008; Fafchamps et al. 2011; McKenzie and Woodruff 2008), there is a lack of research on how investments in productive firm assets can be increased through competitive financial markets and effective business-to-business marketing.

Our proposed project aims to make contributions in both of these literatures. First, by designing a “combined savings-loan product” we can examine the take-up and impact of a new hybrid commitment device. This product essentially links savings deposits with loan proceeds and commits both sources of capital to the same goal. Second, by partnering with a for-profit financial institution we can study whether marketing such a savings-loan product can be successful in a competitive market, particularly its take-up by micro entrepreneurs. This context also lets us explore how effective this product may be in increasing an entrepreneur’s access to financial capital and, in turn, her investment in productive firm assets – as well as the effect this has on business performance and household welfare. Third, we can examine the potential mechanisms underlying the effectiveness of locked versus unlocked financial products. Indeed, it could well be that the relative impact of locked versus unlocked financial products is contingent on individual, organizational or environmental factors: some micro entrepreneurs may benefit from ‘locked in’ financial products (e.g. individuals more prone to self-control problems, businesses in sectors that especially rely on lumpy capital investments, or those facing greater external pressures from family), whereas other entrepreneurs might benefit more from the flexibility offered by unlocked savings accounts and loans.

## Research Questions

In sum, by conducting this research we aim to address the following research questions:

- Which marketing strategy (promoting locked versus unlocked products) is more effective in encouraging take up of formal financial services in developing countries? [*Main effect: adoption behavior.*]

- In general, do locked or unlocked savings-loan products lead to more consistent savings behavior and a greater ability to raise substantial lump sums? [*Main effect: savings behavior.*]
- Which product design (locked or unlocked) leads to greater investment in productive assets for micro and small firms? [*Main effect: investment behavior.*]
- Will a locked savings-loan product lead to better productivity and growth outcomes for micro enterprises compared to the same unlocked financial product? [*Main effect: economic outcomes.*]
- What are the household and welfare benefits (if any) of increasing access to locked (versus unlocked) savings-loan products? [*Main effect: social outcomes.*]
- Which types of micro entrepreneurs benefit more from adoption of a locked savings-loan product, relative to an unlocked savings-loan product? [*Heterogeneous treatment effects: individual, organizational and environmental factors.*]

In addition, we also hope to shed light on whether the inability of female micro entrepreneurs to scale is due to lack of investment in productive firm assets caused by supply side factors such as discriminatory lending practices (PEP-Theme 6), or demand side factors such as lower risk tolerance spurred by household constraints (PEP-Theme 5).

## RESEARCH INTERVENTION

We address our research questions by designing and promoting a hybrid savings-loan product that locks in an entrepreneur's capital investment ex ante to a productive firm asset, e.g. savings linked loan products for acquiring equipment, inventory, vehicles, etc. This product has been designed in collaboration with our commercial partner: Financial Republic, a microfinance institution in Ghana ([www.financial-republic.com](http://www.financial-republic.com)). Both the proposed context and product are novel. Financial Republic focuses on serving business customers, particularly micro enterprises. Thus, we are able to examine a rather unique B2B (business-to-business) marketing phenomenon in a developing country. Further, the proposed product 'locks in' funds from a customer's savings account and loan to the purchase of a capital asset that can enhance firm productivity, as opposed to the large majority of other products available in this market that do not lock in the funds to a specific investment. To assess the effectiveness of our proposed solution, however, we will introduce both an unlocked version and a locked version of this new savings-loan product (see Appendix B for an example of the product brochures). Thus, the intervention will consist of one control group (offered the unlocked savings-loan product) and one treatment group (offered the locked savings-loan product).

### **Control Group: Unlocked Savings-Loan Product**

Participants who are assigned to the control group will be offered the 'unlocked' savings-loan product (Appendix B-1). This product will be marketed using a one-page (front and back) brochure that describes the terms and benefits of the savings account and loan, as well as provides the location of the nearest branch office and background information on the partner, Financial Republic. These brochures will be distributed by Financial Republic's field officers – i.e. sales agents who attract new clients and service existing clients (by collecting savings deposits and loan payments, and performing withdrawals). These field officers will also follow a standard sales script when promoting and explaining the product to ensure consistent marketing quality.

The features of this savings-loan product are listed below. Essentially, there will be no restrictions on how the savings or loan proceeds can be used by the customer. However, before applying for a loan the customer must first open a savings account, make regular micro deposits for at least two months, and save 30% of the desired loan amount (to be held as a down-payment).

- *No 'Lock In' of Investments*
  - The customer does not have to make any commitments ex ante on how she will spend the savings or loan proceeds.
  - Also, there will be no label on the customer's 'passbook' (small booklet where savings deposits and loan payments are recorded daily) and no blank space available for the customer to enter a specific savings goal or reminder. The same holds for the other materials used in the process, such as the sign-up form and loan application.
  
- *Savings Account*
  - Fee: The savings account can be opened free of charge.
  - Rate: The savings account pays the customer interest at 6% per annum (calculated monthly), but no interest is paid if the customer makes a withdrawal before the end of the first-month.
  - Period: Customers are free to continue saving for as long as they wish.
  
- *Loan*
  - Requirements: Customers must maintain a savings account (and be weekly active depositors) for at least two months prior to applying for a loan.
  - Down-Payment: Customers must have a minimum of 30% (in their savings account) of the loan amount for which they want to borrow. These funds are held in the customer's savings account (accumulating interest) until the loan is fully repaid. After such time, the funds are made available for withdrawal or the customer can continue to make deposits into her savings account and add to this lump sum.
  - Rate: Interest is charged at 72% per annum (or 6% per month).
  - Period: Loan terms are three, four or six months in duration – but customers can repay early if they wish.
  
- *Payments*
  - The same field officer will visit each customer on a daily basis to collect any savings deposits or loan payments.
  - The funds are completely fungible.
  - Except for making the minimum weekly payment required on her loan, the customer is free to deposit any amount on any day. If the field officer collects extra money (i.e. beyond the minimum loan payment amount) then these funds are deposited into the customer's savings account.

### **Treatment Group: Locked Savings-Loan Product**

Participants in the treatment group will receive an otherwise identical intervention except the promotional brochure will offer a savings-loan product that 'locks' the funds into one of four productive assets: equipment, vehicle, construction, and inventory (Appendix B-2). This product will be marketed using a similar one-page brochure and the same promotional strategy, including

comparable field officer scripts and visits. The terms of the locked savings-loan product will be identical to the unlocked savings-loan product offered to the control group participants.

The only difference in the treatment group is that the locked savings-loan product is restricted in how the savings and loan funds can be used. Customers offered this financial product will have to choose ex ante which productive firm asset they would like to save towards and (eventually) obtain a loan for. The asset will be made available to the micro entrepreneur as soon as the loan is approved; however, to ensure compliance to the treatment, a Financial Republic representative will purchase this asset on the loan disbursement date. The customer will continue to make micro deposits until the loan is repaid, transitioning from being a saver to an investor in her business.

*i. Equipment Savings-Loan*

- This category includes machinery and general equipment (e.g. tools for a repairman or service worker, fridge or freezer for a shop keeper, hair dryer for a salon owner, cement mixer for a builder, etc).

*ii. Vehicle Savings-Loan*

- This category includes any type of transportation purchase (e.g. larger vehicles like a truck or car, smaller vehicles such as a moped or bicycle, and also transport devices like a trailer or pull-cart) or support (e.g. major repairs, maintenance, enhancements).

*iii. Construction Savings-Loan*

- This category includes any type of building project that increases the capacity of the business or enhances its product/service offerings (e.g. extension of rooms, cement floor, new deck, remodeled interior, etc).

*iv. Inventory Savings-Loan*

- This category includes goods that are purchased and resold, as well as inputs used to create products/services (e.g. extra stock such as consumer goods or perishables for a retail firm, raw materials for a tailor, etc).

## STUDY DESIGN

While we are certainly interested in developing a more inclusive and sustainable solution for female enterprise growth (external validity), at this stage in the research program we are also focused on identification of a causal effect (internal validity). That is, we wish to isolate and quantify the impact of our proposed solution on the ability of a female micro entrepreneur to access credit, invest in her business, and improve firm performance. As such we plan to implement a randomized controlled trial. The main rationale for using such an experimental ‘evaluation design’ is that this approach explicitly addresses potential omitted variables bias, reverse causality and self-selection problems by randomizing the two product offers to Financial Republic customers (n=3,600).

Such a rigorous design helps us to identify the true effects of our new savings-loan product since it can address certain methodological and practical challenges. One important methodological challenge in studying the impact of capital infusions on the productivity and growth of micro entrepreneurs is endogeneity due to self-selection: it is possible that those micro entrepreneurs who manage to secure capital for obtaining productive assets are somehow different from those who do not manage to do so.

For example, those who manage to gain access to capital might be more skilled, more motivated, or may have better social networks than those who do not. Such endogeneity leads to biased estimates of impact, and prevents researchers from accurately attributing outcomes to specific interventions. Our study design will implement a randomized controlled trial, which offers a means to address such endogeneity issues.

### **Unit of Randomization**

The two products will be marketed by field officers during their daily visits to the micro entrepreneur's business location through printed brochures and sales scripts. Field officers will be trained on how to use these scripts during their sales attempts and customer interactions. Randomization of customers into the treatment group (locked savings-loan product) versus the control group (unlocked product) will therefore be done at the individual customer level. At each of the four participating branches, a list of customers that includes only those entrepreneurs who meet the sampling requirements (see below) will be maintained by an independent Research Associate of IPA. We chose this unit of randomization because it most closely aligns with Financial Republic's business objectives (i.e. maximizing market exposure for the new products) and our research objectives (i.e. improving adoption rates to increase statistical power).

### **Population and Sampling Frame**

Financial Republic has given us access to their clients at four branch locations, a total of over 6,000 customers. Refer to Appendix C for further discussion on the potential beneficiaries and benefits of this project. Roughly 80% of them run a business and of this sub-sample of entrepreneurs nearly 70% are female. Given our research objectives we will focus on entrepreneurs who have the greatest likelihood of adopting one of the new savings-loan products. As such, our initial sample (n=3,600) will only include the following types of Financial Republic customers:

- i. *Existing savers* (i.e. already banking with Financial Republic so some level of familiarity and trust exists).
- ii. *Active clients* (i.e. have made regular deposits in the three months prior to the product launch).
- iii. *Owners of micro or small businesses* (i.e. responsible for loan applications and firm investment decisions).

The control group (entrepreneurs offered the unlocked product) and the treatment group (those offered the locked product) will be drawn from the same population of micro entrepreneurs. The initial study sample will be stratified by branch location and field officer prior to randomization. Further, all study participants in the initial sampling frame will be randomly assigned into one of the two groups. Hence, except for the difference in the intervention (i.e. locked versus unlocked product) the two groups should otherwise be identical on all other observed and unobserved characteristics. In this way, the control group should represent a valid counterfactual to the treatment group.

### **Experimental Design**

In this randomized controlled trial, we will randomly offer customers one of two product options (locked or unlocked) then track their adoption, repayment behavior and changes in firm practices and performance over time. Two months prior to Financial Republic's launch of the new savings-loan products in four of its branches, we will conduct a baseline survey on 3,600 of its customers.



Immediately after the baseline survey is conducted, we will randomly assign half of the customers to the control group (n=1,800) and half to the treatment group (n=1,800). Next, we will carry out the product launch (i.e. intervention) for the next three months. All customers (regardless of assignment) will continue to have access to any of the pre-existing products and services offered by Financial Republic. However, customers in the control group will receive additional marketing efforts in which they are offered the unlocked savings-loan product. By contrast, customers in the treatment group will be offered the locked savings-loan product. Importantly, the decision to adopt one of these new savings-loan products will be voluntary and up to the individual customer.

During the following two to three months, customers who have signed up for one of the new savings-loan products (locked or unlocked) will make savings deposits with the goal of reaching the target amount required in order to apply for a loan. On an individual basis, Financial Republic will then conduct its credit application process and determine whether a given micro entrepreneur is approved for a loan. Once all loans have been processed and approved, Financial Republic will either release the funds in cash (customers in control group) or purchase the pre-specified firm asset (customers in the treatment group). We will track the deposit and repayment behaviour of all customers in our sample for at least 18 months and implement multiple ‘post intervention’ surveys to measure both economic and social outcomes. Additional details on our proposed study design and the research team managing the project are provided in Appendix D and Appendix E.

## **Implementation Strategy**

To launch our new product and evaluate the impact of this solution on female micro entrepreneur productivity and growth, we will implement our field experiment according to the steps outlined below.

### Baseline:

One month prior to Financial Republic’s launch of our solution in four of its existing branches, we will conduct a baseline survey to measure features of the business (e.g. industry, size, revenues) and entrepreneur characteristics (e.g. psycho-metrics, demographics, financial literacy). Collecting these pre-treatment covariates can assist us in controlling for potential confounds, as well as in stratifying the sample (if needed) and examining heterogeneous treatment effects to identify potential change mechanisms. Moreover, we can use pre-treatment covariate measures to examine the extent to which randomization is successful.

### Randomization:

Immediately after the baseline survey is conducted, we will randomly assign half of the customers to the control group (~1,800) and half to the treatment group (~1,800). We will also stratify by branch location, field officer, and prior loan approval. The IPA Senior Project Manager will control the master customer list (sampling frame) from Financial Republic and will run the STATA do file written for randomizing the participants into the two study groups. Implementing such a randomized control trial design helps us to address selection bias and minimize the chance that confounding factors (i.e. omitted variables) are driving the results – instead of our proposed intervention.

### Product Launch (Intervention):

Over the next three months, we will carry out the product launch, which includes a marketing campaign (radio adverts, promotional brochures, sales scripts). The new products will be marketed by field officers during their daily visits to the micro entrepreneur’s business location through the printed

brochures and in their personal interactions. Extensive monitoring and compliance activities – conducted on the ground by Innovations for Poverty Action research associates and project managers – will assist in addressing potential spill-over effects.

#### Savings Period & Loan Approvals:

For three months, customers who have signed up for one of our new hybrid savings-loan products will make savings deposits with the goal of reaching the target amount required in order to apply for a loan. On an individual basis, Financial Republic will then carry out its credit process and determine if a given micro entrepreneur is approved for a loan. Once all loans have been processed and approved, Financial Republic will either release the funds in cash (customers in control group) or purchase the pre-specified firm asset (customers in the treatment group).

#### Outcome Measurement:

We will track the deposit and repayment behaviour of all customers for 18 months (baseline to endline). However, six months after the loan approval period, we will also implement a midline survey (subject to funding) on all customers that measures the same business and entrepreneur characteristics as per the baseline survey, as well as any additional ‘change mechanism’ questions. After another six months (~12 months from the end of the savings and loan approval period), we will conduct an endline survey. This approach lets us rigorously measure the impact of our solution using the survey responses and the partner's administrative data on bank account and deposit activity. These data will provide lessons regarding the effectiveness and scalability of our solution.

- Entrepreneurs: enhanced productivity and growth outcomes.
- Households: improved social and household-level outcomes.
- Partner: adoption of financial services, repayment behaviour, customer sustainability, cost/benefits of the product versus marketing effort required, and feasibility of scaling our solution across all current and new branches.

#### **Timeline**

A brief overview of the research schedule and milestones is provided in Appendix F. The study is expected to run for approximately 24 months, with sampling and surveying of participants beginning in April or May 2013.

#### **Outcomes and Measurements**

We aim to collect the following data which, in turn, will allow us to address our specific research questions and compare the effects of the locked versus unlocked savings-loan products for female micro entrepreneurs.

#### Adoption Behavior (access to credit)

Which product is more effective in encouraging adoption of formal financial services?

- Measure: take-up rates
- Timeframe: product launch period (months 1-3)
- Source: bank administrative data

#### Savings Behavior

Which product will result in more consistent savings behavior and a greater ability to raise substantial lump sums?

- Measure:
  - a. frequency of savings deposits
  - b. total amount saved
- Timeframe: client savings period (months 4-6)
- Source: bank administrative data

#### Investment Behavior

Which product will lead to greater investment in productive firm assets?

- Measure:
  - a. Total stock of firm assets
  - b. Change in 'productive' firm assets
- Timeframe: client investment period (months 7-8), then the firm's regular operations (months 7-18)
- Source: midline survey (month 12); endline survey (month 18)

#### Firm Outcomes

Which product best enhances productivity and growth outcomes for female run micro enterprises?

- Measure:
  - a. Revenues
  - b. Profits
  - c. Employment
  - d. Return on investment
  - e. Loan repayment success
- Timeframe: firm's regular operations (months 7-18)
- Source: midline survey (month 12); endline survey (month 18); administrative data

#### Household Outcomes

Which product will result in greater social and welfare improvements for an entrepreneur's household members?

- Measure:
  - a. Food
  - b. Education
  - c. Clothing
  - d. Medical
- Timeframe: firm's regular operations (months 7-18)
- Source: midline survey (month 12); endline survey (month 18)

#### Heterogeneous Treatment Effects

In addition to the main effects of our intervention (e.g. adoption, savings deposits or firm performance outcomes), we will also examine heterogeneous treatment effects. One of our aims is to better understand the type of entrepreneur for whom the proposed intervention (locked savings-loan product) will be most effective in increasing productivity and growth outcomes. Thus, some of the variables that we may use to study impact heterogeneity are listed below.

- Individual Factors: e.g. risk averse (versus risk seeking), self-control (versus easily tempted), myopic (versus forward looking).

- Organizational Factors: e.g. type of industry (need for lumpy assets), debt level (degree of leverage).
- Environmental Factors: e.g. family demands (married, number of children, education expenses), pressure from friends, or susceptibility to income shocks and emergencies.

### Sample Size: Calculations and Assumptions

We use the STATA “samps” command to conduct our power calculations (for results see Table 1 and Table 2). Given the assumptions and parameters listed below, our evaluation study requires a sample size of at least *295 participants in the treatment group* (i.e. adopters of the locked product) and *295 participants in the control group* (i.e. adopters of the unlocked product).

#### Number of Measurements: baseline = 1; follow-up = 2

- We plan to conduct one pre-intervention survey round (baseline) and two post-intervention survey rounds (midline and endline).

#### Ratio of Group Sizes: 1.00

- We assume that the sample size in each group will be approximately equal.
- For instance, we could predict there might be roughly equal take-up of the savings-loan product in the treatment group (e.g., n=295) and the control group (e.g., n=295).

#### Effect Size: 0.20

- We expect an effect size of roughly 20%.
- That is, we believe firms in our treatment group will increase sales (or employment) by 20% more than firms in the control group.

#### Power: 1 - beta = 0.80

- Given our estimated take-up rates (further discussion below), even if power is increased to 0.90 we would still have a large enough sample size to detect a 20% increase in sales or employment for treatment group firms.

#### Statistical Significance: alpha = 0.05

- This is the standard significance level for a two-sided test.

#### Coefficient of Variation (CV): 1.00

- This coefficient of variation (i.e. the standard deviation divided by the mean) may seem overly conservative compared to other field studies. However, research to date on developing country enterprises suggests that across micro and small firms there exists substantial variation in the measurement of outcomes – particularly for sales and profits (see McKenzie 2011a, 2011b).
- For instance, early evidence from Africa provides the following average CVs:
  - Sales: CV = 3.10
  - Employment: CV = 0.262
- We assume a CV of 1.00 for multiple reasons:
  - It is a middle ground between the Sales CV and Employment CV listed above, and we are interested in measuring these key outcomes in our study.
  - Also, similar to employment, some of the other outcomes we are interested in studying can be measured more objectively and, thus, with less noise (i.e. smaller CV).

- In addition, we believe a CV of 1.00 is reasonable for our study given that we are sampling a more homogenous group of entrepreneurs (refer to the discussion on our sampling strategy). Thus, across entrepreneurs there should be less variation in outcomes such as sales and profits.
- Another reason this CV can be considered reasonable is because we will be measuring firm revenues and profits using a detailed cash-flow tracking sheet designed to more accurately obtain firm owner estimates of revenues, expenditures and profits.

#### Intra-cluster Correlation Coefficient: 0.00

- This may likely differ, but for a more conservative power calculation we assume this to be zero.

#### Autocorrelation in Outcomes: 0.50

- As noted, firm outcome measures (especially in Africa) tend to be quite noisy across firms and over time.
- Thus, we have assumed that the correlation between the baseline and follow-up measurements (for the same firm) in our study will be approximately 0.50.
- For a less noisy measure such as firm employment this is a conservative estimate.

Overall, with most parameters set at standard levels, if we assume a coefficient of variation of 1.00 (conservative) and autocorrelation of firm outcomes in the 0.50 range (conservative), the resulting power calculations suggest that a treatment group of 295 firms and a control group of 295 firms is reasonable for detecting the effect of our intervention on increased firm sales, profits or employment (see McKenzie 2011a, 2011b).

This sample size requirement is even lower ( $n=197$  in each group) if we analyze the data using analysis of covariance (ANCOVA), instead of the standard differences-in-differences (DID) method (McKenzie 2011a; see also Table 1 and Table 2).

Also, we have assumed only a 20% increase in sales for firms in the treatment group that adopt the product (compared to control firms). However, the high returns to capital found in prior studies (e.g. de Mel, McKenzie and Woodruff 2008) suggest that the expected increase in our outcome measures (for firms that adopt the locked savings-loan product) might be greater than 20%, therefore increasing statistical power and further decreasing the required sample size.

#### **Statistical Power: Attrition & Take-up Rates**

In sum, if we predict there will be roughly equal take-up of the savings-loan product in the treatment group and in the control group, then an adequate sample would consist of 295 entrepreneurs adopting the locked savings-loan product (treatment group) and 295 entrepreneurs adopting the unlocked product (control group).

If attrition rates are high, however, then we will need to over-sample. Thus, although the assumptions made above are likely conservative (and a smaller sample size could be adequate) we will aim for 400 entrepreneurs per group. This would allow for an attrition rate of 25% (or 105 entrepreneurs per group).

Next, we assess the initial sampling required to achieve a ‘final sample size’ in which there are at least 400 entrepreneurs in the treatment group and 400 in the control group. Based on the adoption rates obtained via Financial Republic’s administrative data, we predict that only 1-in-4 entrepreneurs will adopt a new savings-loan product when it is offered to them. We feel that such a 25% product take-up rate is reasonable for several reasons. Our sampling strategy focuses on entrepreneurs who have the greatest likelihood of adopting one of the new savings-loan products. From discussions with Financial Republic field officers and branch managers, there appears to be a large demand for credit among their customer base. In addition, our intense marketing campaign is meant to provide a strong ‘hammer’ to increase product take-up rates.

We are hopeful that these factors will contribute to us reaching a 25% take-up rate. For treatment group customers, this means we must market the locked product to at least 1,600 micro entrepreneurs with the aim that 400 of them take up the product and (eventually) obtain a productive firm asset. The same number of offers ( $n=1,600$ ) is needed for the control group. Thus, we need an initial sample of roughly 3,200 entrepreneurs who complete the baseline survey and receive a product offer. *However, we will aim increase this number to 3,600 entrepreneurs to further account for attrition and lower take-up rates.*

## ANALYSIS AND RESULTS (TBC)

Given that our research design uses a randomized controlled trial, we can use our ‘product offer’ as an orthogonal treatment variable and calculate both the ITT effects (intention-to-treat) and LATE (local average treatment effects) to examine the impact of our locked savings-loan product on the outcome variables noted previously (Imbens and Angrist 1994). With respect to analyses, we can use the standard DID (differences-in-differences) approach. Or alternatively, we could analyze our data using ANCOVA (analysis of covariance), which has slightly greater statistical power in an experimental setting. Table 1 and Table 2 provide results showing the increased statistical power (and thus, the reduction in required sample size) that can come with ANCOVA (McKenzie 2011a).

## IMPLICATIONS

This research is important to policy makers wishing to stimulate economic development and employment among the poor in developing countries. Research on entrepreneurship is central to the goal of poverty alleviation. The first reason has to do with the sheer numbers involved. “Vast armies” (de Mel, McKenzie and Woodruff 2010, p.1) of micro entrepreneurs populate the poor parts of the world. But few micro entrepreneurs in developing countries appear to grow to a level that allows them to escape poverty. The frustrations of the vast armies of micro and small entrepreneurs can easily explode into chaos and conflict. Yet the energies of these entrepreneurs can also yield growth and prosperity. Second, improvements in entrepreneurial outcomes provide a way of “helping people help themselves” (Nopo 2007, p.2). Designing innovative savings-loan products and working with for-profit financial institutions to more effectively market these products in developing countries could represent a (sustainable) way to enhance the stock of productive firm assets owned and implemented by an individual entrepreneur. Thus, improvements in marketing financial products at a micro-level, as opposed to other programs or macro-level aid efforts, could lead to more effective use of the scarce funds available for poverty alleviation. Third, in the absence of systematic research, potentially promising approaches to improve the lives of micro entrepreneurs may fail to get implemented. As de

Mel, McKenzie, and Woodruff note, “we need a much more nuanced and detailed understanding of [micro and small entrepreneurs] before appropriate policies can be devised” (2010, p.25).

This research can also provide valuable insights for researchers in economics and management. First, entrepreneurship in emerging markets differs from that in developed countries. For instance, most micro entrepreneurs and their customers suffer from small, irregular and uncertain incomes that limit aspirations and economic advancement (Collins et al. 2009). Other notable differences include a greater role for risk due to political-economic instability, agency problems stemming from a lack of formal institutions, and labor challenges resulting from regulatory pressures and lower schooling levels (de Mel, McKenzie and Woodruff 2010, p.7-8). Thus, new research is required to uncover the challenges and identify the success factors critical to stimulating and sustaining entrepreneurial ventures in emerging markets. Second, researchers have been divided on whether micro and small enterprises, particularly micro enterprises, can actually grow into larger firms. On the one hand, academics in the ‘Tokman’ camp argue that micro entrepreneurs cannot scale-up and are simply waiting for opportunities to join the formal labor force (see Schoar 2010). On the other hand, academics in the ‘de Soto’ camp believe that micro entrepreneurs can scale-up and transition into larger firms if certain constraints are lifted (see de Mel, McKenzie and Woodruff 2010). However, as noted, extant research has typically focused on reducing financial constraints by providing ‘free’ capital grants (cash or in-kind) to micro entrepreneurs or by introducing commitment devices to encourage savings. The former is not sustainable or scalable, while the latter ignores the potential of credit-based commitment products. Thus, in line with the work of Karlan, McKenzie, Woodruff, and their colleagues, our research aims to reconcile ‘Tokman’ with ‘de Soto’ by studying how investments in productive firm assets can be increased through competitive financial markets and effective business-to-business marketing. Third, we are employing a relatively new method for data collection (called ‘financial diaries’) that will help overcome some of the measurement issues that typically plague field experiments relying on self-reported firm performance data. The financial diary method allows researchers to more accurately record responses on firm cash-flows, expenditures, management of accounts, and use of financial tools.

Finally, this research is important to managers of multinationals and domestic firms. First, providing firms with tools to systematically evaluate differences across micro and small entrepreneurs can assist management decisions related to identification of optimal partners in emerging markets. Such partnerships can be invaluable for successfully entering new markets, distributing goods, competing on tiny margins, and investing in new ventures. Second, better understanding the heterogeneity in access to financial capital of entrepreneurs can also enhance the success of market expansion and customer segmentation strategies. Third, if hybrid savings-loan products are found to play a critical role in increasing access to financial services and improving growth of micro enterprises, then it is essential for multinational firms to learn how best to build such savings and credit tools into their marketing strategies. It may be that entering (or expanding sales in) developing countries requires multinationals to design products or sales channels in a manner that not only promotes products, but also supports the financing of these purchases by micro enterprises and the billions of other consumers at the bottom-of-the-pyramid.

## **DISSEMINATION**

A detailed policy outreach and dissemination plan is provided in Appendix G.

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**TABLE 1:  
POWER CALCULATIONS WITH UNEQUAL GROUP SIZES**

C.V. of 1.0 with Unequal Group Sizes: e.g. Treatment (n=400) versus Control (n=200)

**Panel A:  $\rho = 0.60$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	1482	1186	1112	816	988	692
Treatment Sample size needed for 80% power	1884	1508	1414	1038	1256	880
Treatment Sample size needed for 90% power	2522	2018	1892	1388	1682	1178
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	660	528	494	364	440	308
Treatment Sample size needed for 80% power	838	670	628	462	560	392
Treatment Sample size needed for 90% power	1122	898	842	618	748	524
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	372	298	278	204	248	174
Treatment Sample size needed for 80% power	472	378	354	260	314	220
Treatment Sample size needed for 90% power	632	506	474	348	422	296

**Panel B:  $\rho = 0.50$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	1852	1390	1390	926	1236	772
Treatment Sample size needed for 80% power	2356	1766	1766	1178	1570	982
Treatment Sample size needed for 90% power	3154	2366	2366	1578	2102	1314
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	824	618	618	412	550	344
Treatment Sample size needed for 80% power	1048	786	786	524	698	438
Treatment Sample size needed for 90% power	1402	1052	1052	702	934	584
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	464	348	348	232	310	194
Treatment Sample size needed for 80% power	590	442	442	296	394	246
Treatment Sample size needed for 90% power	790	592	592	396	526	330

**Panel C:  $\rho = 0.40$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	2222	1556	1668	1000	1482	816
Treatment Sample size needed for 80% power	2826	1978	2120	1272	1884	1038
Treatment Sample size needed for 90% power	3784	2648	2838	1704	2522	1388
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	988	692	742	446	660	364
Treatment Sample size needed for 80% power	1256	880	942	566	838	462
Treatment Sample size needed for 90% power	1682	1178	1262	758	1122	618
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	556	390	418	250	372	204
Treatment Sample size needed for 80% power	708	496	530	318	472	260
Treatment Sample size needed for 90% power	946	662	710	426	632	348

Power calculations calculated for hypothetical experiment with:

- 1) Firm Outcomes: control group mean and standard deviation of 100 (Coefficient of Variation, C.V. = 1.0)
- 2) Ratio of Group Sizes: 2 (treatment) to 1 (control)

**TABLE 2:  
POWER CALCULATIONS WITH EQUAL GROUP SIZES**

C.V. of 1.0 with Equal Group Sizes: e.g. Treatment (n=300) versus Control (n=300)

**Panel A:  $\rho = 0.60$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	988	791	741	544	659	461
Treatment Sample size needed for 80% power	1256	1005	942	691	838	587
Treatment Sample size needed for 90% power	1682	1345	1261	925	1121	785
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	439	352	330	242	293	205
Treatment Sample size needed for 80% power	559	447	419	307	373	261
Treatment Sample size needed for 90% power	748	598	561	411	499	349
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	247	198	186	136	165	116
Treatment Sample size needed for 80% power	314	252	236	173	210	147
Treatment Sample size needed for 90% power	421	337	316	232	281	197

**Panel B:  $\rho = 0.50$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	1235	926	926	618	823	515
Treatment Sample size needed for 80% power	1570	1178	1178	785	1047	655
Treatment Sample size needed for 90% power	2102	1577	1577	1051	1401	876
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	549	412	412	275	366	229
Treatment Sample size needed for 80% power	698	524	524	349	466	291
Treatment Sample size needed for 90% power	934	701	701	467	623	390
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	309	232	232	155	206	129
Treatment Sample size needed for 80% power	393	295	295	197	262	164
Treatment Sample size needed for 90% power	526	395	395	263	351	219

**Panel C:  $\rho = 0.40$  (auto-correlation in firm outcomes) AND  $\alpha = .05$**

	1 Baseline + 1 follow-up		1 Baseline + 2 follow-ups		1 Baseline + 3 follow-ups	
	DID	ANCOVA	DID	ANCOVA	DID	ANCOVA
<b>10% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	1482	1037	1111	667	988	544
Treatment Sample size needed for 80% power	1884	1319	1413	848	1256	691
Treatment Sample size needed for 90% power	2522	1766	1892	1135	1682	925
<b>15% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	659	461	494	297	439	242
Treatment Sample size needed for 80% power	838	587	628	377	559	307
Treatment Sample size needed for 90% power	1121	785	841	505	748	411
<b>20% increase in sales or employment</b>						
Treatment Sample size needed for 70% power	371	260	278	167	247	136
Treatment Sample size needed for 80% power	471	330	354	212	314	173
Treatment Sample size needed for 90% power	631	442	473	284	421	232

Power calculations calculated for hypothetical experiment with:

- 1) Firm Outcomes: control group mean and standard deviation of 100 (Coefficient of Variation, C.V. = 1.0)
- 2) Ratio of Group Sizes: 1 (treatment) to 1 (control)

## APPENDIX A: TAKE UP RATES & BINDING CREDIT CONSTRAINTS

Given that previous studies have shown low take up rates of loan products in developing countries, one may question whether credit constraints are in fact binding for female entrepreneurs running micro businesses. Importantly, we are taking steps to enhance the chances of getting reasonable take up rates so we can examine the research questions of interest. For further details refer to sections in the appendices which highlight: steps for addressing attrition; a sampling frame that consists entirely of pre-existing clients who are active savers and owners of a small business; and ways for increasing adoption of our new product. Moreover, in the section below we address concerns that credit constraints may not be binding for the female entrepreneurs in our context.

### Potential for Positive Outcomes

First, lack of access to finance is continually identified as a key constraint to country and firm growth, particularly for smaller firms (Banerjee and Duflo 2008; Beck and Demirguc-Kunt 2006, 2008; Beck, Demirguc-Kunt and Maksimovic 2005; Bloom et al. 2010). While extant studies and panel datasets on the topic may be lacking, it is hard to imagine that female micro entrepreneurs in developing countries, on average, would not also benefit from increased firm investment – which could be financed through formal loans if said loans were fully used for business purposes. As such, low take up rates of formal credit products does not (alone) suggest credit constraints are absent for micro and small businesses run by female entrepreneurs (see Karlan, Morduch and Mullainathan 2010). Female business owners may likely face binding credit constraints, but they probably also face formidable pressures that lead them to avoid taking on formal loans or to use such funds for non-business purposes (e.g. household items, education fees, or health expenditures). Moreover, there is increasing evidence that female entrepreneurs may demand and benefit from increased access to credit, including improvements in business outcomes (see Banerjee et al. 2010; Fafchamps et al. 2011; Karlan and Zinman 2008). Taken together, this suggests that with the right product design and marketing efforts, there is an opportunity to achieve higher take-up rates for our proposed solution compared to typical loan products in the market.

### Relevant Studies

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### **Demand for Informal Credit**

Second, there does seem to exist a demand for credit in general by micro and small business owners in developing countries (see Banerjee and Duflo 2007, 2011; Collins et al. 2009). Most of these firms, however, are tiny and operate informally, particularly female micro entrepreneurs. As such, the demand for financing in these businesses is most often of the ‘informal’ variety. For example, in a review of multiple developing country studies, Banerjee and Duflo came to the conclusion that “across the surveys, very few of the poor households get loans from a formal lending source” (2007, p.155). This was not because these poor entrepreneurs lacked credit constraints. In fact, the majority of them did have a need for increased credit, but fulfilled this requirement through informal lending sources such as family, friends, money lenders, and shopkeepers (instead of commercial banks, microfinance institutes or cooperatives). Other researchers find a similar pattern of borrowing with micro entrepreneurs actually managing extensive financial portfolios in which informal loans heavily outweigh formal loans – even in markets with substantial ‘micro’ financing options by banks and microfinance institutes (Collins et al. 2009; de Mel, McKenzie and Woodruff 2008; see also Karlan and Morduch 2009). In sum, female entrepreneurs may likely prefer informal credit sources; however, if our proposed solution has been designed effectively to overcome their hesitations with borrowing from formal sources then we may be able to achieve higher take-up rates.

### Relevant Studies

- Banerjee, A. and Duflo, E. (2007) “The Economic Lives of the Poor,” *Journal of Economic Perspectives*, 21(1): 141-167.
- Banerjee, Abhijit, and Esther Duflo (2011). *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, Public Affairs: New York, NY, USA.
- Collins, Daryl, Jonathan Morduch, Stuart Rutherford, Orlanda Ruthven (2009). *Portfolios of the Poor: How the World’s Poor Live on \$2 a Day*, Princeton University Press: Princeton, NJ.
- De Mel, Suresh, David McKenzie and Christopher Woodruff (2008). “Returns to capital in microenterprises: Evidence from a field experiment”, *Quarterly Journal of Economics*, 123(4): 1329-72.
- Karlan, Dean, and Jonathan Morduch (2009). “Access to Finance,” Chapter 2, *Handbook of Development Economics*, Dani Rodrik and Mark Rosenzweig, eds, Volume 5.

### **Heterogeneous Take-Up Rates**

Third, while there may be a general demand for increased access to finance, the extent of the demand for ‘formal’ credit may not be universal: indeed there may be lower levels of demand for formal credit in certain sectors or depending on certain individual, organizational and environmental characteristics.



Thus, although we can expect most entrepreneurs to be credit constrained, in practice the take up of formal loan products likely varies depending on the characteristics and circumstances facing an entrepreneur and her firm. More critically, a female entrepreneur's access to finance could be constrained for multiple reasons. On the one hand, problems in obtaining formal credit can stem from supply-side issues, such as a bank not effectively marketing its products to female entrepreneurs so they have complete information on the financing options available in the market (Bertrand et al. 2010; de Mel, McKenzie and Woodruff 2011; Dupas et al. 2011; Gine, Mansuri and Picon 2011). On the other hand, issues could originate on the demand-side. For instance, credit market inefficiencies can be created when an entrepreneur lacks the skills to understand options (Cole, Sampson and Zia 2010; Cole et al. 2011) or to provide financial institutions with the information required for risk assessment, such as proof of credit history, income and business stability (Banerjee and Duflo 2000; Chavis, Klapper and Love 2011). Other demand side factors that may also limit the take up of formal credit products include individual level entrepreneur characteristics like present bias, fear of debt, lack of self-control, or insufficient risk-taking when making investment decisions (Banerjee and Mullainathan 2010; Bertrand, Mullainathan and Shafir 2004; Karlan, Morduch and Mullainathan 2010; Field, Pande and Papp 2009). Given the extent of this heterogeneity across entrepreneurs, it is not surprising that the few studies related to female SME owners (to date) have found low take up rates for formal credit products. We hope our research design and novel product design improve the chances of achieving higher take up rates in our study.

#### Relevant Studies

- Banerjee, A. and Duflo, E. (2000). "Reputation Effects and the Limits of Contracting: a Study of the Indian Software Industry," *Quarterly Journal of Economics*, August.
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- Chavis, Larry W., Leora F. Klapper, and Inessa Love (2011). "The Impact of the Business Environment on Young Firm Financing," *The World Bank Economic Review*, 25(3): 486-507.
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- Cole, Shawn, Xavier Gine, Jeremy Tobacman, Petia Topalova, Robert Townsend and James Vickery (2011). "Barriers to Household Risk Management: Evidence from India," mimeo, Harvard.
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- Dupas, Pascaline, Sarah Green, Anthony Keats, and Jonathan Robinson (2011). "Challenges in Banking the Rural Poor: Evidence from Kenya's Western Province," mimeo, Stanford.
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- Gine, Xavier, Ghazala Mansuri, and Mario Picon (2011). “Does a Picture Paint a Thousand Words? Evidence from a Microcredit Marketing Experiment,” *The World Bank Economic Review*, 25(3): 508-542.
  - Karlan, Dean, Jonathan Morduch and Sendhil Mullainathan (2010). “Take-up: Why Microfinance Take-up Rates Are Low and Why It Matters”, *Financial Access Initiative Research Framing Note*: June.

## APPENDIX B-1: BROCHURE FOR ‘UNLOCKED’ PRODUCT (CONTROL GROUP)



# BUSINESS SAVINGS-LOAN PRODUCT

**SPECIAL OFFER FOR YOU...**

Are you interested in **saving** towards the future expansion of your business?

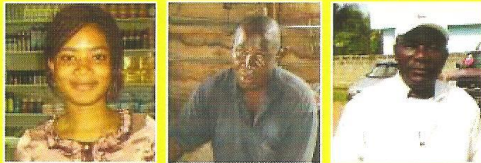
Would you like to obtain a **loan** that you can use to grow your business and increase sales?

*If yes... then combine your savings and loan funds for the same business goal!*

- Step 1: Sign up and use the money in the future to achieve a business goal.
- Step 2: Save for 2-3 months.
- Step 3: Save 30% of your desired loan amount, and then complete an interview.
- Step 4: FR gives you the loan funds directly – so you can decide how to invest in your business.

### FEATURES

- Easy to **add a loan** to your existing savings account.
- **Quick** sign up with no fees.
- No monthly charges.
- Only need to **save 30%** of your loan amount.



### BENEFITS

- FR will give you a **loan to expand** your business whilst you still keep your savings intact.
- Reach your financial **goal faster**.
- Access to account **5 days per week**.

### REQUIREMENTS

- **Application Form** – completed and signed.
- Two passport **photographs**.
- **Identification** (e.g. passport or driving license)
- **Address Verification** (e.g. electricity or water bill)



### MORE BENEFITS

- Loan interest **rate is low**.
- Gives you financial **security**.
- **Flexible** payments – FR staff come to you so it is easier to make daily or weekly payments

### SIGN UP TODAY!

Contact any branch of Financial Republic for details and we will complete the application for you!

# BUSINESS SAVINGS-LOAN PRODUCT

## FEATURES

- Easy process to add a loan to your existing savings account.
- Quick sign up with no fees.
- No monthly charges.
- Only need to save 30% of your requested loan amount.

## BENEFITS

- FR will give you a loan to expand your business whilst you still keep your savings intact.
- Reach your financial goal faster.
- Access to account 5 days per week.
- Loan interest rate is low.
- Gives you financial security.
- Free advisory services.
- Flexible payments - FR staff come to you so it is easier to make daily or weekly payments.

## ELIGIBILITY

- Individuals 18 years and above.
- Owners running a small business of any size or type.

## REQUIREMENTS

- Application Form - completed and signed.
- Two passport photographs.
- One identification document (e.g. passport, driving license, etc)
- Address Verification (e.g. electricity or water bill)

## SIGNUP

Contact any branch of FR for details and we will complete the application for you!



### BRANCHES & CONTACTS

#### SANTA MARIA BRANCH

Main Kwashieman - Santa Maria Road  
Jah Love Junction, behind Regix Spot  
Tel: 0289016963 / 0302433049

#### TETEGU BRANCH

Tetegu Town, same building as ICGC  
Near Westfield School  
South West McCarty Hill  
Accra - Winneba Road  
Tel: 0289016964 / 0302433049

#### AGBOGBLOSHIE

#### MARKET BRANCH

DOMOD Aluminium building  
First Floor, Near the IRS office, Accra.  
Tel: 0289017022 / 0302433049

#### DARKUMAN BRANCH

Near Accra Lorry station  
Same building as Access Bank  
Tel: 0289017023 / 0302433049

#### MADINA BRANCH:

Near the main Station Taxi Rank  
Opposite the Women's World Banking  
Building.  
Tel: 0302433049

#### Website:

[www.financial-republic.com](http://www.financial-republic.com)

#### E-mail:

[info@financial-republic.com](mailto:info@financial-republic.com)

## APPENDIX B-2: BROCHURE FOR 'LOCKED' PRODUCT (TREATMENT GROUP)



# BUSINESS SAVINGS-LOAN PRODUCT

**SPECIAL OFFER FOR YOU...**

Are you interested in **saving** towards the future expansion of your business?

Would you like to obtain a **loan** that you can use to grow your business and increase sales?

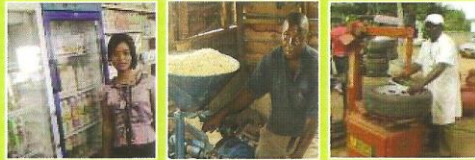
*If yes... then combine your savings and loan funds for the same business goal!*

- Step 1: Sign up and commit the money now to achieve a business goal.
- Step 2: Save for 2-3 months.
- Step 3: Save 30% of your desired loan amount, and then complete an interview.
- Step 4: FR makes the purchase for you – so the loan funds are directly invested in your business.

### EQUIPMENT Savings-Loan

*This product is great for the owner of a...*

- Convenience store: to buy a **fridge** or **freezer**
- Flour mill: to buy a grinding **machine** or **press**
- Manufacturing shop: to buy a **drill** or **tools**



### CONSTRUCTION Savings-Loan

*You might want to sign up if you own a...*

- Retail shop: to extend the **roof** of your store front
- Hair salon: to redesign or construct a **new room**
- Restaurant: to build a **fence** or **deck space**

### INVENTORY Savings-Loan

*This is a good product for someone running a...*

- Grocery store: to buy **stock** or products for resale
- Tailor shop: to buy **materials**, cloth or thread
- Repair garage: to buy **supplies** or spare parts



### VEHICLE Savings-Loan

*This product can be useful for the owner of a...*

- Taxi service: to buy a **car**, **bus** or **"tro tro"**
- Fruit-Veg wholesaler: to buy a **cart** or **"truck"**
- Delivery business: to buy a **motorcycle** or **scooter**

**SIGN UP TODAY!**

Contact any branch of Financial Republic for details and we will complete the application for you!

# BUSINESS SAVINGS-LOAN PRODUCT

## FEATURES

- Easy process to add a loan to your existing savings account.
- Quick sign up with no fees.
- No monthly charges.
- Only need to save 30% of your requested loan amount.

## BENEFITS

- FR will give you a loan to expand your business whilst you still keep your savings intact.
- Reach your financial goal faster.
- Access to account 5 days per week.
- Loan interest rate is low.
- Gives you financial security.
- Free advisory services.
- Flexible payments - FR staff come to you so it is easier to make daily or weekly payments.

## ELIGIBILITY

- Individuals 18 years and above.
- Owners running a small business of any size or type.

## REQUIREMENTS

- Application Form - completed and signed.
- Two passport photographs.
- One identification document (e.g. passport, driving license, etc)
- Address Verification (e.g. electricity or water bill)

## SIGN UP

Contact any branch of FR for details and we will complete the application for you!



### BRANCHES & CONTACTS

#### SANTA MARIA BRANCH

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Tel: 0302433049

Website:

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E-mail:

[info@financial-republic.com](mailto:info@financial-republic.com)

## APPENDIX C: BENEFICIARIES AND BENEFITS

### Beneficiaries

Our solution has the potential to directly benefit 1,000 Ghanaians in 2013. By direct beneficiary we are referring to the female micro entrepreneurs who adopt our hybrid savings-loan product and enhance business outcomes. In addition, our solution could indirectly benefit another 4,000 Ghanaians in 2013. Indirect beneficiaries refer to the members of the entrepreneur's household who realize social benefits due to the increased disposable income that arises after an entrepreneur adopts our solution – and subsequently improves firm productivity and profits. According to a review of studies done by Banerjee and Duflo (2007, p.144) in developing countries the “number of family members varies between about six and twelve, with a median value (across the different countries) of between seven and eight”. Taking a conservative estimate, we will therefore assume that the average household has 5 members. Thus, each time our product solution is adopted, we estimate there will be approximately 1 direct beneficiary (the entrepreneur) and 4 indirect beneficiaries (the entrepreneur’s household family members).

Moreover, our partner, Financial Republic, currently runs four branches and will let us market the new product to 3,600 of its customers who own and operate a business. We conservatively estimate that 1,000 of these entrepreneurs will take up our solution. So in the next year we expect there to be roughly 5,000 beneficiaries in total (1,000 direct and 4,000 indirect). However, starting in 2013 Financial Republic will be opening branches at rate of 1 per month in Ghana and plans to market our solution to all customers. Thus, in three years there should be 40 branches (4 current + 36 new) operating across Ghana that offer our hybrid savings-loan product. With an estimated take-up of 1,500 customers per branch in total (over the three year period), there could likely be 60,000 entrepreneurs directly benefiting from our solution (40 branches x 1,500 adopters per branch). This also means another 240,000 people could indirectly benefit from the hybrid savings-loan product.

There are a couple points worth noting. First, scale up could be even greater if other firms follow and offer similar products. Second, the activities within each Financial Republic branch will be growth focused and dynamic so the estimated number of adopters (and hence beneficiaries) may be much larger than 1,500 per branch overall. For instance, there is reason to believe that the total number of customers per branch who adopt our solution will increase year by year. Also, a large portion of entrepreneurs will likely become repeat customers who adopt the hybrid savings-loan product in one year, but then re-adopt in a subsequent year to make a different firm investment. Taken together, these points suggest that our heuristic guess of 1,500 product adopters in total per branch probably underestimates the total number of beneficiaries who could be positively impacted by our solution.

### Benefits

Our solution is designed to overcome many of the demand-side constraints that otherwise keep female micro entrepreneurs from investing in their businesses. Thus, by adopting our locked savings-loan product, micro enterprises will be committed to investing in productive assets and have a greater chance of increasing sales and growing their business. The prospects of such outcomes might, in turn, encourage greater financial access for female micro entrepreneurs in developing countries. Over time,

our solution could increase the ability of female micro entrepreneurs to scale operations and fill in the ‘missing middle’ of small and medium enterprises.

Our solution should therefore appeal to policy makers interested in enhancing the productivity and growth of micro enterprises. Moreover, from the point of view of a financial institution marketing savings and loan products to these micro entrepreneurs, female clients who invest in productive business assets might have lower odds of default. These customers may also achieve potentially greater profitability than those who apply the capital toward other uses. Taken together, these outcomes might, in turn, stimulate new policies or products aimed at promoting even greater financial access for female micro entrepreneurs in developing countries.



## APPENDIX D: STUDY DESIGN – ADDITIONAL DETAILS

### RESEARCH CONTEXT

#### Study Locations

This project will be carried out in Accra, Ghana. The four study locations will correspond to four different regions where our study partner has physical (brick-and-mortar) retail banking branches. Thus, the study setting is an urban geographical location and the Ghanaian cultural will dominate the research context. By focusing on micro entrepreneurs, our study participants will be of a lower socio-economic status. In addition, roughly 70% of our participants will be females given the prevalence of subsistence entrepreneurship amongst this demographic. Micro entrepreneurship tends to be quite common in urban slum areas and marketplaces – in Ghana as well as other developing countries. Moreover, a large number of these entrepreneurs suffer from poor access to capital and/or financing options that facilitate the acquisition of productive firm assets. Overall, we believe this geographical and cultural context provides an ideal research setting for implementing this project.

#### Replications

This project is not a replication. However, depending on the results of our field experiment, we hope that the savings-loan product (its structure, design and implementation) will be replicable in other developing countries. In fact, our partner financial institution is planning to enter additional African countries by 2015 where it plans to market this savings-loan product within its portfolio of financial offerings.

### IMPLEMENTING PARTNER

#### Overview

Financial Republic ([www.financial-republic.com](http://www.financial-republic.com)) is a fully registered and for-profit micro finance institution in Ghana. We are partnering with Financial Republic for multiple reasons.

First, the founder is Ghanaian and a recent graduate from the London Business School. Given our close connections with the management team of Financial Republic, communication is clear and decisions regarding the project's objectives are both quick and aligned between their business objectives and our research interests.

Second, the company has a professional management team with international experience. In addition to the founder, the chairman and managing director are chartered accountants who together have nearly 40 years experience working for large multinationals in the UK and across Africa. These two managers are on the ground in Accra and heavily involved in the day-to-day operations of Financial Republic. We have spent time with all of them and have been impressed by their level of professionalism and dedication to the project. We can rely on them for an 18-month project.

Third, the company has a growth focus. Within Ghana, Financial Republic currently has four fully operational branches and grew its client base to over 4,000 micro entrepreneurs in 18 months. Each

branch has roughly 20 staff members. Now that the business model has been tested and refined, Financial Republic has plans to add branches in Accra. Thus, given the company's expansion plans, the management team is very open to product and market 'experimentation' so as to learn more about how to market and service customers more effectively. This means Financial Republic is willing – within the constraints of its operations – to let us implement a randomized controlled trial research project so long as it is aligned with their business objectives.

Fourth, Financial Republic focuses on supporting the growth of micro and small enterprises. As such, the company offers both savings and loan products tailored to meet the personal and business demands of this market segment. Financial Republic uses the same field officer salesforce to collect savings deposits, process loan payments and make withdrawals. Thus, given the company's target customers, current product offerings and distribution model, it is an ideal partner for implementing the hybrid savings-loan product we plan to use as the intervention in our study.

### **Design of Intervention**

The intervention is a new financial product that the research team and Financial Republic have jointly designed. The underlying financial features (terms, rates, period) will be identical across the proposed product options. Further, these financial features will not differ substantially from the individual savings and loan products already offered by Financial Republic. However, as described previously, both the design features (combining savings and loans into a single product) and marketing features (brochures with categories for each of the four locked product options) will differ for the new intervention.

### **Agreements**

Financial Republic has agreed to cooperate for this project and allow us to randomize the customers from whom the intervention is introduced. We have a signed MOU from Financial Republic (as well as an NDA) to cooperate on the project, including approval to access their administrative data (customer records of savings deposits and loan payments). Further, Financial Republic has agreed to let us conduct baseline and endline surveys to examine the impact of the intervention (locked versus unlocked savings-loan products) on the economic and social outcomes of its micro entrepreneur customers. Additionally, we will be able to track their ongoing relationship with customers, including default/repayment rates and adoption of other financial products and services.

### **Potential Risks**

Overall, we feel there is a good relationship between the research team and Financial Republic's management team. The main concern we have is regarding take-up of the new locked savings-loan product we are introducing as the intervention for this project. If customers do not adopt the product or take-up is slow, then we may need to adjust the product design or enhance the marketing efforts.

- In terms of product design, we could look into lowering the interest rate (from 6% to 5% per month) or possibly decreasing the down-payment required for loan applications (from 30% to 25%).
- In terms of the marketing strategy, we could create additional product brochures and have field officers carry out a second (or third) round of sales visits to all customers. Increasing the radio

advertising efforts by Financial Republic is another option for generating awareness about the new savings-loan products.

- Finally, after the first four months of the marketing program’s launch we will assess whether enough micro entrepreneurs have adopted the product such that the size of the treatment group provides sufficient statistical power. If take-up rates are low in the four regions where the study is initially launched, we will consider introducing the product in other branches of Financial Republic.

## RESEARCH DESIGN

As is typical in a large-scale field experiment with thousands of micro and small enterprises, there are multiple problems, which could arise and need to be addressed during the project term.

### Spill-over Effects

Our unit of randomization is the individual customer. Given this randomization strategy, it is possible that knowledge of the locked product (offered only to the treatment group) can ‘spill over’ to a customer in the control group. We will take several steps to minimize contamination through spill-over effects.

- We will introduce the product in a controlled way using externally contracted research assistants to make the initial product offers and use color-coded product brochures and passbook stickers for identifying treatment versus control group customers.
- A similar set of procedures will be implemented in each of the four participating branches to control and enforce randomization.
- Moreover, within each branch, individual training and detailed instructions will be provided to the branch manager, secretary and teller regarding which product option can be offered to (and signed up by) every single customer.

### Survey Effects (or Demand Effects)

We will take several steps to deal with potential survey/demand effects (Shadish, Cook and Campbell 2005, p.78-80).

- We will measure whether key outcomes differ in non-random ways across the sample, such as for participants whom the surveyor indicates as attempting to guess the purpose for the interview.
- We will make the dependent variables less obvious by measuring them outside the experimental setting (e.g. using bank administrative data which the customer never sees) or at a different time from when the interventions are implemented.
- Our baseline survey will include a host of questions and the key outcomes or hypothesized variables will be embedded within the instrument so participants are not given cues on expected outcomes or desired behaviors.
- We will further disguise the purpose of questions and use the “list randomization” approach for eliciting responses on sensitive questions (Karlan and Zinman 2011).
- We will do our best to minimize interactions between the research team and Financial Republic customers so that participants do not feel they are being given any special.

- All of the research assistants and Financial Republic staff will be blind to the study design, research objectives, and random assignment of customers. Only the top management team is privy to study details.

### **Hawthorne and John Henry Effects**

In our study, Hawthorne and John Henry effects might occur if the intervention changes the participants' motivation levels, and this change in motivation contributes to the entrepreneur's successful outcomes in the future. We have taken numerous steps to enhance the ecology validity (realism) of our study so that the participants will believe the surveys are simply part of Financial Republic's new market research initiatives and the product offers are really being offered by Financial Republic (and are not some experimental intervention). Moreover, we have also ensured that the entire experience is identical for customers in the treatment and control groups. The only difference between the two groups will be the product brochures and the loan receipt process. Otherwise, the market research, product offers, sales scripts, sign-up sheets, loan applications, etc will be the same for all participants – participants in each group are therefore unlikely to become aware of their test or control status. This should hopefully reduce the chances that Hawthorne and John Henry Effects occur. Nonetheless, we will use qualitative methods such as unstructured interviews and direct observation to help discover whether such effects exist.

### **Attrition**

Attrition is likely to occur despite our study participants being closely connected to Financial Republic. While we are not providing incentives for participation, the fact that the participants are all active savings customers of Financial Republic should reduce the likelihood of their dropping out over the 18-month study period. Attrition rates could also be reduced by ensuring that Financial Republic's field officers continue to provide a high level of service and interact with all customers on a daily basis. Nonetheless, we will still be checking that there is not differential attrition (between the treatment and control groups) or systematic attrition (for sub-groups of the population based on a particular individual or firm characteristic). If it happens, then we will control for this potential confounding factor in the analysis.

### **RISKS AND ETHICS**

This project is open to the usual implementation risks that come with running randomized controlled trials in developing countries. For example, internal validity could be compromised due to selection biases, contamination, or differential attrition. Alternatively, external validity could suffer due to a local context that is too narrow or a product / intervention that has little chance of generalizing to other developing countries. We will continue to work closely with the junior researchers and other local IPA Ghana staff to mitigate these risks as best we can. IPA Ghana has been running RCTs in Accra and across the country for many years. We can rely on the experience and in country knowledge of our colleagues.

Another risk is, of course, that of the product not succeeding in attracting enough customers. While this is always a risk with an innovative product, we have taken a number of steps to minimize this possibility. First, we have had extensive interactions with both top management and the field sales force of Financial Republic, to gauge how high the demand for loans is. It is precisely because

Financial Republic feels there is a great hunger for loans that it is willing to invest significantly in offering our product. Even after take-up, there might be issues around repayment, which would in turn lead us to find very few economic and social effects of the loans. Again, while possible, the fact that our sample consists of customers with long savings histories with Financial Republic should mitigate this worry. In addition, we have a signed Letter of Support and an MOU from the CEO of Financial Republic conveying their commitment to this project over the next 18 months.

Finally, there are also two potential ethical issues that could arise in our context. One, there is the general concern that we might be unfairly disadvantaging a set of people (the control group) from receiving the benefits of a product that might lead to superior economic and social outcomes. We feel that this concern is minimal in our case, because except for the ‘locked’ aspect, both control and treatment groups are dealt with in an identical manner. In particular, the control group is eligible for loans of exactly the same magnitude as the treatment group. Further, it is not clear, *ex ante*, that the locked savings-loan product is, in fact, superior to the unlocked product. Indeed, an ethical issue would arise if we found dramatically different impacts on social and economic outcomes very soon after the intervention – at that point, we would perhaps be forced to revise our strategy of offering any unlocked loans at all. But we feel the possibility of such dramatic effects very soon after the intervention is negligible. Two, there are the usual ethical issues when one is dealing with sensitive financial data at the individual customer level. Here we follow best practice through IPA’s strict protocols for data security and confidentiality.

With respect to IRB/Ethics protocols, such approval has been obtained from IPA’s head office in Washington, DC. The collaborating researcher has also obtained IRB/Ethics approval from the London Business School. In addition, all members of the research team (the senior researcher and the three junior researchers) have completed the National Institute of Health (NIH) training course on “Protecting Human Research Participants”. Moreover, all participants will provide their informed consent prior to any interactions with the researchers or survey team. A short consent form will be read to each participant in English (and translated into a local language as required). This form will need to be signed by the participant and will include such statements as:

- Your participation is voluntary.
- Your data will always remain confidential and anonymous. No information will be shared with any third party. Your answers are for internal research purposes only.
- You are already a client of Financial Republic and, thus, your answers on this research survey will not affect your chances of receiving a loan from Financial Republic in the future.
- Please sign below to confirm the truth of the information you are providing and your commitment to participate in the project for the next eighteen months.

With respect to privacy and confidentiality protocols, all project-related data will be encrypted (via TrueCrypt software) and kept on the password-protected computers of the IPA field staff assigned to the study. Personally identifiable information (i.e., name, address, and Ghana ID number) will be removed from data sets and stored in a separate data file. The working data set and the ‘personally identifiable’ data set will be linked via a unique identifier; the two files will never be stored or transmitted together.

## APPENDIX E: RESEARCH TEAM & CAPACITY BUILDING

### Research Team: Roles and Responsibilities

Name	Task
Philip S. Amara <i>(Senior Researcher)</i>	Country Director, IPA Ghana <ul style="list-style-type: none"> <li>▪ Partner relations; policy oversight; project oversight and guidance.</li> <li>▪ Development of junior researcher skills and careers.</li> </ul>
Augustine Dampsey Owusu <i>(Junior Researcher)</i>	Project Manager, IPA Ghana <ul style="list-style-type: none"> <li>▪ In-country project coordination of all research activities: study design; instrument design; data collection, surveyor / team leader management; monitoring and compliance; data preparation; analysis of datasets; writing of reports and articles.</li> </ul>
Janet Adjabeng <i>(Junior Researcher)</i>	Team Leader & Research Officer, IPA Ghana <ul style="list-style-type: none"> <li>▪ Manages piloting of intervention and survey instruments.</li> <li>▪ Coordinates team of 9-10 surveyors during data collection (baseline, midline, endline).</li> <li>▪ Leads monitoring and compliance activities.</li> </ul>
Mavis Amponsah <i>(Junior Researcher)</i>	Team Leader & Data Coordinator, IPA Ghana <ul style="list-style-type: none"> <li>▪ Supervises data audit and management process, including training and support to data entry team.</li> <li>▪ Coordinates team of 9-10 surveyors during data collection (baseline, midline, endline).</li> </ul>

### Research Team: Training and Experience

Name	Age	Sex (M, F)	Training and experience
Philip S. Amara <i>(Senior Researcher)</i>	Over 30	M	MSc (Survey Methodology); MSc (Statistics); BSc (Economics); 14+ years of project management experience, including ten years of experience in initiating and overseeing high quality research on economic and social issues.  <i>(Note: permanent residence in Ghana, as per PEP requirement.)</i>
Augustine Dampsey Owusu <i>(Junior Researcher)</i>	32	M	BSc (Engineering); 4+ years of project management experience leading evaluation projects in the area of development economics.  <i>(Note: permanent residence in Ghana, as per PEP requirement.)</i>
Janet Adjabeng <i>(Junior Researcher)</i>	27	F	BA (Mathematics); 4+ years of research experience supervising data collection and intervention implementation activities.  <i>(Note: permanent residence in Ghana, as per PEP requirement.)</i>

			<i>requirement.)</i>
Mavis Amponsah <i>(Junior Researcher)</i>	27	F	BA (Economics, Computer Science); 4+ years experience managing data entry and analysis for multiple development-related research projects.  <i>(Note: permanent residence in Ghana, as per PEP requirement.)</i>

### Capacity Building

First and foremost, Augustine Owusu is the senior project manager who is fully in charge of managing the day-to-day operations of the project from conception to completion. This includes designing and implementing all aspects of the research program – strategic and tactical activities, as well as conceptual and empirical deliverables. It also involves working with the partner organization, Financial Republic, on client sampling and the creation of our novel savings-loan product (e.g. meetings with customers, field officers, credit officers, and branch managers). Augustine also leads discussions with the executive team of Financial Republic, including its directors and Chairperson. Moreover, in the later stages of the project, Augustine will take the lead on analyzing the data and writing up the results. The success of this project very much depends on Augustine.

*It is important to note that this is a new ‘project management’ model for our organization.* IPA senior project managers are always graduate students from the US (or the UK, Canada, etc) who have already received extensive training in economics, research methods and econometrics. In the case of the proposed project with Financial Republic, however, we decided to make an exception that lets us test out a new model in which locally sourced talent can be developed into more senior research roles. Augustine showed a lot of promise during his previous positions with IPA and so we decided to give him the senior project management role for this Financial Republic project. Thus far, Augustine has been making tremendous gains in areas such as research design, field management and partner relationship building. Nonetheless, for this new model to work, Augustine must further refine his skills and also build new skills so that in the future he will be able to fully manage a large scale impact evaluation study end-to-end without the need for close supervision by an IPA director (e.g. in this case, the senior researcher on the project: Philip Amara). For instance, over the next 18 months, one of our goals is for Augustine to build his policy outreach skills and his ability to translate research so it is more accessible for policy makers. Another area where we expect Augustine to develop professionally is in his analytical and empirical analysis techniques, including learning programs such as SPSS and Stata.

Furthermore, IPA Ghana carries out numerous training activities and workshops to enhance the capacity of all the developing country researchers involved in its projects. Importantly, a PAGE research grant would provide the funding for the three “junior researchers” to remain dedicated to this project on a full-time basis. As a direct result, these junior researchers would have the opportunity (and allocated time) to take part in numerous training activities and workshops focused on the following “capacity building” topics:

- research design (focus on RCTs),
- survey methodology,

- Blaise programming for electronic surveying
- interviewing skills,
- data collection skills and techniques,
- advanced data handling,
- analysis and econometrics,
- report writing,
- presentation skills.

This training would be provided during at least four phases of the study (launch, baseline, midline, and endline phases). Depending on the phase, all developing country “junior researchers” involved in this evaluation project will receive additional training: Augustine Owusu, Janet Adjabeng, and Mavis Amponsah.

With support from a PAGE grant, Augustine and Jane would also be able to attend a weeklong research training camp hosted by J-PAL and IPA in Nairobi, Kenya in February 2013 or in Chennai India in August 2013. While Augustine and Jane have experience overseeing survey teams, the J-PAL / IPA workshop will give them high level training on randomized-control trial research design, statistical analysis, survey design, and project management. In addition, a PAGE grant would pay for Augustine and Jane to take an online Stata course through the University of North Carolina ([http://www.cpc.unc.edu/research/tools/data\\_analysis](http://www.cpc.unc.edu/research/tools/data_analysis)) and possibly some intense ‘program evaluation’ courses via the Institute for Fiscal Studies in London (<http://www.cemmap.ac.uk>). The funding could also cover a flight between Accra and London so Augustine and Stephen Anderson (a collaborating researcher) could work together on data analysis. Finally, funding from PEP would be used to train Jane and Augustine in survey methods, data collection, questionnaire design, and data analysis using statistical software (such as SAS, Stata and SPSS) at the University of Michigan’s “Summer Institute in Survey Research Techniques” (through the contacts of the project’s senior researcher, Philip Amara). These opportunities would greatly develop Augustine and Jane’s capacity as researchers and their professional prospects.

Outside of the current project, Mavis Amponsah is the IPA Ghana Data Entry Coordinator. In addition to the training activities outlined above, we would like Mavis to develop her ‘electronic survey’ programming skills. Currently she is able to program CS-Pro and Epidata software for entering responses from paper based surveys. However, IPA and other research organizations are increasingly using electronic data collection with netbooks, tablets, or smart phones. The most advanced software used for electronic data collection is Blaise, which the proposed Financial Republic research study will use. Mavis currently has basic Blaise programming skills, but we would like Mavis to be able to program Blaise without the use of an external consultant. With the PAGE grant we will pay for programmers to train Mavis on advanced Blaise code so that she can program the entire Financial Republic survey, as well as surveys for future research projects.

In addition, by working full-time on the project the three junior researchers could further develop their research skills by participating in PEP meetings, presenting at international conferences, organizing a local or national policy conference in this research area, and performing various dissemination activities.



## APPENDIX F: TIMELINE AND MILESTONES

Milestone	Target Start Date	Target End Date
<b>Finalize design of intervention (savings-loan product) and baseline</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Includes piloting of:                             <ul style="list-style-type: none"> <li>○ Product Brochures and Product Packages</li> <li>○ Research Officer roles/responsibilities and Sale Scripts</li> <li>○ Baseline Survey</li> </ul> </li> </ul>	<b>2013/02</b> <i>(Month 0)</i>	<b>2013/04</b> <i>(Month 2)</i>
<b>Implement baseline survey</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Confirmed for implementation (n = 3,600 entrepreneurs).</li> </ul>	<b>2013/04</b> <i>(Month 2)</i>	<b>2013/06</b> <i>(Month 4)</i>
<b>Launch intervention</b> [FR, with IPA Ghana monitoring/compliance] <ul style="list-style-type: none"> <li>• Intervention to be launched in combination with baseline survey.</li> </ul>	<b>2013/04</b> <i>(Month 2)</i>	<b>2013/06</b> <i>(Month 4)</i>
<b>Savings period</b> [FR clients, with IPA Ghana monitoring/compliance] <ul style="list-style-type: none"> <li>• The savings period will be 8 weeks (per client) from the sign up date. However, since the product offers will be made one branch at a time, this will be a rolling period that could last up to 5 months in total (across all study branches).</li> </ul>	<b>2013/04</b> <i>(Month 2)</i>	<b>2013/08</b> <i>(Month 6)</i>
<b>Loan disbursement and firm investment</b> [FR, IPA Ghana monitoring/compliance] <ul style="list-style-type: none"> <li>• Release of funds in cash (control group) – Investment ‘unlocked’.</li> <li>• Asset purchase (treatment group) – Investment ‘locked in’.</li> </ul>	<b>2013/07</b> <i>(Month 5)</i>	<b>2013/09</b> <i>(Month 7)</i>
<b>Loan repayment period</b> [FR clients, with IPA Ghana monitoring/compliance]	<b>2013/07</b> <i>(Month 5)</i>	<b>2014/01</b> <i>(Month 11)</i>
<b>Midline survey</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Confirmed for implementation (n = 3,600 entrepreneurs).</li> </ul>	<b>2014/02</b> <i>(Month 12)</i>	<b>2014/03</b> <i>(Month 13)</i>
<b>Analyze data</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• First attempts at analyzing data to obtain initial insights.                             <ul style="list-style-type: none"> <li>○ Baseline Survey Data.</li> <li>○ Bank Admin Data (take-up, deposit and savings behavior).</li> <li>○ Midline Survey Data.</li> </ul> </li> </ul>	<b>2014/04</b> <i>(Month 14)</i>	<b>2014/05</b> <i>(Month 15)</i>
<b>Endline survey</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Confirmed for implementation (n = 3,600 entrepreneurs).</li> </ul>	<b>2014/08</b> <i>(Month 18)</i>	<b>2014/09</b> <i>(Month 19)</i>
<b>Analyze data and construct report</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Finish analyzing dataset, once updated with endline data.</li> <li>• Write up report with results and lessons learned.</li> </ul>	<b>2014/10</b> <i>(Month 20)</i>	<b>2014/11</b> <i>(Month 21)</i>
<b>Policy: Dissemination and Outreach</b> [IPA Ghana] <ul style="list-style-type: none"> <li>• Dissemination of Summary Report with findings (email, websites, etc).</li> <li>• Initial meetings with key stakeholders and policy makers (locally in Ghana).</li> </ul>	<b>2014/11</b> <i>(Month 21)</i>	<b>2015/02</b> <i>(Month 24)</i>



<p><b>Academic Paper: writing of draft</b> [IPA Ghana]</p> <ul style="list-style-type: none"> <li>• Target Journal: American Economic Review.</li> </ul>	<p><b>2015/03</b> <i>(Month 25)</i></p>	<p><b>2015/08</b> <i>(Month 30)</i></p>
<p><b>Launch Phase 2 of project</b> [IPA Ghana &amp; additional partners]</p> <ul style="list-style-type: none"> <li>• Intervention: Efficiency Assets solution (e.g. solar, water, etc).</li> </ul>	<p><b>2015</b></p>	<p><b>2016</b></p>
<p><b>Policy: Dissemination and Outreach</b> [IPA Ghana]</p> <ul style="list-style-type: none"> <li>• Dissemination of Final Report for Phase 1 findings and lessons learned (email, websites, etc).</li> <li>• Meetings with key stakeholders and policy makers (locally in Ghana and internationally).</li> <li>• Presentations at conferences, consortiums and association general meetings (locally in Ghana and internationally).</li> <li>• Dissemination of Initial Report for Phase 2 findings (email, websites, etc).</li> </ul>	<p><b>2015</b></p>	<p><b>2017</b></p>

## APPENDIX G: POLICY RELEVANCE AND INFLUENCE PLAN

Entrepreneurship plays a critical (but often overlooked) role in the private enterprise space of developing countries. As such, the timing of our proposed research project fits well with the development landscape currently facing policy makers. Moreover, our research questions are particularly relevant for international and national policy decisions. Despite their collective economic footprint, the vast majority of developing country entrepreneurs remains tiny and lacks sufficient resources to scale a business. And without scale, the chances of improved productivity are low. This is a challenge in most developing countries where very few firms manage to grow beyond 10 employees (refer to Table 1 in McKenzie 2011b, p.20). Ghana is no exception. Data from the mid-2000s estimated there were a total of 26,088 manufacturing firms in the country. Roughly 22,181 of them (85%) were firms with less than 10 employees. Only 3,907 firms managed to reach a size of 10 or more employees (15%). And of this number, only 251 firms exceeded the 100-employee mark (Ghana Industrial Census, 2003). This means less than 1% of all firms in Ghana managed to substantially scale operations. Thus, given the sheer number of female owned micro enterprises across the globe, our intervention has the potential to improve the firm productivity and, in turn, the lives of millions of poor entrepreneurs. And as argued by McKenzie (2011b, p.2): increasing the productivity of African firms “is vital for long-run growth prospects and generating the jobs needed to employ Africa’s young and rapidly growing labor force”.

Insights from this research should therefore assist policy makers in designing and promoting new financial products that can enhance the productive assets of female micro enterprises and, in turn, increase their ability to scale operations and transition into SMEs. While there exist thousands of micro finance institutes, to the best of our knowledge they do not yet offer the hybrid savings-loan product (which includes the accompanying service-delivery model) that we have designed for this evaluation project. In general, overcoming the challenges of ensuring female micro entrepreneurs invest capital into productive business assets has proved difficult to date. Financial institutions typically give a micro entrepreneur savings accounts or loans that do not restrict the funds. As such, female micro entrepreneurs are able to (and most often do because of household constraints) reallocate the capital to non-business uses. By contrast, our product will restrict investment choices of entrepreneurs by tying the financial product to investments in specific productive assets. Thus, the intervention designed for this study offers an innovative approach for filling in the ‘missing middle’ by combining improved access to credit with increased investment in firm assets. These outcomes might, in turn, stimulate new policies aimed at promoting even greater financial access and firm investment for female micro entrepreneurs in developing countries.

In addition, in order to make a clearer presentation of the policy relevance of our research, the implications we draw from this field experiment can be discussed in the context of related NGO and Government efforts to enhance development of micro, small and medium enterprises (MSMEs). In particular, our research project is aligned with the pilot program of the International Finance Corporation (IFC) launched in 2003 to deliver a package of development products to MSMEs in Africa. This program invested over \$384 million into three key areas: increasing access to finance for MSMEs, taking measures to build capacity in MSMEs, and promoting business environment reforms. Our study will examine the impact of a financial investment intervention (i.e. a hybrid savings-loan product that ties funds to the investment of productive firm assets) on the business performance of micro and small enterprises in Ghana. Thus, the intervention we will implement is linked to one of the

three policy objectives outlined by the IFC as important for the growth of MSMEs in developing countries. The proposed research project also fits closely with the first of four ‘building blocks’ more recently outlined by the IFC for supporting SME development across Sub Saharan Africa: (1) Access to Finance, (2) Capacity Building, (3) Access to Markets, and (4) Investment Climate.

In the context of Ghanaian government policies, our proposed project fits with elements of the Ghana Industrial Policy (<http://www.ghana.gov.gh/index.php/information/policy-documents/6108-ghana-industrial-policy>). One, as noted in this policy document: “Financing is a major challenge that confronts the manufacturing sector in Ghana” (Section 1.3.1). In particular, improved financing for equipment purchases and working capital is recommended, while the high cost of borrowing is said to limit access to credit and restrict the scope for growth. As such, this policy provides several prescriptions related to micro and small business development, such as the “government will support the banking sector to reduce transaction cost and risks through measures such as... promoting capacity building for SME lending and promoting BDS [Business Development Services] for SMEs” (Section 1.3.2). The government also claims that it will continue to encourage the growth of lease financing as it is a “convenient alternative source of providing the necessary equipment for manufacturing firms without collateral” but to date it represents an under developed market (Section 1.3.5). Considered together, the research study we aim to launch aligns with several of the growth priorities recently established by Ghanaian policy makers. The outcomes of our impact evaluation can shed light on these SME financing and development issues and help inform policy decisions in Ghana.

Finally, the project’s design has benefited from discussions with and/or feedback from:

- Development economists (e.g. Dean Karlan, [dean.karlan@yale.edu](mailto:dean.karlan@yale.edu); Chris Woodruff, [c.woodruff@warwick.ac.uk](mailto:c.woodruff@warwick.ac.uk); Bilal Zia, [bzia@worldbank.org](mailto:bzia@worldbank.org)).
- IDRC program officers (e.g. Martha Melesse, [mmelesse@idrc.ca](mailto:mmelesse@idrc.ca); via our project’s contributing PhD student, Stephen Anderson-Macdonald of LBS).
- Research Review Committee of Innovations for Poverty Action (IPA, [www.poverty-action.org](http://www.poverty-action.org)).
- Senior management team of our commercial partner, Financial Republic (e.g. Nana Banton, [nana@financial-republic.com](mailto:nana@financial-republic.com)).
- Local bank and microfinance institutions in Ghana (see the “Policy Influence Plan” in Section 5 below).

<b>Institution</b>	<b>Contact</b>	<b>Target</b>
<p><i>Ghanaian Micro Finance Organizations and Rural Banks</i> (*Current IPA Partner)</p> <ol style="list-style-type: none"> <li>1. Financial Republic*</li> <li>2. Opportunity International*</li> <li>3. Sinapi Aba Trust*</li> <li>4. Responsible Finance Ghana</li> <li>5. Mumadu Rural Bank*</li> </ol>	<p><i>(Note: We have already discussed the project with these individuals and will continue consultations throughout the project.)</i></p> <ol style="list-style-type: none"> <li>1. Nana Banton</li> <li>2. Fleur de Vries</li> <li>3. Matthew Brown</li> <li>4. Cynthia Odonkor</li> <li>5. Benedict Appiah</li> </ol>	<p><i>(Note: We will contact the named individuals in the next 3 months.)</i></p>

<p>6. Northern Volta Rural Bank*                  7. Accion International                  8. Apex Bank                  9. ProCredit                  10. Many other MFIs and Rural Banks across Ghana.</p>	<p>6. Patrick Atta                  7. Alex Shaw                  8. Eric Osei-Bonsu                  9. Edwige Takassi                  10. TBD</p>	
<p><i>Northern Rural Growth Programme, Tamale</i>                  (promote pro growth policies and programmes in Northern Ghana)</p>	<p>G.A. Roy Ayariga, National Programme Coordinator</p>	
<p><i>Ghana Association of Microfinance Companies (GAMC), Accra</i></p>	<p>Kwaku Ohene Boakye, Southern Sector President                  (meetings via Financial Republic)</p>	<p>Ekow Orleans Boham, National Vice Chairperson</p>
<p><i>Bank of Ghana (BOG), Accra</i></p>	<p>Mr. Millison K. Narh, Deputy Governor                  (meetings via Financial Republic)</p>	<p>Mr. Franklin Belnye, Head of Banking Supervision department</p>
<p><i>Innovations for Poverty Action, Ghana Country Office, Accra</i>                  (local conferences, including workshops and seminars at the University of Ghana)</p>	<p>Pace Philips, Deputy Country Director</p>	
<p><i>World Bank, Development Research Group, Washington DC and Globally</i>                  (feedback on research design, assistance with policy implications, as well as dissemination of key findings via conferences and meetings with relevant policy makers in Africa)</p>	<p>Bilal Zia, Senior Economist, Development Research Group</p>	<p>David McKenzie, Lead Economist, Development Research Group</p>
<p><i>Africa Development Bank Group, Tunisia</i>                  (assistance with policy implications, as well as dissemination of key findings via conferences and meetings with relevant policy makers in Africa)</p>		<p>Senior contacts in the Gender department and the Private Sector Development department</p>
<p><i>London Business School and Columbia Business School, London and New York, “Business Solutions to Poverty”</i>                  (bi-annual conference, publication of academic articles in peer-reviewed journals)</p>	<p>Professor Rajesh Chandy, Chair in Entrepreneurship</p>	
<p><i>Deloitte Institute for Innovation and Entrepreneurship, London</i>                  (website news, Business Strategy Review articles, local conferences and workshops)</p>	<p>Professor Kamalini Ramdas, Academic Director</p>	
<p><i>International Development Research Center (IDRC), Ottawa</i>                  (international conferences and workshops)</p>	<p>Martha Melesse, Senior Program Officer</p>	
<p><i>Innovations for Poverty Action, SME</i></p>	<p>Lucia Sanchez, Director</p>	

<i>Initiative</i> , Washington DC (website news, annual conference, workshops, etc)		
<i>Global Entrepreneurship Monitor (GEM)</i> , London and Cape Town (working paper series, international conferences and workshops)	Mike Herrington, Executive Director	
<i>Stanford Institute for Innovation in Developing Economies (SEED)</i> , San Francisco (international conferences and workshops)		Gina Klein Jorasch, Director, SEED Education and Dissemination

Our experimental design allows us to measure the impact of this innovative solution on product take-up and investment in firm assets, as well as on the female micro entrepreneur’s savings behavior, loan repayment behavior, business performance and household welfare. In addition, our approach should shed light on the mechanisms through which these behavioral changes may occur, such as overcoming risk aversion of female micro entrepreneurs or the diversion of cash into non-business uses.

Insights from this research project will therefore be invaluable for learning what works (and what doesn’t) in the current product design and delivery model. Thus, the first user of our research will be Financial Republic. Senior management of Financial Republic can rely on the rigorous evidence produced to adjust the product solution and improve future rollouts of our locked savings-loan product to micro entrepreneurs across Ghana and (eventually) other African countries.

Beyond Financial Republic, our findings will be widely applicable to micro-finance organizations and private banks within Ghana and other African countries looking to adapt the loan services they offer and ways to promote their client’s business development. IPA has a strong track record of disseminating results both within the countries where they operate and in international venues. For example, in 2012, IPA held a savings conference to disseminate the results of its savings studies in Ghana, which was attended by over 100 policy makers and practitioners from MFIs, banks, and the government. Likewise, IPA will hold at least one but likely more in-country conferences to disseminate the results of this study to local decision makers. Moreover, through meetings with our partner (Financial Republic), the project has already been discussed with senior contacts at the Ghana Association of Microfinance Companies (GAMC) and the Bank of Ghana (BOG). In fact, during one of these meetings, it was suggested by the Deputy Governor of the BOG that car or automobile loans be removed from the “Vehicle Savings-Loan” category of our solution (given the differences in repayment periods and principal amounts for these loans compared to those for other productive firm assets). In some of the recent GAMC and BOG discussions, additional feedback was also provided on the portfolio of loans to target with the product launch (i.e. across the four asset categories and across various loan sizes). We will continue to reach out to these government policy makers.

Outside of Ghana, both IPA and the LBS research collaborators will disseminate the results to international audiences through publication on the IPA website, targeting relevant organizations and academics, and speaking about the results at international conferences. The formal way IPA disseminates results is through our conferences and publishing two page policy briefs of our research studies that are handed out and posted on our website. Less formally, IPA’s Country Directors are very

connected with relevant stakeholders in their respective countries and share results of pertinent studies in partner meetings on a monthly basis. In addition, we can communicate with economists at the World Bank who have expressed an interest in learning about how our project progresses and the eventual economic and social outcomes realized by the participating female entrepreneurs.

For the LBS collaborating junior researcher, initial feedback on the research and its design was obtained at the inaugural “Business Solutions to Poverty” workshop held at London Business School in December 2012. More complete results will be presented at the second “Business Solutions to Poverty” workshop to be held at Columbia Business School in December 2014. These workshops feature participants from leading academic, corporate, and government institutions. Corporate participants include executives from leading banks and mobile phone companies, and governmental institutions include policy makers from the UK, US, and African nations, in addition to those from the World Bank and IFC. In addition, we will seek to actively disseminate the results at other venues such as the World Economic Forum and at other academic and policy events, including those organized by the International Development Research Council (IDRC) in Canada and globally (e.g. via PEP and related networks). Moreover, the research team can share insights from the work in print, online, and via podcasts through the Deloitte Institute for Innovation and Entrepreneurship. Other groups, which are increasing their reach for dissemination of research on entrepreneurship in developing countries, include the Global Entrepreneurship Monitor (GEM) and the Stanford Institute for Innovation in Developing Economies (SEED). We will follow-up with contacts to pursue further outreach activities through these channels.