The Supply and Demand Effects of Financial Incentives: Experimental Evidence from Branchless Banking in Indonesia*

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Abstract

We propose to test the effects of an increase of monetary incentives paid to frontline service providers and the effect of making their pay transparent on the take-up of a new technology. The context is one of a large bank that hires local branchless banking agents to introduce a new savings account in a rural and largely unbanked area of Indonesia. These agents are (a) randomized into receiving a high vs. low piece rate for recruiting new customers, and (b) randomized into whether or not the piece rate is revealed to the community. The goal of our experiment is to shed light on the supply- and demand-side effects of monetary incentives: While high incentives can increase the agent's effort, they can also convey a signal about the quality of the product, the agent, or the bank to potential clients. If the signal is negative, then raising financial incentives may backfire, even though they increase agents' effort and particularly so if they are made public knowledge in the village. Ultimately, our project will contribute to our understanding of how financial incentives paid to frontline workers can affect the adoption of

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new beneficial technologies in developing countries.

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1 Introduction

Many beneficial technologies are vastly underused (e.g., bed-nets, chlorine tabs, improved seeds, fertilizers, financial products), and this is particularly the case in developing countries. This has been shown to contribute to the lack of economic growth in these countries (Caselli and II (2001); Comin and Hobijn (2004); Parente and Prescott (1994)). While a large body of work has analyzed how to boost the demand for new technologies by lowering consumer prices (Dupas and Cohen (2010); Ashraf, Berry, and Shapiro (2010)), increasing credit availability (Duflo, Kremer, and Robinson (2011)), or raising awareness (Conley and Udry (2010); Bryan, Chowdhury, and Mobarak (2014); Bandiera and Rasul (2006)), very few papers have analyzed the role of *supply-side financial incentives* on technology adoption. In this paper, we study the effect of changing the *level* and the *transparency* of financial incentives paid to agents in charge of promoting a new technology on its take-up.

While it has been widely shown that paying workers higher financial incentives increases their level of effort (and thus, in our context, increases their effort in promoting a new technology),[1] we hypothesize that — in a setting with incomplete information about a new product — the level of financial incentives paid to workers can also affect the take-up of technologies through potential customers' perceptions of the product attributes (*demand-side effects*). A new product might, for instance, be perceived as being of lower quality when it is promoted or sold by a person who receives high incentives for selling it (e.g., the worker could be perceived as being motivated by monetary benefits rather than by the benefit the client derives from its use). If financial incentives convey such negative signals, then raising them might reduce technology adoption, even if the agent's effort increases. On the other hand, financial incentives could convey a positive signal, e.g., if potential customers perceive a well-paid agent as being more competent or as working for a more efficient organization, in which case the demand effect of incentives might instead reinforce the supply effect.[2]

The direction of the demand-side effect of financial incentives has important implications for the design of incentives in development organizations and the way they are disclosed.

[1] See Lazear and Shaw (2007) and Bandiera, Barankay, and Rasul (2011) for reviews.

[2] This "signaling effect" of incentives is analogous to the well-known evidence that increasing the price of a new product can reduce the perceived quality of the product and this signal can affect consumers' decisions, e.g., Milgrom and Roberts (1986).

If increasing financial incentives conveys a negative signal about the product, organizations seeking to maximize the take-up of new technologies would be better off not publicizing front-line workers' pay structures among the community (private information). On the other hand, if increasing the agent's incentives conveys a positive signal about the product, then making the agent's pay public information would further increase the take-up of new technologies.[3]

Our study takes place in the context of the introduction of branchless banking in rural Indonesia. The Government of Indonesia has recently issued a law designed to promote branchless banking as a means to increase access to financial services among its largely unbanked population. The delivery of banking services is done through local agents who are tasked with promoting *savings accounts* in their own community and are in charge of doing deposits and withdrawals to and from customers' accounts.

The experiment takes place in 400 rural villages in five kabupatens of East Java, where a large share of the population is unbanked and where our partner bank was expanding at the start of the project. Each village is served by a locally recruited agent. These agents are not paid a fixed wage for their work, but rather they are given a commission for each customer who opens a new account. The experiment randomizes the 400 villages (one agent per village) into *low* vs. *high* incentives treatments, in which the agent receives 2,000 IDR vs. 10,000 IDR (~0.14 vs. 0.71 USD) for each new customer who signs up for an account, respectively. To assess the effect of the treatment on take-up, we will have access to the bank's individual-level administrative data on take-up and transactions, as well as baseline and endline household survey information.

The comparison of the take-up rate under the *high* vs. *low* incentives treatments will allow us to estimate the reduced-form effect of monetary incentives on the adoption of the new savings accounts. We expect this reduced-form effect to reflect both a supply-side channel (the effect of higher incentives on agent's effort) and a demand-side channel (the effect of higher incentives on potential clients' perceptions of the quality of the product). To disentangle these two channels, we further cross-randomize the *high* and *low* incentives treatments into *public* vs. *private* incentives treatments. In the *public* incentives treatment, potential customers are provided with information about the level and structure of the agent's compensation. In the *private* incentives treatment, potential customers are not provided with such information. The idea of the design is that the difference in take-up between the high and low incentive treatments captures supply effects when incentives are private, while it captures both supply and demand effects when incentives are public. To provide further evidence on the supply and

[3]Examples of pay-transparency policies include: posting job announcements that prominently feature the worker's wage, announcing the agent's incentive structure along with the product's prices, revealing workers' pay online on a dedicated website, etc.

demand channels, we also collect detailed survey data on the amount of effort provided by the agent (supply channel) and household perceptions about: (a) the quality of the product, (b) their level of trust in the product, the agent, and the bank, and (c) the perceived identity of the agent (demand channel).

In the next section, we describe the context of the study, the branchless banking agent's job and the products offered. Section 3 presents the experimental design, our hypotheses, and theory of change. Section 4 describes our main outcome variables and the timeline of our data collection. Section 5 discusses the empirical strategy.

2 Research Context and Background

Indonesia, as well as many other developing countries around the world, has recently adopted a law designed to promote financial inclusion by introducing branchless banking. Similar to the model used elsewhere (e.g., Jack and Suri (2014), Batista and Vicente (2019)), branchless banking in Indonesia provides basic banking services, including low-cost savings accounts, and uses local agents (often shop owners) to cash into and out of customers' bank accounts. Five large banks have already been approved to provide branchless banking and more are expected to be approved in the near future.

We collaborate with one of these five large banks (henceforth, *the bank*).[4] The experiment takes place in 400 villages in five kabupatens of the province of East Java (Tuban, Bojonegoro, Gresik, Ngawi, and Lamongan), where the bank was expanding its branchless-banking activities in 2016. The study area was highly unbanked at baseline (November 2016): only one-third of the villages in our sample had access to a bank (either a branch or an agent) and despite the fact that about half of the households interviewed had a formal bank account, only a third of the respondents had made a transaction in the past 30 days.

In each of the 400 villages in the study, a branchless-banking agent was recruited by the bank (more details on the recruitment process are given below). Branchless-banking agents are typically business owners with an existing clientele (e.g., they own shop, a restaurant, a cell-phone top-up station) and are asked to promote savings accounts as a side job. They do not receive a fixed wage from the bank, but rather are paid a piece rate for each new customer who signs up for an account and for each transaction made. Financial services are delivered through an online platform that the agent can access from a phone or a computer with internet access. The platform allows the agent to register new clients and make deposits

[4]For confidentiality reasons, the name of our partner bank will remain anonymous.

to and withdrawals from their accounts.[5,6]

The duties of branchless banking agents include: (1) promoting the take up and use of branchless banking products in their villages, (2) identifying and enrolling new clients, and (3) supporting existing clients. Agents also assist users to prepare the paperwork necessary to open an account and are responsible for transmitting the completed paperwork to branch offices for processing. Only the account holders and their banks have access to account balances, which makes them less vulnerable to the demands of spouses and other social claimants.

Study pilot and stylized facts In 2016, when we started this project, the bank had already begun providing branchless banking services in two other provinces of Indonesia. Take-up had been slower than expected and only a few people had signed up for a savings account. In a small pilot survey done with 30 registered agents prior to the experiment, we discovered that one of the key problems was the branchless-banking agents' low levels of effort in promoting the products: only 29% of these agents reported actually working as an agent and, among those who were working, 90% were dedicating less than 3 hours a week to the branchless-banking job. It thus became clear to the bank that motivating the branchless-banking agents to put in more effort — through the design of appropriate incentives — was key for the success of the branchless-banking program.

Another important insight from the pilot was the low level of trust in the financial institutions: branchless-banking agents told us that, even when financial products became available in rural communities, people had little confidence in the bank or in the agent. This is confirmed in our baseline data where 21% of respondents reported having low levels of confidence in the enforcement of contracts between banks and their customers and 33% reported not being confident about the possibility of getting their money back if they made deposit with an agent.

Overall, these stylized facts indicate that raising the incentives of branchless-banking agents can increase take-up only if it increases their effort without *deteriorating* a client's trust in the agent or the bank. If the product is perceived as being less safe and having

[5]The specific features of the saving accounts are as follows: (i) clients receive an automated text-message notification on their cell-phone for each transaction to or from their account, (ii) there is no minimum deposit limit or account balance, (iii) there are no fees for administration of the account, for opening it or closing it, or for payments or incoming transfers, (iv) the account can be used for payment, purchases, savings, and transfers, (vi) the account can be topped up with cash by the branchless-bank agent or online, through the bank's webpage or through the bank's app, (vi) there is an interest of 0.15%, (vii) the maximum withdrawal is 5 million IRD per month, (viii) the maximum account balance is 20 million IDR, (ix) it is guaranteed by the government through Lembaga Penjamin Simpanan (the Indonesian version of FDC).

[6]Aside from the savings account, branchless-banking agents also offer a mobile-wallet product. In our baseline and endline surveys, we also collect information on knowledge and usage of these accounts.

lower quality when it is promoted by a person who receives high incentives for selling it, then financial incentives may backfire if they are public knowledge. Qualitative interviews done in the field in July/August 2016, prior to the baseline survey, in 3 villages supports this "signaling" hypothesis. When asked about two hypothetical agents — one earning a high piece rate for promoting a product and another one earning a low piece rate — respondents in focus groups reported perceiving the high-pay person as more "greedy" and "caring less for the needs of others." Likewise, they were more likely to think that the product offered by this person is of poor quality. This observation motivated us to design a field experiment that allows to rigorously study the effect of higher incentives not only on agents' effort but also on clients' perceptions.

3 Research Design

3.1 Intervention and Treatment Groups

The experiment takes place in 400 villages of East Java. The first layer of the experiment randomizes the 400 agents (one per village) into high vs. low incentives.

- In the *Low Incentives* treatment (200 villages), the agent receives 2,000 IDR (0.14 USD) for each new customer who signs up for a savings account.
- In the *High Incentives* treatment (200 villages), the agent receives 10,000 IDR (0.72 USD) for each new customer who signs up for a savings account.

We define an individual as having "signed up" for an account if she opens one and keeps a minimum balance of 20,000 IRP (1.42 USD) for at least two weeks. The latter condition has been added to avoid collusion between the customer and the agent.[7,8] Assuming that the median agent signs up 10 clients per month — irrespective of the treatment they are assigned to — the difference in the monthly pay of a high- vs a low-incentives agent is 80,000 IDR, roughly 9.1% of the average monthly food consumption in East Java (Central Bureau of Statistics).

[7]This was done to minimize the likelihood of a client signing up for the account with the only intention to raise the agent's pay, and then closing it immediately after. As explained below, our data will provide us with detailed information on each client's account and will allow us to assess whether any client "games" the system by withdrawing their money and/or closing their account exactly two weeks after she opens it.

[8]In addition, all agents (across all treatments) earn Rp. 1,000 for each cash deposit of minimum Rp. 10,000 and Rp. 2,500 for cash withdrawals under Rp. 200,000 and Rp. 4,000 for cash withdrawals of Rp. 200,000 and above. Obviously, the agent can earn money from cash-ins and cash-outs only conditionally on a customer having signed up for the account.

The second layer of the experiment cross-randomizes an equal share of agents in the *High Incentives* and *Low Incentives* treatments into two additional treatment arms: one in which the pay of the agent is revealed to potential clients in the village (*Public Incentives* treatment) and one in which the pay is instead not publicized (*Private Incentives* treatment). More precisely:

- In the *Public Incentives* treatment (260 villages), a sample of households receive information about the product, the identity of the agent (her name), and her compensation structure (i.e., the amount of incentives she earns for each new customer).
- In the *Private Incentives* treatment (140 villages), a sample of households receive information about the new product, the identity of the agent (her name) but receive no information about her compensation.

In both the *Public* and *Private* incentives treatments, the information was provided by a team of trained enumerators who were in charge of reading a precise script to households over the phone and making sure the information was well understood by asking the household to repeat what they heard. The leaflets with the exact information enumerators were asked to provide to the households are shown in Figures 2, 3, and 4. The information was provided to an average of 40 randomly selected households per village.[9] As explained in detail in the next section, we expect households' beliefs about the agent pay to differ more strongly between the *High Incentives* and the *Low Incentives* treatments when incentives are made *public* than when they are not publicized.[10]

To summarize, each branchless-banking agent (one per village) was randomly assigned to one of four groups, which vary in the level and the transparency of pay, as described in Table 1. The randomization was performed by the researchers on Stata and was stratified by three village-level characteristics that are expected to predict the take-up of the new savings account: (1) whether the distance between the village and the closest branch of our partner bank is above the median, (2) whether the number of households in the village is above the median, and (3) whether there is one or more banks already operating in the village.[11]

[9] See Section 4.1 for more details on how these 16,000 households were sampled.

[10] The fact that 60% of the respondents in the baseline survey report that most people are very secretive about their income, and only 33% of the respondents say that they have a rough idea of how much their close friends and family earn, supports our prior that the public vs. private treatment will generate a differential information update about the agent's pay. We will corroborate this by collecting data on household beliefs about the agent's pay in our endline survey.

[11] The first two variables were collected from the Village Potential Statistics (PODES 2011), and the third variable was collected by our survey firm through village interviews.

Table 1: Experimental Design (Village-Level Randomization, N=400)

	Private incentives	**Public incentives**
High incentives	T1 (70 villages)	T2 (130 villages)
Low incentives	T3 (70 villages)	T4 (130 villages)

To shut down any selection effect of incentives, agents were recruited in the same exact way in all four treatments. In each of the 400 villages, our field team approached the best candidate in the village and advertised the job to her without mentioning anything about the level or the transparency of pay.[12,13] If the candidate showed interest in the position, she then received three separate training sessions at her workplace in which she was given further information about the job, the bank, and the compensation scheme. Out of the 400 agents who initially expressed interest in the position, only 9 dropped out during the training and mentoring period, and they were replaced by the next suitable candidate on the list.

To limit *spillover* across treatments, our design minimizes interactions between agents. First, training sessions for all branchless-banking agents were organized separately in the agents' own villages (rather than in a joint training).[14] Second, agents are never invited to joint meetings after the training, avoiding that they meet throughout the experiment.[15]

3.2 Hypotheses and Theory of Change

Hypotheses

We hypothesize that the take-up of a new financial product is a function of:

1. *Supply-side factors, and, in particular, the level of effort exerted by the agent* (i.e., the effort exerted in identifying potential customers and reaching out to them, providing

[12]In each sample village, the bank recruited a branchless banking agent using its standard selection criteria (the selected agents were in many cases clients with a good credit history). The standard criteria are: (1) the owner is a previous borrower from the bank, (2) the business is in a central location in the village, (3) the owner is mostly present at the business premises, (4) the owner has a good reputation among villagers (as confirmed by the village chief), and (5) the owner is able to demonstrate sufficient financial liquidity.

[13]In order to have full control of the experiment, the selection of the agents was performed by our field team, using the bank's criteria. This ensured that (a) the incentives offered to the agents followed the treatment and random assignments, (b) all agents were selected using the same recruitment protocol and without any risk of nepotism in the hiring process. The recruitment of agents was done in two batches, in November 2016 – February 2017 and July – November 2017; we recruited 107 and 294 agents, respectively.

[14]All agents included in the 400 trial villages were trained and mentored by the research team. The agent training was provided in one individual session that averaged about 3 hours in length (but that varied from 2.5 to 4 hours) in which the agent learned how to use the on-line branchless banking software and the features of the basic savings account. The agent training also included a module on marketing that emphasized the potential value of marketing to under-banked groups, particularly women. Following the agents' initial training, the research team and partner bank staff provided one-on-one mentoring in three subsequent visits.

[15]We will confirm whether spillovers actually happened by using our endline data, where we ask agents whether they know personally any other agent hired by our partner bank.

information about the benefits of the product, making themselves available to facilitate transactions, etc). Agents who receive higher monetary incentives for attracting new clients are expected to exert a higher level of effort.

2. *Demand-side factors.* The willingness to pay for a new financial product is a function of the perceived qualities of the product and the associated services. In the context of low information about a new product and low levels of trust in the financial sector, potential customer use different types of signals to make inferences about the qualities of the product and the bank. More specifically, information about the agent's pay could convey a signal on the quality of the product, and the intentions of the agent or the bank. The direction of the signal is theoretically ambiguous:

   (a) The signal can be positively interpreted, i.e., higher incentives could indicate that the agent has a high opportunity cost and hence is of high ability (e.g., she provides better services or is better able to assess the potential benefits of the product for the user). Higher incentives could also indicate that the bank is successful (and hence able to pay high incentives) because of the good quality of the products it offers.

   (b) The same signal can be negatively interpreted, i.e., higher incentives could indicate that the agent is primarily motivated by monetary incentives (as opposed to pro-socially motivated), and hence more likely to take advantage of an uninformed consumer. Similarly, a bank that pays high monetary incentives may be perceived as one with low-quality products that needs a more motivated marketing staff.

While both (a) and (b) are theoretically possible — and ultimately depend on potential clients' priors and on how they update them — a pre-experiment pilot we conducted in July/August 2016 suggests (b) is likely to dominate in our settings. This will be validated in our baseline and endline survey data and will be the focus of this study.

Testing the hypotheses

The reduced-form effect of financial incentives on the take-up of the new financial product will be estimated by comparing take-up in the high vs. low incentives treatment. This reduced-form effect will reflect two possible channels: a supply-side channel (the effect of higher incentives on effort) and a demand-side channel (the effect of higher incentives on potential clients' perceptions of the quality of the product and the intentions of the agent or organization that promotes the product). One key difference between these two channels is that the demand channel can only exist in contexts in which potential clients are informed

about the pay of the agent (public incentives treatment), while it should be absent in situations where the pay structure is revealed to the agent only (private incentives treatment). In contrast, the supply channel should exist irrespective of whether incentives are private or public. In other words:

1. When incentives are private, the difference in take-up between high vs. low incentives treatments only captures the supply-side effect of incentives (T1-T3 in Table 1).

2. When incentives are public, the difference in take-up between high vs. low incentives treatments instead captures the supply *and* the demand effects (T2-T4).

3. Under the assumption that the supply effects in 1 and 2 are comparable, the difference-in-difference estimator isolates the demand-side effect of higher incentives.

Note that the assumption that the supply effects in 1 and 2 are comparable requires agent's effort to be independent of the transparency of pay. This only true in contexts with limited earning redistribution/informal taxation, like ours (see Section 5.1 for a more detailed discussion). Endline data on agent's effort will allow us to validate this assumption and our plan of action in case it does not hold.

The direction of the demand-side effect of financial incentives has important implications for the design of incentives in development organizations and the way they are disclosed. If the demand-side effect is negative (i.e., higher incentives convey a negative signal about the product and/or agent), higher agents' financial incentives may only be effective if the organization keeps these incentives private. In contrast, if the demand-side effect is positive, a cost-effective way of boosting the positive effect of raising agents' financial incentives would be to implement policies that increase pay transparency.

4 Outcome Variables and Survey Instruments

4.1 Sampling

Our experiment takes place in 400 rural villages in five kabupatens of East Java where the bank had not started their operations in 2016. The 400 villages were randomly chosen from the exhaustive list of 480 villages in which (a) the population was unbanked and (b) there was internet connectivity (data source: PODES 2011).

Across the 400 villages, we randomly sampled 16,000 households (average of 40 households per village) within the universe of "eligible" households.[16] We refer to these households as

[16]Given our interest in identifying potential customers for financial products, households are considered

the "*Listing*" sample. Out of these 16,000 households, 4,800 households (12 per village) were randomly selected to take part in our baseline and endline survey ("*Survey*" sample). To summarize: all households in the "*Listing*" sample received a phone call, as part of the *Public* vs. *Private Incentives* treatments. Baseline and endline data were not collected for all the "*Listing*" sample but only for a subsample (the "*Survey*" sample).

4.2 Statistical Power

Our main analysis is going to be done on our "Listing" or "Survey" samples, collected in 400 villages. In the randomization, we oversampled villages in the public information treatment (130 villages in each treatment arm), while we assigned 70 villages to each treatment arm with private information. In order to estimate the minimum detectable effects (MDE), we need estimates of the mean take-up rate in the comparison group (Low X Private Incentives), as well as the intracluster correlation (ICC) in the main outcome.

There are no reliable sources of data that allow us to benchmark the take-up rates in the comparison group. Therefore, we rely on qualitative information we collected prior to the start of the experiment. Bank officials with whom we had conversations prior to the start of the experiment reported expecting the take-up rate of the product to be somewhere between 5 and 20 percent. We take these numbers at face value and use them in our power calculations. To compute the ICC, we rely on data from our baseline survey on the take-up and use of savings accounts, and in particular, we compute the ICC for three variables: whether the household uses a saving account, whether the household has a savings account under its name, and whether the household made any transactions to/from the savings account in the past 30 days.[17] The underlying assumption is that the ICC of our own main outcome variable (take-up) will be in the same range as that of the three variables, an assumption which we believe to be realistic.

Table 2 reports the MDE for different combinations of (a) take-up rate in the comparison group and (b) ICCs. All computations are based on a two-sided hypothesis test with a 5% significance level and 80% power. The table shows that our experiment is powered to

"eligible" to be part of our sampling if they satisfy three criteria: (i) they own at least one cell phone, (ii) they own a nonagricultural business located in the village, (iii) the household's business owner is aged 18-55. Out of these pool of eligible households, we randomly selected an average of 40 households per village. This was done in three steps: (1) the village head/chief was asked to list as many eligible households living in the village as possible, (2) the field team conducted door-to-door interviews with each household on the list and collected basic demographic and contact information from each of them, (3) if the number of household interviewed was fewer than 60 per village, the field team asked the interviewed households to provide more names until eligible households in the village run out (this limit was mostly non binding, as on average we found about 40 households per village who met the criteria).

[17]The means of these variables are 55, 53.2, and 35.5%, respectively. The corresponding intra cluster correlations are 0.0197, 0.0167, and 0.0209.

Table 2: Power Calculations

		Minimum Detectable Effect (MDE)	
Intra Cluster Correlation (ICC)	Mean of the outcome in the comparison group	Comparison with 70 clusters	Comparison with 130 clusters
0.0167	0.05	0.03	0.03
	0.08	0.04	0.03
	0.10	0.05	0.04
	0.15	0.06	0.04
	0.20	0.06	0.05
0.0197	0.05	0.03	0.03
	0.08	0.04	0.03
	0.10	0.05	0.04
	0.15	0.05	0.04
	0.20	0.06	0.04
0.0209	0.05	0.04	0.03
	0.08	0.05	0.04
	0.10	0.05	0.04
	0.15	0.06	0.04
	0.20	0.06	0.05

detect effects as small as 3-6 percentage points, which are plausible effect sizes given previous findings in the literature.

4.3 Description of the Survey Instruments

The paper will leverage three main sources of data.

1. Bank's *administrative data.* Our partner bank will provide us with a monthly level individual dataset, from October 2016 (start of the project) through July 2019. This dataset will provide us with information on all households in the "*Listing*" and "*Survey*" samples on (a) whether the household has opened a savings account in that specific month, (b) the balance on the account at the end of each month, and (c) whether the person made any cash-in or cash-out transactions and the total amounts. These administrative data will provide us reliable information on *take-up* of financial products within our "*Listing*" (and "*Survey*") sample without having to rely on self-reported household data.

2. *Baseline and endline household surveys* from a random sample of 4,800 households ("*Survey*" sample).

   (a) The household baseline data will be used to determine whether the underlying pool of potential clients is ex-ante comparable across treatments in terms of their propensity to take up the product (e.g., financial literacy, own a phone/laptop, age, occupation) and other relevant characteristics. The household baseline data will also allow us to assess whether our treatments differentially affect the "type" of households that are targeted by agents and those who take up the products. We are particularly interested in understanding if higher financial incentives lead to a quantity – quality trade-off, i.e., the agents may increase the overall product take-up by targeting households that are easier to persuade but that need the products the least (e.g., richer households, whose members are financially literate and have a bank account already, and who may be friends with the agent). This will be tested by collecting baseline household-level information on wealth, financial literacy, bank-account ownership, and social ties with the agent.
   Overall, the baseline household survey collects information on household characteristics, mobile phone usage, connections with the agent, knowledge about other people's earnings, trust in financial institutions, usage and knowledge about mobile and branchless banking, savings and credit, business activities and revenues, prior beliefs about the agent/the savings products/the bank, inequality aversion, and informal taxation.

   (b) The household endline data will help us separate the supply- and demand-side effects of incentive. To do so, we will estimate treatment effects on *agents' effort*, as proxied by the number of times the household reports being visited/informed by the agent about the products,[18] by whether the agent talks to the household about financial matters, and by whether the household thinks the agent did everything she/he could to convince the people in the village to adopt the financial product. We will also use these data to study treatment effects on demand-side *perceptions/beliefs about the product*. The questions on perceptions we ask include (a) whether the respondents perceive the savings account as useful and beneficial, (b) whether they perceive these products as being safe, i.e., whether they trust the agent/bank to give them back the money whenever they need it back and/or to store their money without risks, and (c) the perceived intentions of the agent/bank

[18] In the extreme case in which the agent drops out, the number of hours of work will be assumed to be zero.

in selling the product.[19] To validate our research design, all households will be asked whether they are aware of the agent's pay.

Aside from re asking all the time-varying questions from the baseline survey, the endline household survey will also include information on the relationship with the agent, knowledge and usage of financial products, and ex-post perceptions about the products, the agent, and the bank.

3. *Baseline and endline agent survey.*

   These data includes information on agent characteristics at baseline (occupation, location, financial literacy) and make sure these are balanced across treatments. The baseline survey includes questions on background characteristics, mobile phone usage, previous experience, job expectations and perceptions, inequality aversion, informal taxation, pro-social motivation and identity, knowledge about other people's earnings, trust in financial institutions, savings and credit, prior beliefs about the savings products and the bank, time and risk preferences, and business activities. At endline, we collect this information again, and we include questions about job performance and time use (e.g. , self-reported number of hours of work as an agent), competition from other banks, beliefs about the financial products offered, the demand for them, and the bank.

4.4 Data processing

As mentioned above, the two key sources of data for this experiment are the bank's administrative information on take-up in our "Listing" sample and survey data, collected at baseline and endline, from our "Survey" sample. The baseline and endline surveys were collected via in-person interviews by Survey Meter. Collection of household and agent baseline data was completed in one year, in two separate batches. Since the endline data are in the process of being collected (fieldwork is scheduled to finish at the end of March 2019), researchers have not accessed the data yet and will likely not access them until end of April 2019, when the cleaning of the data will be completed. We expect to have access to the bank administrative data in April/May 2019.

The survey interviews were conducted by Survey Meter using the Computer Assisted Personal Interviewing Software (CAPI), where consistency checks were built into the program. Additionally, a team of field supervisors conducted random visits to enumerators and tagged along during the interviews, and a team of back-checkers reinterviewed a random sample

[19] All beliefs and perceptions questions were thoroughly piloted in the field.

Table 3: Survey and Experiment Timeline

Instrument/Stage	Sample (N)	Stage	Date
Piloting	HHs in 3 villages and 30 agents	Completed	July. – Aug. 2016
Start of the experiment	Randomization – 400 villages	Completed	Oct. 2016
Village survey	400 villages	Completed	Nov. 2016 – Feb. 2017 / Jul. – Nov. 2017
Household listing	16,000 HHs ("Listing")	Completed	Nov. 2016 – Feb. 2017 / Jul. – Nov. 2017
Household baseline survey	4,800 HHs ("Survey")	Completed	Nov. 2016 – Feb. 2017 / Jul. – Nov. 2017
Agent baseline survey	400 agents	Completed	Nov. 2016 – Feb. 2017 / Jul. – Nov. 2017
Administrative data	All HHs in 400 villages	In Process	Exp. Apr./May 2019
Household endline survey	4,800 households ("Survey")	In Process	Exp. Oct. 2018 – Mar. 2019
Agent endline survey	400 agents	In Process	Exp. Oct. 2018 – Mar. 2019

of 5% of respondents to verify the quality of the data. We are confident that the attrition rate in the survey will be minimal. Our partner survey firm (Survey Meter) has always had an excellent record in maintaining low attrition rates in their surveys all around Indonesia, including the well-known Indonesia Family Life Surveys panel survey (IFLS). From their experience, recontacting respondents in Java should not pose a difficult challenge especially since there were only a couple of years between the baseline and the endline surveys, and respondents are business owners who we expect have a low likelihood of migration.

5 Empirical Analysis

The effect of our treatments on the take-up of the savings account will be estimated using individual-level administrative data in the "Listing" sample using the data described in the previous section. Table 4 provides a mapping between each of the variables we plan to use in our analysis and our survey questions. With this information, we will use the following empirical in our analysis:[20]

$$Take-up_{ij} = \beta_0 + \beta_1 High_j * Private_j + \beta_2 High_j * Public_j + \beta_3 Low_j * Public_j + Z_j'\gamma + \epsilon_{ij} \quad (1)$$

where $Take-up_{ij}$ is a dummy variable equal to one if individual i in village j has taken up the product; $High\,(Low)_j$ and $Public\,(Private)_j$ are indicators for whether the village/agent is assigned to receive high (low) incentives, which are made public (private) information to potential customers. The omitted category is $Low_j * Private_j$. Z_j are the village-level stratification variables, and ϵ_{ij} are robust standard errors clustered at the village level. Given that

[20]We will also replicate the analysis restricting to the "Survey" sample.

the treatment was randomized, we expect no correlation between the independent variables and the error term. In Equation 1:

1. β_1 isolates the effect of incentives on the agent's effort (effects on the supply side) by computing the difference in take-up between the high- vs. low-incentives treatment when incentives are *private* (T1 - T3 in Table 1).

2. $(\beta_2 - \beta_3)$ identifies the combined effect of supply and demand effects by computing the difference in take-up between the high- vs. low-incentives treatment when incentives are *public* (T2 - T4 in Table 1).

3. Under the assumption that the supply effects in 1 and 2 are comparable, $(\beta_2 - \beta_3 - \beta_1)$ isolates the effect of incentives on the demand side (T2 - T4 - T1 + T3 in Table 1).

Heterogenous treatment effects will be estimated with 1 in the "Survey" sample, by extending the equation to also include the interaction term between the treatment dummies and the baseline household characteristic (e.g., wealth, social ties and connections with agent, etc)., along with the household characteristic on its own. We will use both the administrative data and our endline proxies for agent effort to assess whether agents target different types of households under the different incentive structures. It is important to note that this heterogeneity analysis will be exploratory in essence, since we do not have specific hypotheses on how these effects may vary by the different variables mentioned.

To assess the demand-side effect of incentives on potential clients' perceptions/beliefs about the product, we will run the regression

$$Beliefs_{ij} = \beta_0 + \beta_1 Public + Z_j'\gamma + \epsilon_{ij} \ (if \ High_j = 1),$$

restricting the analysis to respondents in the "Survey" sample who are located in "high-incentives villages" ($if \ High_j = 1$) and comparing perceptions/beliefs in the public vs. private treatment (β_1).[21] We will make sure that all results on perceptions and beliefs are robust to correcting standard errors for Multiple Hypothesis Testing using the Bonferroni-Holm correction and the approach in List, Shaikh, and Xu (2016). We will further study standardized treatment effects on perceptions/beliefs by following the approach of Kling, Liebman, and Katz (2007) to combine measures into aggregate indices on (i) trust in the financial sector, (ii) trust in the bank, (iii) trust in the agent, and (iv) quality of the product.[22]

[21] The questions to be used are specified in Section 4 and detailed in Table 4. Some of these variables were collected both at baseline and endline, in which case we will run an ANCOVA model to improve the precision of the estimates.

[22] The aggregation will be done in the following steps: (i) Sign all outcomes in the domain so the hypothe-

The richness of the bank administrative data allows us to dig further into the dynamics of the effects observed. We will assess the effects of our treatments not only on the effort agents exert to maximize take-up but also on the effort they exert to keep their clients active. To do so, we will estimate the treatment effects on the clients' amount of money kept as a balance and the total of number of monthly transactions in Equation 1. Additionally, since administrative data are available at a monthly frequency, regression 1 can be run for each month after the start of the intervention to trace out the treatment impact on take-up over time and usage, going up to six months after the end of the intervention. This will allow us to test whether the treatment effects vary over time. If it is not possible to reject equality of treatment effects over time, the monthly data will be combined to increase power following the procedures described in McKenzie (2012).

Demand- vs. Supply-Channel

Our research design will allow us to precisely disentangle the demand- and the supply-channel under the assumption that agent's effort is not directly affected by pay transparency (i.e., if the supply effect is the same in the private vs. public treatment). We will formally test for this assumption by estimating whether the agent's effort is comparable when the pay is private vs. public*, holding the level of incentives constant* (e.g., within the high incentives treatment). Specifically, we will run the following equation using the "Survey" sample:

$$Effort_j = \nu_0 + \nu_1 Private_j + Z_j'\gamma + \epsilon_j \ (if\ High_j = 1)$$

where $Effort_j$ is the amount of effort of the agent in village j (as reported by the households).[23] We will then check whether ν_1 is statistically different from zero or not.

Note that our ex-ante expectation is that the assumption will be satisfied in our context (i.e., we expect ν_1 to *not* be statistically different from zero) for two reasons. First, unlike many settings such as sub-Saharan Africa, informal taxation —i.e., the pressure agents' face in sharing their income with family or other members of the community— is low in our context, thus minimizing the direct negative effect pay transparency can have on agent's effort, especially when incentives are high (Jakiela and Ozier (2016); Squires (2019)).[24] Second, our baseline data indicate that agents are not sophisticated enough to anticipate, upon being hired, higher/lower demand when incentives are private vs. public. In other words, in the

sized effects go in the same direction (ii) Standardize each variable as a z-score by subtracting the comparison group mean and dividing by the standard deviation of the control group, and (iii) Average the z-scores.

[23] See Table 4 for the list of variables we will use to proxy agent's effort.

[24] In our baseline surveys, only 2.8 percent of the households and 6.3 percent of the agents say that "when someone is doing well in their business, they are always asked to share their profits."

regression:

$$Expected\,Take-up\,(at\,baseline)_{ij} = \delta_0 + \delta_1 Private_j + Z_j'\gamma + \epsilon_{ij}\ (if\ High_j = 1),$$

δ_1 is *not* statistically different from zero.[25] Therefore, agents do not seem to ex-ante expect a demand shock due to pay transparency which could otherwise affect their effort level.[26]

If the assumption that *agent's effort is not directly affected by pay transparency* fails (i..e, if ν_1 and δ_1 in the two above equations are statistically significant), we will have recourse to an alternative approach to separate the demand-side effect of higher incentives from the supply-side effect. We will compare take-up in the high*public vs. low*public incentives treatment *controlling for our measures of effort*. Admittedly, this is imperfect, since controlling for the post-treatment variables may create a bias in the main estimates (Montgomery, Nyhan, and Torres (2018)). Although it may not allow us to precisely quantify the supply from the demand channel, this approach will nonetheless allow us to estimate the direction of both channels.

On a broader picture, note that the experiment remains worthwhile even if the assumption fails and we end up not precisely disentangling the supply from the demand channel. All organizations decide on a regular basis to which extent the pay of employees should be made visible or kept private. In this experiment, we will be able to provide evidence on the aggregate consequences of this decision, given a combined effort and demand channels, in the high and in the low incentive treatment. Moreover, irrespective of the pay transparency, the experiment will be able to assess whether raising agents' financial incentives is an effective policy to increasing the adoption of mobile banking in a largely unbanked population.

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[25] In a regression where the outcome variable is "How many households in this village do you think will open an account in the first month (*in the first 12 months*) it is available?", the estimate for δ_1 equals -1.71 (*-5.70*) and its p-value is 0.33 (*0.62*).

[26] We thus expect our findings not to mirror those in Wagner, Asiimwe, and Levine (2019), where they observe a supply reaction to incentives due to social pressure.

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Figure 1: Phone Script

Me (surveyor) : Hello (Assamualaikum). May I please speak with [*name of respondent*]? My name is [*name of surveyor*] from Jogjakarta. (…) I will explain to you some information about the Laku Pandai Saving account

Laku Pandai Basic Saving Account is a basic saving account which has an interest, no saving book, no administration fee, no ATM card and can be submitted through the agent by using cellphone number.
The benefit of the product are
1. Safe
2. No minimum
3. No need to go to the bank
4. No fees

Agent is a third-party who cooperates with the Bank, and is trained and authorized by the bank in operating limited banking transaction activities, such as : account opening, deposit, and withdraw money. All of these activities are under procedures of Bank Mandiri. Bank Mandiri will ensure every transaction is safe and secured.

Me (surveyor) : Do you know who is the agent? His/her name is [*name of agent*]. He/she has already started to work as an agent in your village.

ADDITIONAL FOR PUBLIC TREATMENT: The agent will get [2k/10k] from the bank if the agent get one client of simakmur (laku pandai's basic saving product).

Me (surveyor) : Thanks for your time.

Figure 2: Leaflet for the two Private Information treatments

Figure 3: Leaflet for the Public Information & Low Incentives treatment

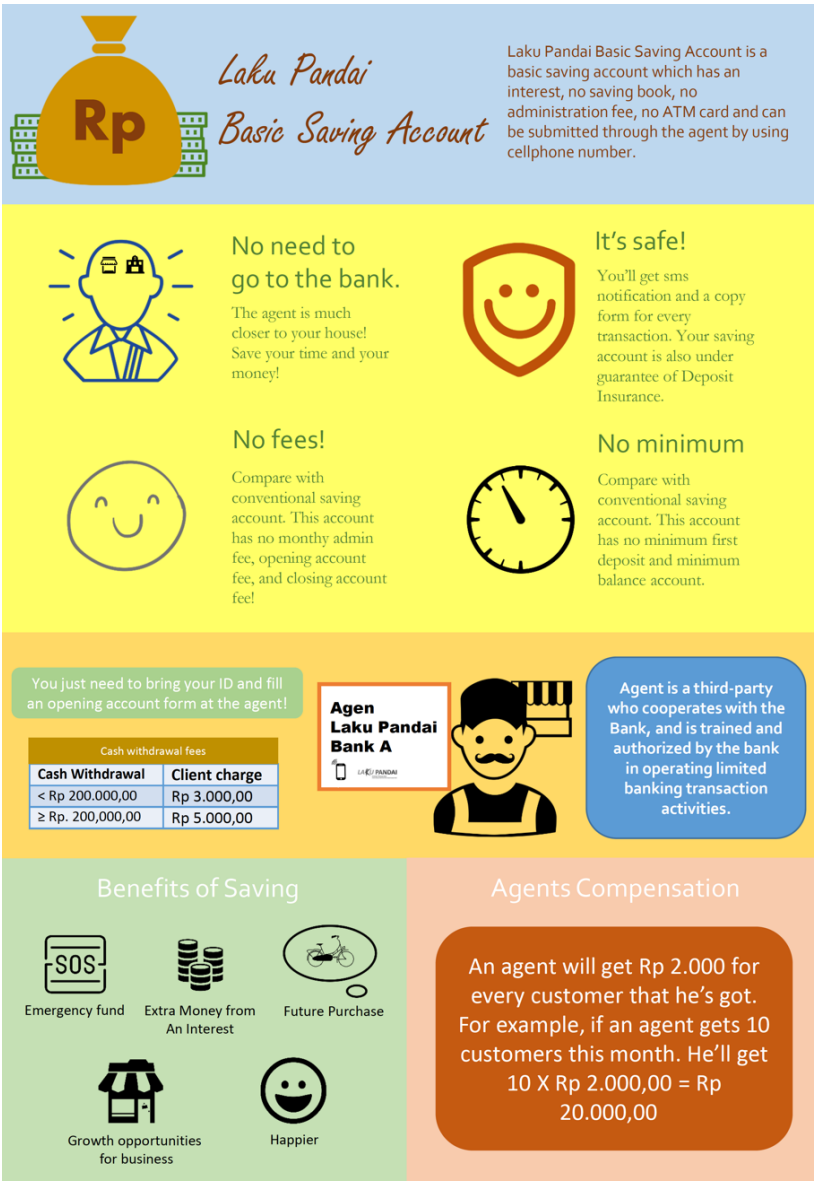

Figure 4: Leaflet for the Public Information & High Incentives treatment

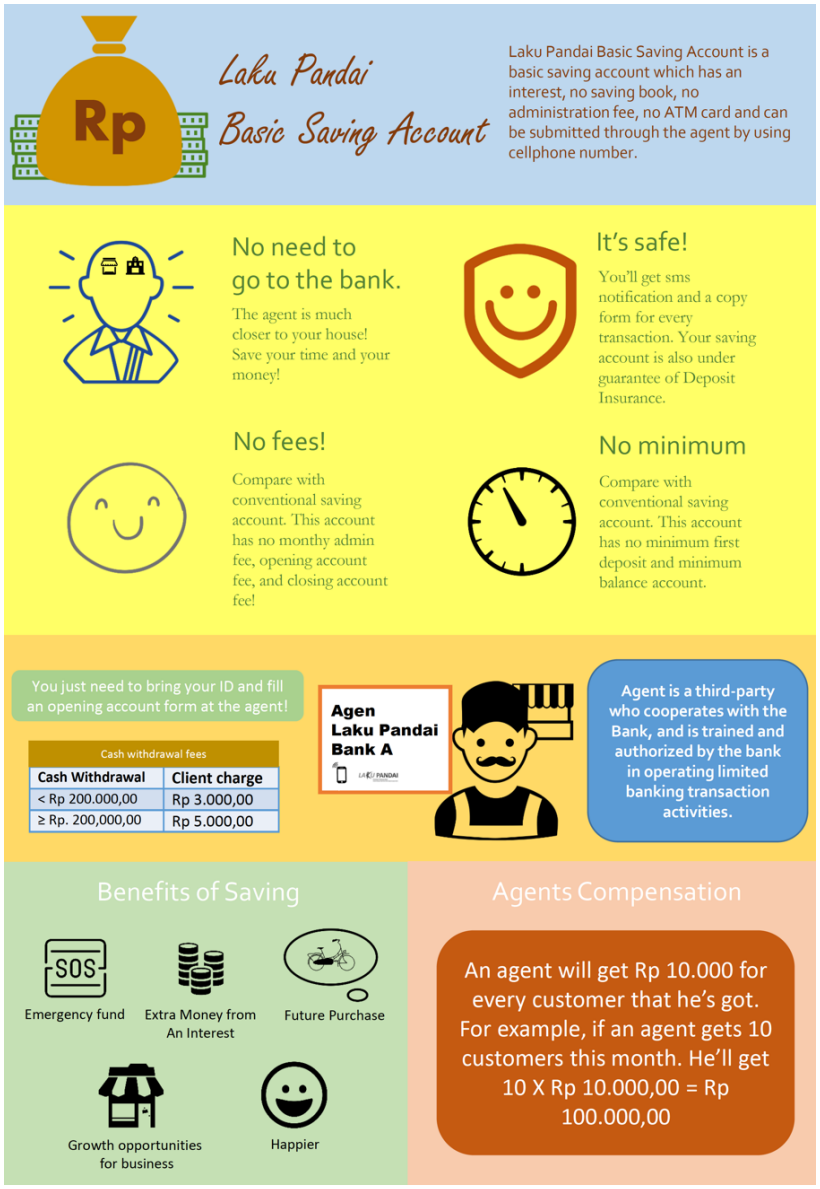

Table 4: Relevant Variables and Corresponding Survey Questions

	Dataset		Questions
A. Take-up of the product			
A.1. Objective measures of take-up from bank's record			
Indicator for a savings account opening, by month	Administrative data		Dummy defined =1 if in a given month the person has a savings account
Balance on the account at the end of each month	Administrative data		Variable equal to the mean balance kept in the savings account in a given month
Cash-in or cash-out transactions , by month	Administrative data		Total amount of cash ins and cash outs (separate variables) done in any given month
A.2. Self-reported take-up from the survey			
Self-reported take-up of financial products	HH Survey	Endline	Do you have financial product […]? (11 financial products listed)
Respondent's assessment of the take-up in her/his village	HH Survey	Endline	In your opinion, how many people in your village use bank product?
	HH Survey	Endline	On a scale from 1 to 10, how popular do you think bank product is in your village?
A.3. Hypothetical willingness to pay for financial products			
Hypothetical demand for the saving product	HH Survey	Baseline and Endline	If I were to offer you a safe financial product (for free) where you could save money, would you like to take it up?
	HH Survey	Baseline and Endline	How often do you think you'd deposit money?
	HH Survey	Baseline and Endline	How about if the product cost were Rp 2,500, would you like to take it up?
	HH Survey	Baseline and Endline	How about if the product cost were Rp 5,000, would you like to take it up?
	HH Survey	Baseline and Endline	How about if the product cost were Rp 7,500, would you like to take it up?
	HH Survey	Baseline and Endline	Would you be interested in becoming a client of bank product under the current conditions (no fees to sign up)?
B. Agent's on-job outcomes			
The number of times the household reports being visited/informed by the agent about the products	HH Survey	Endline	How many times has [NAME OF bank's agent] ever talked to you about branchless banking product such as bank productS in the past year?
	HH Survey	Endline	How many times has […] ever come visit you to promote bank product financial products in the past year?
	HH Survey	Baseline and Endline	Do you know who that person bank's agent is?
Does respondent talk to bank's agent about financial matters?	HH Survey	Baseline and Endline	What are the main things that you talk about when you meet […]? Option G. Financial matters (savings, investing, financial products, etc.)
The bank's agent did absolutely all she/he could	HH Survey	Endline	Do you agree with this statement "bank's agent did absolutely all she/he could to convince people in the village to adopt the bank product product?"
Job performance / effort	Agent Survey	Endline	How many people have opened (still active, not active, and later on decide to close) an account with you?
	Agent Survey	Endline	How many people have opened an account, but then decided to close it?
	Agent Survey	Endline	How many people did you explain/promote the bank product to (irrespective of whether they took up the product or not)?
Self-reported number of hours worked as an agent	Agent Survey	Endline	How many hours per week do you spend working as bank agent? (hours per day)
Self-reported wages earned as an agent	Agent Survey	Endline	Since you started your work as a bank agent, in a typical month how much commission did you earn on average from bank job each month?
	Agent Survey	Endline	How much commission did you receive from bank job in the past month?

Table 5: Relevant Variables and Corresponding Survey Questions (continued)

C. Perceptions and preferences			
Expectations about the demand of the product	Agent Survey	Baseline	On a scale from 1 to 10, how popular do you think the bank bank product product is going to be?
	Agent Survey	Baseline	How many households in this village do you think will open an account in the first month it is available?
	Agent Survey	Baseline	How many households in this village do you think will open an account in the first 12 months it is available?
	Agent Survey	Baseline	Imagine that signing up for bank product involved a flat fee of 20,000 Rp to the user (plus all the other fees currently in place for cash in/cash out, etc.). How many people in your village do you think will sign up in the first month?
D. Perception about the product, agent's, and bank's intentions			
D.1. Perception about the product			
Indicator for whether respondent perceives savings account useful and beneficial	HH Survey	Baseline and Endline	If you were to sign up for the bank product, do you think you would benefit from this product?
	HH Survey	Endline	Do you think you benefitted from this bank product? (among those you signed up)
Is the product safe?	HH Survey	Baseline and Endline	On a scale of 1 to 10 what is your perception on how safe is bank product to use, with 1 being you will always lose your money after you give it to the agent and 10 being you will never lose any money after your give to the agent?
	HH Survey	Endline	Do you agree or not with the following statement? No one can steal my money if I store it in the bank product
Is the product reliable?	HH Survey	Baseline and Endline	On a scale of 1 to 10 what is your perception on how reliable is bank product to use, with 1 being you always have a problem using the service and 10 being you never have any issues using the service?
Are the fees reasonable?	HH Survey	Endline	Do you agree or not with the following statement? The fees/costs of bank product are reasonable
Is the product easy to use?	HH Survey	Endline	Do you agree or not with the following statement? It is easy to deposit money and withdraw money with the bank product
Is the product useful in saving more money?	HH Survey	Endline	Do you agree or not with the following statement? The bank product helps me save more money
D.2. Trust in the agent			
Trust in agent's advice on financial matters	HH Survey	Baseline and Endline	How much would you trust bank's agent to give you good advice on financial matters?
Perceived intentions of the agent in selling the product	HH Survey	Baseline and Endline	What is the main reason you think bank's agent decided to work for bank as an agent?
How likely that an agent does not return the money?	HH Survey	Baseline and Endline	How likely is it that a person goes to an agent to withdraw Rp 500,000 from his/her own bank product account and the agent does not give all the money?
How trustworthy is the agent relative to the average person in the village?	HH Survey	Baseline and Endline	Here is a list of characteristics that an agent can have. How would you rank the agent's characteristics with respect to the average person in this village for each of the following? Option F: High honesty/ trusthworthiness
How likely is that a bank's agent returns someone's wallet she/he finds?	HH Survey	Baseline and Endline	If you dropped your wallet (with Rp 100,000 in it) and the agent found it, what do you think is the likelihood that he/she will give it back to you?
D.3. Perception of agent's incentives			
Indicator for whether respondent is aware of agent's pay	HH Survey	Endline	Do you know the commision earned by the agent when a client signed up for bank product?
	HH Survey	Endline	Do you know the commision earned by the agent when a client deposit in bank account?
	HH Survey	Endline	Do you know the commision earned by the agent when a client withdraw money from bank account?
Agent's overall earnings	HH Survey	Endline	How much money do you think bank's agent earns per month from all of her business activities?
Agent's earnings from being a bank's agent	HH Survey	Endline	How much money do you think bank's agent earns from working as a branchless banking agent?
Attitudes against agents earning higher fee	HH Survey	Baseline	There is an NGO who hires 2 agents to sell. One agent get a high fee for each sold. The other agent gets very small fee for each sold. Imagine that you are interested in buying, who would you buy it from?

Table 6: Relevant Variables and Corresponding Survey Questions (continued)

D.4. Trust in the financial institutions and bank			
Respondent didn't sign up because lacks trust in the bank's agent	HH Survey	Endline	Why did you not sign up for financial product […]? Option E. I didn't trust the agent
Respondent didn't sign up because lacks trust in the financial institutions	HH Survey	Endline	Why did you not sign up for bank product? Option G. I didn't trust the financial institution
Trust in the village in banks in general	HH Survey	Endline	Do you agree with this statement "people in your village do not typically trust banks"
Trust in the village in bank	HH Survey	Endline	Do you agree with this statement "people in your village are worried that if they deposit their money in bank, they will not get it back when they need it"
Confidence in contract enforcement between state-owned banks and customers	HH Survey	Baseline and Endline	How much confidence do you have in the enforcement of contracts between state owned banks and their customers?
Confidence in contract enforcement between privately-owned banks and customers	HH Survey	Baseline and Endline	How much confidence do you have in the enforcement of contracts between private owned banks and their customers?
Confidence in contract enforcement between bank and customers	HH Survey	Baseline and Endline	How much confidence do you have in the enforcement of contracts between bank and their customers?
Confidence in contract enforcement between Sharia Bank and customers	HH Survey	Endline	How much confidence do you have in the enforcement of contracts between Sharia Bank and their customers?
Confidence in security of savings	HH Survey	Baseline and Endline	How confident are you that you will be able to get back your savings if you deposit them in any bank?
	HH Survey	Endline	How confident are you that you will be able to get back your savings if you deposit them in bank?
	HH Survey	Endline	How confident are you that you will be able to get back your savings if you deposit them using the bank product?
Perceived intentions of bank (making money vs. helping people)	HH Survey	Baseline and Endline	Banks can have multiple objectives for introducing new products. These objectives might go from just making money out of the product to helping people in remote areas by giving them access to bank products which were not available before. What are the intentions of bank in starting branchless banking in the villages?
Is there an issue with the agent?	HH Survey	Endline	How likely are you to become a client if another agent offered the product?
E. Knowledge about other people's earnings			
Norms in the village regarding earnings privacy	HH and Agent Survey	Baseline	In your village, would you say that people openly talk about how much they earn/ what their income is or does this tend to be a secret?
	HH and Agent Survey	Baseline	In your opinion, do most people in this village know the approximate amount of your monthly income?
Respondent's knowledge of others' earnings	HH and Agent Survey	Baseline	Do you know approximately how much your close friends/family earn?
	HH and Agent Survey	Baseline	Do you know approximately how much your distant family or friends earn?
	HH and Agent Survey	Baseline	Do you know approximately how much your acquaintance earn?
	HH and Agent Survey	Baseline	Do you know approximately how much people you don't know in your village earn?