Moving to Profitability?
Alleviating Constraints on Microentrepreneur Location*

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Abstract

Observationally similar business owners earn vastly different profits across city locations within Kampala, Uganda. This variation may reflect spatial misallocation, aspects of entrepreneurs' objective function other than profits (e.g., amenities or risk), or sorting on unobservables. I first quantify the extent of profit variation using primary surveys of microentrepreneurs. I then quantify the extent of spatial misallocation using a field experiment with nearly three thousand microentrepreneurs and a structural model. I experimentally allocate a moving subsidy, cross-randomized with an information intervention, and estimate the effect of moving business location on profits. Entrepreneurs realize 45% higher profits—net of the value of the subsidy—as the result of moving, but only when they receive both the subsidy and information. The subsidy serves as insurance for profitable but risky moves, and information induces high-return entrepreneurs to select into moving. Impacts fade throughout the month after the intervention ends, consistent with risk-averse entrepreneurs gradually losing the ability to self-insure. I rationalize these results in a structural model where entrepreneurs choose locations and realize profit in equilibrium. Using data from the experiment to estimate the model, I show that aggregate income increases by 37% when financial and information constraints are relieved at scale. The results demonstrate spatial misallocation of entrepreneurs within the city, as well as complementarities between liquidity and information in overcoming frictions that otherwise inhibit the mobility of entrepreneurs.

KEYWORDS: Microentrepreneurship, spatial misallocation, firm location, information frictions

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1 Introduction

The location of economic activity is associated with its value. In low- and middle-income countries, workers in urban areas earn more than three times those in rural areas (Gollin et al., 2014). In the United States, average earnings vary considerably between commuting zones (Card et al., 2023). These spatial income gaps may reflect market frictions that inhibit a worker's ability to move between regions. In these cases, relieving constraints on mobility, such as by paying moving costs or providing information about income prospects in other regions, increases workers' earnings (Bryan et al., 2014; Baseler, 2023). Much less is known about spatial variation in earnings *within* cities, especially among the self-employed.

In this paper, I quantify the extent of spatial misallocation of microentrepreneurs within a large city. First, I use original field surveys to show descriptively that similar microentrepreneurs earn vastly different profits across city locations. Second, I use a field experiment (n=2,883) to empirically test whether spatial profit gaps reflect misallocation. I randomly allocate a moving subsidy, cross-randomized with an information intervention, and estimate the effect of moving on microentrepreneurs' profits.[1] On average, entrepreneurs increase profits by 45% as the result of moving, but only when they receive both the subsidy and information. Third, I rationalize these results in a structural model where entrepreneurs choose locations and realize profit in equilibrium. Using data from the experiment to estimate the model, I find that aggregate income increases by 37% when financial and information frictions are relieved at scale, net of changes in profit due to firm entry and exit from locations across the city. Relieving financial or information constraints alone is not sufficient, indicating the presence of simultaneous market failures that lead to spatial misallocation.[2]

I focus on seemingly mobile microentrepreneurs—street vendors and motorcycle taxi drivers—in Kampala, the capital of Uganda and home to approximately 2 million people.[3] I document that microenterprise profits associated with the 90^{th} percentile most profitable city parish are three times those of the 10^{th} percentile parish, even after controlling for individual entrepreneur characteristics. Absent market frictions, we expect microentrepreneurs to move from lower to higher profit places and compete down differences in profit between locations. Thus, if spatial profit gaps reflect market frictions that inhibit moving between

[1] I use microentrepreneur profits synonymously with net earnings, or the entrepreneur's revenue less costs, *not* accounting for the value of their own time. This treatment of profits is standard in the development literature and reflects the well-documented lack of separation between production and consumption decisions in owner-occupied firms, i.e., where the owner is the only employee and daily business earnings are the primary source of household income.

[2] Here, misallocation refers to *profit* misallocation. Below, I use the model to quantify profit and utility misallocation.

[3] Microentrepreneurs in this sample operate with mobile capital, such as motorcycles and wheelbarrows, instead of from fixed structures, and they operate informally, without paying rent, taxes or licensing fees. While this setting differs from the typical business environment in high-income countries, the entrepreneurs in this study operate businesses that represent a frequent source of income for urban Ugandans and those living in low-income countries more broadly. Uganda's National Labor Force Survey indicates that 35% of Kampala's labor force is self-employed with no employees other than the owner, and more than 95% of these businesses operate informally without registering with government authorities (Uganda Bureau of Statistics, 2021), like the businesses in this study.

business locations, i.e., misallocation, then entrepreneurs should realize higher profits by relocating. If, on the other hand, profit gaps reflect sorting, i.e., selection, then moving will not increase profits (e.g., Roy, 1951; Borjas, 1987). If there are large differences in nonmonetary amenities between locations and entrepreneurs trade off profit against amenity value, then moving may not increase welfare (e.g., Rosen, 1979; Roback, 1982). The cause of spatial variation in income therefore informs which policies will increase business income and entrepreneur welfare.

The experiment cross-randomizes an information intervention with two liquidity interventions, testing directly whether spatial profit gaps reflect misallocation and whether misallocation results from information and financial frictions. The information intervention identifies locations in the city that have higher average profits within an entrepreneur's sector. The first liquidity intervention is a moving subsidy, which pays microentrepreneurs who relocate their businesses within the city, and the second is an unconditional transfer of equivalent value to the subsidy.[4] The moving subsidy induces exogenous variation in business location, testing whether entrepreneurs can increase profits by moving business locations. In doing so, it identifies the extent to which there is misallocation (i.e., location-specific profit premia have not been competed away) as opposed to selection by entrepreneurs into particular places (i.e., individual entrepreneur characteristics drive profits).[5] The unconditional cash transfer relieves liquidity constraints in general. If entrepreneurs prefer to allocate the marginal dollar towards moving but face liquidity constraints that prevent them from doing so (due to, for example, incomplete credit, savings, or insurance markets), then responses to the subsidy and unconditional cash transfer should be the same. Alternatively, if entrepreneurs prefer not to allocate funds towards moving, but this preference is of lower value than the subsidy, then the subsidy alone will induce entrepreneurs to move business locations.[6] Cross-randomizing both liquidity interventions with the information intervention allows me to test whether liquidity, information, or both restrict firm location decisions.

I find that only entrepreneurs who take up the moving subsidy when it is provided with information are more likely to move into higher profit parishes. Those taking up the moving subsidy and also receiving information are 37% more likely than the control group to move into parishes with higher average profits.[7] They also realize statistically significant revenue and income gains during the intervention. Their revenue is 26% higher and profit is 45% higher than the control group, net of the moving subsidy itself. The large

[4]Specifically, the moving subsidy pays $2 per day to entrepreneurs who move their businesses three or more kilometers from their pre-intervention business location.

[5]A hybrid case might involve a location-entrepreneur match, where market frictions inhibit entrepreneurs from accessing their individual highest profit location, leaving untapped location-entrepreneur profit premia. In this case, I still expect a profit effect of relieving frictions that restrict entrepreneurs' access to particular locations. Absent market frictions, idiosyncratic location-entrepreneur matches would show up as sorting, where there are common entrepreneur characteristics that lead to sorting by particular types of entrepreneurs into particular places.

[6]The subsidy will induce moves by those for whom it exceeds the net pecuniary and nonpecuniary costs of moving.

[7]Here, I provide treatment-on-treated (ToT) effects, which reflect the effect of moving business locations for those taking up the subsidy. The corresponding intent-to-treat (ITT) effects are below.

profit effect is driven by increases in revenue without an increase in costs, underscoring the nature of the spatial arbitrage opportunity: entrepreneurs taking up the subsidy with information increase profit solely by moving, without expanding their businesses on any other dimension. Those receiving information alone, the moving subsidy alone, the unconditional cash alone, or the unconditional cash with information experience no statistically significant effect on the likelihood of moving into a higher profit parish, on revenue, or on profit.

Information serves to induce a high-return subset of entrepreneurs to take up the moving subsidy. Those taking up the moving subsidy when it is offered with information differ on baseline characteristics from those taking up the moving subsidy when it is offered without information. They have higher baseline knowledge of profits throughout the city, longer commutes, and locate their businesses in parishes with lower average profits than those taking up the subsidy without information. The subgroup of entrepreneurs with these baseline characteristics realizes statistically significantly higher profit when offered either the moving subsidy with information or the unconditional cash with information. I find no effect—of the subsidy or the unconditional transfer, with or without information—on profit for the group with baseline characteristics resembling those who are likely to take up the moving subsidy without information. This suggests that information serves a self-selection function by inducing a group that is able to realize differentially higher returns of moving to in fact take up the moving subsidy, in contrast to when the moving subsidy is offered without information. When offered with information, the unconditional transfer serves in a similar capacity as the subsidy for this subgroup of high-return movers.

The role of the liquidity interventions is consistent with an insurance-like mechanism. In an omnibus test for consumption smoothing (Townsend, 1994), I find that receipt of either the subsidy or the cash transfer reduces the correlation between the entrepreneur's income and consumption. Moreover, entrepreneurs who locate in places with higher average profits also experience much greater variance in profits. Thus, entrepreneurs may desire insurance to locate in places that have higher average profits but are also risky. Consistent with a desire for insurance, the moving, revenue and profit effects realized by those receiving liquidity and information fade throughout the month after the intervention. Given the much larger variance associated with high-profit places, a plausible degree of risk aversion—a coefficient of relative risk aversion of 1.16—can rationalize a decision to move while the liquidity interventions pay out (and effectively function as a consumption floor) but not after they cease. Incomplete insurance, thus, may explain both the lack of persistence and the role of liquidity in inducing entrepreneurs to move business locations.

I rationalize the empirical results in a structural model where entrepreneurs choose locations and realize profit in equilibrium. I adapt a spatial equilibrium model (e.g., Ahlfeldt et al., 2015; Monte et al., 2018) to the business location decisions of self-employed microentrepreneurs who maximize utility, not profit, reflecting a lack of separation between consumption and production decisions (e.g., Jayachandran, 2006; LaFave and

Thomas, 2016). Entrepreneurs realize profit in equilibrium, as new entrants compete down profits. I use survey data and exogenous variation from the experiment to estimate the model. I find that a model with fixed costs of moving, limited knowledge of profits across the city, and heterogeneous returns to moving can replicate the empirical results.

I use the model to simulate the aggregate impacts of permanently alleviating information and financial constraints on entrepreneurs. The model simulations show that aggregate income increases by 37% when information and liquidity constraints are relieved in general equilibrium, *net* of changes in the profitability of a place as new firms enter and compete down profits. Aggregate welfare gains, while positive, are not as large as aggregate income gains, reflecting a steep tradeoff between the monetary and non-monetary aspects of an entrepreneur's objective. A relatively small set of high-profit, high-amenity places become congested as entrepreneurs enter and compete down profits. As a result, entrepreneurs move into less congested places that have higher profits but lower amenities. The large income gains in equilibrium demonstrate sizable underlying frictions that constrain firm location decisions and suppress aggregate income.

I contribute evidence on spatial misallocation of entrepreneurs to the literature on spatial frictions in low-income countries. Prior work finds large income gains from the expansion of transportation infrastructure (Donaldson, 2018; Balboni et al., 2020; Brooks and Donovan, 2020) and from encouraging rural-urban migration (Bryan et al., 2014; Bryan and Morten, 2019). Prior work has not considered the role of the within-city mobility of entrepreneurs, as opposed to workers, despite the prevalence of self-employment in low-income countries. Other work on within-city firm location shows that consumer search frictions can explain the spatial clustering of tailoring firms (Vitali, 2024) and that higher firm profits compensate for greater pollution exposure in the city (Bassi et al., 2024). This paper provides complementary evidence on the ability of liquidity and information together to enable small-scale microentrepreneurs to overcome market frictions that otherwise prohibit moving and constrain firm profits, even in the face of urban disamenities.

I contribute evidence on the complementarity between liquidity and information to existing research on the barriers to enterprise growth, and I show that underinvestment in firm location can partially explain low microenterprise profits. Prior work documents large returns to capital for microentrepreneurs (De Mel et al., 2008), but researchers find low average effects of policies that relieve liquidity constraints for microentrepreneurs, such as the expansion of microcredit (Angelucci et al., 2015; Attanasio et al., 2015; Banerjee et al., 2015; Tarozzi et al., 2015). I show that adding information to a liquidity intervention leads high-return entrepreneurs to take it up, providing a potential policy lever to induce take up by the optimal compliers in settings where there is both a take up decision and heterogeneity in returns, as in Beaman et al. (2023).

This paper expands prior work on liquidity and information frictions that inhibit the mobility of workers by showing how these frictions also constrain the mobility of firms. Bryan et al. (2014) and Abebe

et al. (2021) show that paying transport costs directly can increase incomes via access to jobs, while Doornik et al. (2021) shows similar impacts of extending credit for personal vehicle purchase. Larcom et al. (2017) show that information about transit routes leads commuters to make more efficient routing decisions, and Baseler (2023) shows that information about the income prospects in cities increases rural to urban migration. This paper contributes new evidence on the complementary nature of liquidity and information frictions in relieving mobility constraints for entrepreneurs in particular.

This paper proceeds as follows: Section 2 describes the setting and motivating facts, Section 3 describes the model setup, Section 4 explains the experimental design and data collection, Section 5 describes the empirical analysis and main results, Section 6 explores the underlying mechanisms that can explain the pattern of results, and Section 7 details the estimation of model parameters and simulation results.

2 Baseline Setting and Motivating Facts

I study mobile microentrepreneurs, primarily street vendors and motorcycle taxi drivers ("boda bodas"), a typically low-income group who may have both relatively low costs of moving and relatively high marginal utility of additional earnings. I begin by documenting substantial variation in microfirm profits across Kampala for a spatially representative sample of mobile microentrepreneurs. I find that profits associated with the 90^{th} percentile parish are more than three times those associated with the 10^{th} percentile parish, controlling for entrepreneur characteristics (education level, years of experience, gender, sector, and asset stock), as shown in Figure 1.

2.1 Sampling Procedure

In a baseline survey in October and November 2022, I sampled 3,745 business owners who (1) have one or fewer paid employees, (2) have a cell phone (to allow for tracking and mobile money transfers in the treatment phase), and (3) do not operate from a permanent structure or stall, including their home. Surveys take place at randomly selected points (latitude-longitude pairs), stratified by city parish, such that the sample is spatially representative of microenterprises in Kampala.[8] This baseline data collection served several purposes:

[8]To draw the baseline sample, I imposed a square lattice of points, 100 meters apart, over the area of Kampala and randomly selected an average of 15 "nodes" per city parish, or 1300 nodes in total across 86 city parishes. I then moved each randomly selected node to the nearest city road to ensure that it was accessible (i.e., not in the middle of a field or body of water). Enumerators were instructed to survey the entrepreneur located closest to the node who satisfied the inclusion criteria and consented to participation in the study (and enumerators worked in pairs, so one could check to the left and the other to the right). After this first survey, enumerators would then survey the first entrepreneur who again satisfied the inclusion criteria located a minimum of 100 meters to the left of the initial survey point. They repeated the same process to the right, resulting in three surveys per node. The 100 meter condition is to avoid surveying three entrepreneurs operating in a cluster (for example, at the same boda stage) and to reduce the likelihood of spillovers in the treatment phase. This survey protocol yielded an average of 45 surveys per city parish. Occasionally, it was not possible to find 3 entrepreneurs at a node, so a replacement node was drawn.

it provided a spatially representative cross-section of microenterprise profits across the city from which I measure the extent of unexplained variation in pre-intervention profits in Figure 1, identified the sample from which I primarily drew participants for the experiment, and provided the data needed to construct the information arm of the experiment. Figure 2 maps average microenterprise profits in each parish across the city and depicts the geographic coverage of the baseline data collection.

2.2 Sample Characteristics

The selection criteria yield a baseline sample of retail vendors (56%), such as those selling fruits, vegetables, clothing, or packaged foods; motorcycle taxi drivers ("boda bodas") (29%); and entrepreneurs working in non-transportation services (15%), such as those providing car washes, shoe shining, or freshly cooked food. I aggregate retail vendors and those working in services together in a group termed "vendors" and describe the characteristics of the sample overall, as well as separately for vendors and bodas, in Table 1.

As intended, the sample is quite mobile: the median commute time from home to business location is 30 minutes (the average is 34 minutes), 93% are unregistered and have no official permit to use their business location, and only 22% primarily rely on repeat customers. Two-thirds of the sample believes that they could earn higher profits by locating elsewhere within the city, and a lack of liquidity is the modal self-reported constraint preventing moving to another business location, among those who believe that they could earn higher profits elsewhere. Anticipated moving costs to a new location, however, are only 3,400 UGX per day, or less than $1 in November 2022.[9] Despite claiming that they expect to make higher profits elsewhere, respondents earn low scores on a quiz assessing knowledge of profit levels across the city: the average score is equivalent to the expected accuracy rate under random guessing.[10] These facts inform the decision to ease liquidity and information constraints in the experiment.

Only 25% of the sample is female, perhaps the result of selecting for a mobile sample (i.e., not operating from a permanent structure, including the home). All of the female entrepreneurs in the sample are vendors; there are no female boda drivers. On average, entrepreneurs in the sample are 30 years old and have five years of experience. The entrepreneurs report low levels of education: only 15% have completed secondary school, while about 70% have completed primary school.

Average daily revenue is 60,000 Ugandan shillings (UGX), or $16. Revenues are typically higher for vendors than bodas, but so are costs. Average daily profit across the sample is 23,000 UGX ($6) but 21,000 UGX among vendors and 27,000 UGX among bodas. Asset levels also differ between vendors and bodas:

[9] At the time of the baseline survey in November 2022, the exchange rate is approximately 3,700 UGX to 1 USD.

[10] The quiz asks a series of questions with binary responses, where the entrepreneur is asked whether they believe that typical profits are lower or higher in X other city parish for businesses operating in their same sector. I score the quizzes using the parish-sector profit rankings, calculated from the information collected in the baseline survey. A score of 50% is equivalent to the expected score under random guessing.

while vendors typically have only 188,000 UGX ($51), or about nine times their daily profit, in assets, boda drivers have nearly 3,000,000 UGX ($810) in assets, where the bulk of their asset stock is the motorcycle that they use to transport customers.

No boda driver and nearly no vendor hires any paid labor, indicating that the entrepreneur supplies all of the labor to the business (an average of 67 hours per week). Inventory is the primary input cost incurred by vendors, while fuel is the primary input cost incurred by bodas. Only 7% of the sample pays any sort of rent, formal or informal, to use their space for their business.[11] Approximately 60% of the sample has any savings at all, with vendors having average savings of 212,000 UGX ($57) and bodas having more than twice that, 443,000 UGX ($120). This level of savings far exceeds entrepreneurs' anticipated moving costs, suggesting that the reported insufficient liquidity to move to a more profitable place may not result from incomplete savings markets. About a quarter of the sample reports having any credit.

The baseline data yield several facts that guide the model setup and experimental design:

1. The profits associated with the 90$^{\text{th}}$ percentile most profitable city parish are more than three times those associated with the 10$^{\text{th}}$ percentile parish, for observationally similar microentrepreneurs.

2. Microentrepreneurs in the sample are relatively mobile (i.e., the mean commute from home is over 30 minutes) and rarely pay rent for use of space for their business place.

3. Despite a lack of physical and contractual barriers to moving, the majority of entrepreneurs in the sample believe they could be more profitable elsewhere.

4. They identify liquidity as the primary constraint that prevents moving business locations. Although savings far exceed anticipated moving costs and almost a quarter of the sample has access to credit, liquidity may be desired for other reasons, e.g., as insurance if moving is profitable but risky.

5. While entrepreneurs believe that they could be more profitable elsewhere, they have low levels of knowledge about spatial profit variation in the city.

3 Model

I use a spatial equilibrium model (e.g., Ahlfeldt et al., 2015; Monte et al., 2018), estimated with data collected during the experiment, to simulate aggregate outcomes under counterfactual policies. I adapt the model to reflect the business location decisions of microentrepreneurs who do not pay rent for business space. These entrepreneurs consume directly out of their business profits and choose locations to maximize utility, not

[11] I document the frequency with which microentrepreneurs pay rent at baseline to characterize the sample. Ultimately, those paying fixed monthly rent will be excluded from the experimental sample.

profit, reflecting the well-documented lack of separation between consumption and production decisions in low-income settings (Jayachandran, 2006; LaFave and Thomas, 2016).

3.1 Entrepreneur's Preferences

The utility, U_{jknd}, of entrepreneur j operating in sector $k \in \{\text{Retail}, \text{Transport}\}$ with incumbent location (city parish) n who moves to destination parish d depends on income (i.e., business profit), amenities, and costs as follows:

$$U_{jknd} = \frac{A_{kd} z_{jkd}}{c_{nd} \nu_{kd}} \ln(Y_{kd}) \tag{1}$$

Here Y_{kd} captures average income for businesses in sector k at parish d, A_{kd} captures nonmonetary amenities, and c_{nd} captures the utility cost of moving. The parameter ν_{kd} is the coefficient of variation (standard deviation divided by the mean) of income. Its presence in the denominator indicates that variability in income lowers utility in a manner similar to moving costs. I assume that the idiosyncratic distribution of amenities is distributed Fréchet, $z_{jkd} \sim \text{Fréchet}(\theta_k)$, as is typical in the spatial literature, and I allow the shape parameter, θ_k, to vary by sector.[12]

In order to move, entrepreneurs must have exogenous liquid capital (i.e., savings), a_j, greater than or equal to $\bar{a}$. This could reflect a start-up cost incurred to explore alternative locations or a buffer stock that serves to insure risk in moving. Contingent on having $a_j \geq \bar{a}$, the entrepreneur faces an unconstrained, discrete-choice utility maximization. Otherwise, the entrepreneur cannot move, and their indirect utility simply equals that associated with their incumbent business location. The entrepreneur's *ex ante* indirect utility is as follows:

$$V(j,k,n) = \begin{cases} \max_d \frac{A_{kd} z_{jkd}}{c_{nd} \nu_{kd}} \ln\left(\delta_{jkd} Y_{kd}\right), & \text{if } a_j \geq \bar{a} \\ \frac{A_{kn} z_{jkn}}{\nu_{kn}} \ln\left(\delta_{jkn} Y_{kn}\right), & \text{otherwise} \end{cases} \tag{2}$$

Here $\delta_{jkd} \sim \text{Log-normal}(\lambda_{kd}, \sigma^2_{kd})$ is idiosyncratic knowledge of income, where inaccurate knowledge has a mean distortion of λ_{kd} with variance σ^2_{kd}. This knowledge shock may distort the entrepreneur's *ex ante* location decision but does not feature in realized, *ex post* welfare. Solving equation (2) yields N_{kd}, the number of firms of a given sector choosing to locate in parish d.

[12] Idiosyncratic amenities, or idiosyncratic preferences, could be, for example, a preference by a vendor who cooks fresh food to locate in a place with sufficient sidewalk space to set up a portable stove. In this setup, the Fréchet scale parameter is normalized to 1, as the A_d term will reflect average amenity value in each location. The Fréchet shape parameter, θ_k, is an inverse measure of dispersion where a smaller θ_k indicates greater dispersion between locations and a larger role for idiosyncratic preferences. I let it vary by sector to reflect that vendors (k = Retail) and bodas (k = Transport) may have different willingness to move, especially since bodas have direct access to capital that facilitates mobility via their motorbike.

3.2 Determination of Profits in General Equilibrium

In equilibrium, as parish-level demand curves are downward-sloping, profits will be determined by jointly solving the consumer's problem and firm's problem, which I model as follows:

Consumer's Problem. Households are assigned to exogenous locations d. Their total expenditure is divided between sectors $k \in \{\text{Retail}, \text{Transport}, \text{Other}\}$. Given prices $p_{kd}(j)$ and exogenous expenditure I_{kd}, households choose the quantity $x_{kd}(j)$ to purchase from each firm j:

$$\begin{aligned} U_{kd} \quad &= \quad \max\left(\int x_{kd}(j)^{\frac{\sigma-1}{\sigma}}\, dj\right)^{\frac{\sigma}{\sigma-1}} \\ &\text{subject to} \int p_{kd}(j)\, x_{kd}(j)\, dj \quad \leq \quad I_{kd} \end{aligned} \tag{3}$$

where σ is the elasticity of substitution between goods sold by different firms.

Firm's Problem. Given prices $p_{kd}(j)$ and cost function $C(\cdot)$, firms choose quantity $x_{kd}(j)$:

$$Y_{kd} \quad = \quad \max p_{kd}(j)\, x_{kd}(j) - C(x_{kd}(j)) \tag{4}$$

Profits result from jointly solving the consumer's problem and firm's problem:

$$\ln(Y_{kd}) \quad = \quad \ln(\Phi_{kd}) - \ln(N_{kd}) \tag{5}$$

Profits depend on a location-specific parameter, Φ_{kd}, which captures the baseline profitability of a parish, and the number of firms, N_{kd}, in parish d. The full derivation of equation (5) is in Appendix A.

Solving equations (2) and (5) together yields entrepreneurs' optimal location choices in general equilibrium.

3.3 Model Predictions

The model implies the following about the entrepreneur's decision:

1. Entrepreneurs are more likely to locate in places with higher profits, Y_{kd}, and with greater amenity value, A_{kd}, all else equal.

2. They are less likely to locate in places with greater variation in profits, ν_{kd}, and to which they face higher costs of relocation, c_{nd}, all else equal.

3. For high values of θ_k, entrepreneurs will be more responsive to changes in the location-specific value of moving to destination d, V_{kd}. For low values of θ_k, idiosyncratic preferences will dominate.

4. An entrepreneur's knowledge of profits throughout the city, δ_{jkd}, can distort their location decision. On average, entrepreneurs are less likely to locate in places where profits are underestimated ($\lambda_{kd} < 0$) and more likely to locate in places where profits are overestimated ($\lambda_{kd} > 0$).

In Section 7, I use data collected through the experiment to estimate model parameters and simulate aggregate impacts on income and welfare.

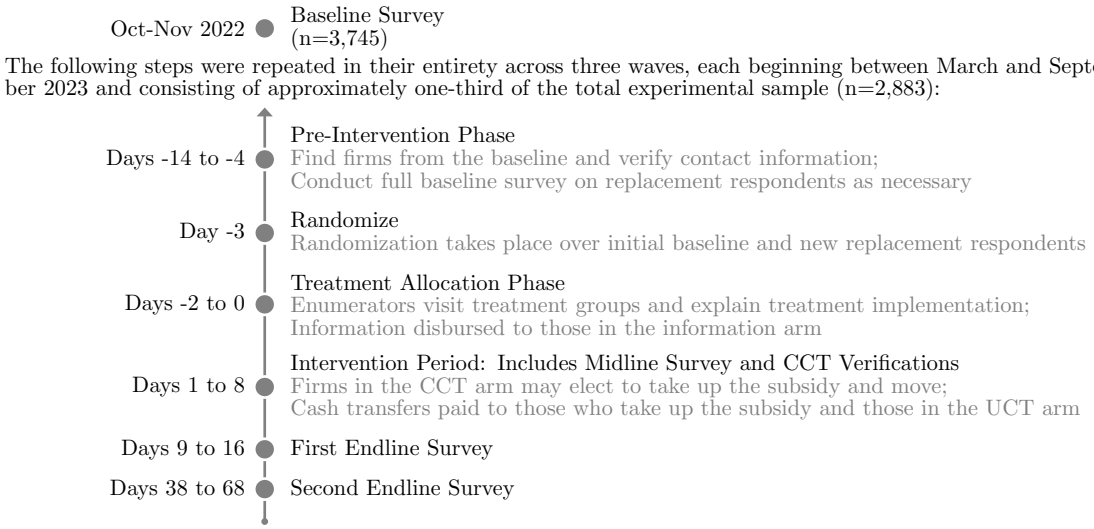
4 Experimental Design and Data Collection

The experiment cross-randomizes an information intervention with each of two different liquidity interventions, a moving subsidy and an unconditional cash transfer of equivalent value, to test whether entrepreneurs can increase profits by moving business locations and whether liquidity and/or information constrain their location decisions. The moving subsidy, or a conditional cash transfer (CCT) that pays entrepreneurs who move their business location three or more kilometers from their pre-intervention location, induces random variation in business location. The moving subsidy explicitly increases the value of moving to a destination (V_d, in the model) that is three kilometers or more from the entrepreneur's pre-intervention business location. The unconditional cash transfer alleviates liquidity constraints in general. Comparing the effect of taking up the unconditional transfer to taking up the moving subsidy will indicate whether entrepreneurs on average put the cash to a higher or lower return use than the return realized in a new business location. The information intervention tests whether information frictions constrain entrepreneurs' location and investment decisions. This yields a 3x2 design, as depicted in Table 2.

4.1 Experimental Sample and Randomized Treatment Assignment

The experimental sample – those randomly assigned to one of the six treatment or control arms – consists of 2,883 entrepreneurs. When possible, I draw the experimental sample from the baseline sample (n=3,745). A baseline participant is eligible for retention in the experimental sample if they (1) successfully received a small mobile money transfer after participating in the baseline survey, as verification that they are able to receive mobile money transfers, (2) do not operate from the most profitable parish for their sector, i.e., there is at least one parish with higher average profits about which they can be informed if assigned to the information arm, (3) do not pay fixed monthly rent (a binding condition for less than 7% of the baseline sample), and (4) are successfully found and re-surveyed during a short interview after the baseline and immediately preceding randomization and treatment allocation (the "pre-intervention" phase). Ultimately, 1,691 (59%) of the 2,883 experiment participants are drawn from the baseline sample, while the other 1,192 (41%) are "replacement"

respondents, who meet both the initial inclusion criteria for the baseline sample (as laid out in Section 2), as well as "retention" conditions (1) - (3).[13] The sequence of the baseline survey, pre-intervention phase, randomization, treatment allocation, intervention, and data collection is summarized below:



Once the experimental sample has been selected through the baseline survey and pre-intervention phase, I randomly allocate each participant to one of the six arms, stratifying over business sector (vendor; boda; services), geographic division in Kampala (an administrative unit, of which there are five in the city), gender (female; male), and participation cohort (of which there are three).[14] Randomization is at the level of the individual entrepreneur. Table 3 depicts balance between treatment arms on baseline sample characteristics. Characteristics are generally balanced across treatment arms, and the frequency with which I reject the null of equality (at the 95% confidence level) is in line with the number of rejections expected due to random chance. In a test for joint orthogonality across treatment arms, I reject the null of joint orthogonality for two of 19 baseline characteristics. In 95 pairwise tests (19 covariates × 5 tests) for equality on baseline characteristics between the control and each treatment arm, I reject the null in 7 instances. Table B.1 summarizes the sample composition along sector and gender, two of the stratification variables, which thus are not featured

[13]Retention condition (4) is irrelevant for replacement respondents, as they are solely interviewed in the pre-intervention phase. The most common reason for replacing baseline respondents was a failure to meet retention criterion (4): the baseline respondent could not be found again during the pre-intervention phase immediately preceding treatment allocation, reflecting a high level of transience in a sample of low-income, urban microentrepreneurs operating largely informal businesses that lack a permanent structure. The baseline survey was conducted in October and November 2022, while the treatment phase was initiated in waves between March and October 2023, so 4 - 12 months elapsed between the initial baseline and the pre-intervention follow-up. Randomization is orthogonal to whether an entrepreneur is an original or replacement respondent, and so this does not confound the estimation of treatment effects.

[14]For logistical purposes of implementing the treatments, especially the conditional cash transfer, I divide the experimental sample into three cohorts of roughly equivalent size (approx. n=960 in each cohort). The pre-intervention phase, randomization, treatment allocation, intervention, and endline surveys take place in succession within a given cohort and are repeated in their entirety for each cohort. As I stratify treatment assignment over cohort, all six experimental arms are represented within a given cohort. This guarantees that no more than one-third of the sample participates in the experiment at any given time, enabling the enumerator team to carefully verify compliance with the three kilometer moving condition, among those assigned to and taking up the CCT.

in the balance table. The sample is heavily male (70%), perhaps due to selecting a mobile sample, and is composed of 62% vendors, 26% bodas, and 12% other services.[15] The modal vendor sells fruits or vegetables.

4.2 Implementation of the Interventions

A "treatment allocation" visit takes place 1 - 3 days before the intervention period begins to explain the implementation logistics to all entrepreneurs randomly assigned to a treatment (non-control) arm. If an entrepreneur is randomly assigned to receive both a liquidity intervention (either the subsidy or cash transfer) and the information intervention together, then implementation is additive: the entrepreneur receives the liquidity intervention exactly as an entrepreneur receiving the liquidity intervention alone plus the information intervention in the exact form that it is disbursed to an entrepreneur receiving the information intervention alone.

Moving Subsidy, or Conditional Cash Transfer (CCT). The moving subsidy, or conditional cash transfer (CCT), allocates 7,000 Ugandan shillings (UGX), or approximately $2 per day, on any day in an eight-day intervention period that an entrepreneur locates three or more kilometers from their initial (pre-intervention) business location. This distance is measured in road travel distance. The 7,000 UGX incentive is equivalent to 35% of median daily income and covers entrepreneurs' anticipated daily moving costs to a more profitable location for more than 90% of the sample. The subsidy is paid out on a daily basis to mimic the time horizon on which entrepreneurs in the sample make investment decisions (the modal entrepreneur incurs 1-2 input costs, typically inventory or transport costs, and pays both on a daily basis). I select three kilometers as the distance at which an entrepreneur becomes eligible for the CCT based on the typical distance that entrepreneurs must travel to access more profitable parts of the city. As depicted in Figure B.1, more than 60% of the sample is able to access a parish with average profits that are at least 20% higher than average profits in their own parish within three kilometers. Furthermore, I find that less than 20% of the sample moves more than three kilometers between the baseline survey and a pre-intervention follow-up survey (among those in the experimental sample who are retained from the baseline), suggesting that the conditionality will require most entrepreneurs to deviate from their typical habits. The CCT is disbursed via mobile money, to the mobile phone number confirmed during the treatment allocation visit, after an enumerator verifies the respondent's new business location and records the geopoint of the new location. Detailed information on the process of verifying compliance with the 3 km conditionality is provided

[15] Note that the composition of the experimental sample (n=2,883) is slightly different from the full baseline sample (n=3,745), as it consists of only a subset of those surveyed at baseline plus some replacement respondents. The baseline characteristics of the experimental sample are summarized in Table 3, while the baseline characteristics of the full baseline sample are summarized in Table 1.

in Appendix B. The requirements and logistics of verification are communicated to the entrepreneur during the treatment allocation visit, immediately before the eight-day intervention period begins.

Unconditional Cash Transfer (UCT). The unconditional cash transfer equivalently allocates 7,000 UGX per day during each day of the same eight-day intervention period and is also allocated using mobile money. If the study team could not reach an entrepreneur in the UCT arm to conduct the treatment allocation visit – where the study team explained the entrepreneur's treatment assignment and logistics of implementation, i.e., that a 7,000 UGX transfer would be disbursed each day via mobile money for eight days – then no transfer was made. This is both a cost-savings measure and to maintain comparability with the implementation of the CCT: if an entrepreneur in the CCT arm could not be reached during the treatment allocation phase, then they were not aware of their eligibility for the moving subsidy and thus would be unable to take it up. Likewise, if an entrepreneur in the UCT arm was unreachable during treatment allocation, then they were not aware of their assignment to the UCT arm and so no transfer was made. About 10% of entrepreneurs in both the CCT and UCT arms were unreachable during treatment allocation and so did not take up their respective liquidity intervention.

Information Intervention. The information treatment uses the baseline distribution of profits across the city to inform respondents about parishes where profits for businesses in their sector are typically higher than in their own parish. Respondents receive information about the average difference in profits for businesses of their same sector in up to four other parishes, randomly selected from among those where the average sector profit exceeds that in the entrepreneur's own parish.[16] The profit differential about which the respondent is informed is the difference in the parish-sector fixed effect from the entrepreneur's own parish-sector to the randomly selected parish about which they receive information. To increase the likelihood of providing useful information, I restrict the set of parishes about which an entrepreneur could be informed to the parishes with a parish-sector fixed effect among the 90% most precise within a given sector, and I double the probability that an entrepreneur is informed about parishes in the top profit quartile within their sector.

In addition to the name of the parish and the profit differential, I also share a landmark in the parish for those who may not be familiar with administrative boundaries. Figure 3 shows an example "information card" that a respondent assigned to the information treatment would receive during the experiment. This information is provided verbally by the enumerator during the treatment allocation visit, on a physical card with text in both English and Luganda, and in a follow-up text message.

[16] All respondents in the information arm receive information about four randomly selected parishes, unless there are fewer than four with higher average profits than the entrepreneur's own parish, for businesses of their same sector. There is always at least one parish about which to inform the respondent, as entrepreneurs located in the highest profit parish for their sector were dropped from the experimental sample.

4.3 Data Collection

I collect survey data before, during, and shortly after the intervention period, to document how firms respond to the intervention while they are actively receiving subsidies and cash transfers, as well as whether impacts persist following the conclusion of the intervention. Surveys take place at the following points, and the sequence of data collection relative to the intervention is given in the timeline in Section 4.1:

1. Baseline survey (n=3,745): Comprehensive initial survey in October - November 2022 or immediately preceding the intervention period for replacement respondents
2. Pre-intervention survey (n=2,883): Brief follow-up for those retained from the baseline to experimental sample ("original" respondents) that verifies contact information and pre-intervention location

Randomization then takes place over the respondents surveyed in the pre-intervention phase (the 2,883 respondents who compose the experimental sample). After randomization, I attempt to re-survey all treatment and control respondents at the following points:

3. Midline survey (retained 2,410 of 2,883 respondents): Brief survey that takes place during the intervention
4. First endline survey (retained 2,500 of 2,883 respondents): Comprehensive follow-up survey that takes place in the week after the intervention concludes
5. Second endline survey (retained 2,596 of 2,883 respondents): Comprehensive follow-up survey that takes place 1-2 months after the intervention concludes

The baseline and pre-intervention survey are one and the same for replacement respondents (n=1,192), while they are two separate surveys for original respondents (n=1,691). After the pre-intervention survey and following randomization, replacement and original respondents are surveyed in an identical manner. I also conduct a very brief survey at the time of CCT compliance verification, for anyone taking up the CCT. These data lack any experimental variation, as they are only collected from those who comply with the CCT. Thus, these data are only used for descriptive purposes, especially related to describing where entrepreneurs moved. I use these data to characterize where and how far entrepreneurs taking up the CCT moved in Section 5.1.

Baseline Survey. The baseline survey captures GPS firm location, the business owner's demographic characteristics (e.g., gender, age, education level, years of experience), characteristics of the business (e.g., business sector and type of goods sold, if in retail), typical daily revenue, value of and frequency with which costs are incurred (separately for each type of cost), number of hours that the entrepreneur works on their own business, mode of transportation and commute time from home to business location, business assets (including inventory), personal savings and credit, knowledge of business profits in other locations in the city,

beliefs about barriers to accessing other locations, future business expansion aspirations, and finally patience and time consistency through an incentivized cash lottery.

Pre-Intervention Survey. The brief pre-intervention survey primarily serves to verify contact information and location of original baseline respondents, as 4-10 months have elapsed from the baseline, depending on the cohort. It takes place in the two-week period immediately preceding randomization and the intervention period. The survey once again records GPS firm location (the location from which compliance with the CCT will be determined, for those randomly assigned to the CCT arm), gives the respondent the opportunity to update their phone number if it has changed since the baseline, and collects information on a few dimensions that were not included in the baseline survey. These new questions include the number of competitors (other businesses selling the exact same good or service) within eyesight of the respondent's business (counted and recorded by the enumerator), where vendors buy inventory (i.e., which market), frequency of trips to the market, and the type of fruit or vegetable sold by any vendors for whom this is their primary good. If the respondent is a replacement respondent, then the pre-intervention and baseline surveys are coalesced into one.

Midline Survey. The midline survey is also a brief follow-up survey that takes place during the eight-day intervention period. The midline survey collects GPS location, the number of competitors surrounding the entrepreneur at their business location, their mode of transportation to work, number of hours worked so far that day, revenue earned so far, costs so far, expected profit for the day, mobile money balance, and whether and where (i.e., which market) the entrepreneur has purchased inventory. The midline survey also collects profit earned in the prior day and approximate location in the prior day, but the aim of collecting revenue and costs so far at the moment of the survey is to tie firm performance to an exact GPS location. While the midline survey takes place during the intervention, it is entirely independent of the CCT verification and associated CCT verification survey. For example, an entrepreneur taking up the CCT might participate in the midline survey early in the day, before they have reached their primary business location for the day, or on a day during the intervention period in which they elect not to take up the CCT. For these reasons, the entrepreneur's location in the midline survey may not be the same as at the time of CCT verification.

Endline Surveys. The first endline survey takes place in the week immediately following the conclusion of the intervention, and the second endline survey takes place one to two months following the conclusion of the intervention. These surveys closely resemble the baseline survey, collecting GPS location and detailed information on firm revenues and costs, assets, market access, savings, credit, knowledge of profit variation across the city, and business aspirations.

Attrition from the Sample. I retain 84%, 87%, and 90% of respondents at the midline, first endline, and second endline wave, respectively. Attrition is higher at midline than in subsequent survey rounds because

there is a shorter period of time over which to track respondents: if a respondent cannot be found and surveyed during the eight-day intervention period, then they will have attrited from the midline sample. In contrast, the first and second endline surveys do not have the same fixed end date after which a respondent can no longer be tracked. Midline respondents do, however, appear to be missing at random. The rate of attrition in each treatment arm is not statisticially significantly different from that of the control group, and I cannot reject the null of joint orthogonality across all treatment arms (Table B.2).

5 Empirical Analysis and Results

Of those assigned to the moving subsidy (CCT) arm, 55% take it up and move business locations on at least one day of the intervention period. This indicates that the majority of the sample perceives positive net value of moving when offered the subsidy, or more specifically that the net value of moving for one day exceeds -$2 for 55% of the sample. I find that only firms offered both the moving subsidy (the CCT) and information are more likely than the control group to move into a city parish with higher average profits for businesses of their same sector. They also increase revenues by 14% relative to the control group, the only group to report statistically significant revenue gains. Those offered both the subsidy and information have differentially higher profits relative to those receiving information alone, and they also differentially realize a higher fraction of expected profits in the parishes they move to, suggesting that the combination of the subsidy and information enables a more profitable entrepreneur-location match.

5.1 Take-Up and Description of Moves

As shown in Table B.3, 54% of those in the CCT only group take up the subsidy, while 56% of those in the CCT+Info group take it up, but the difference is not statistically significant. The baseline characteristics of who take up the subsidy do, however, vary depending on whether it is offered with or without information. Because the rate of compliance is similar between groups, this indicates a compositional change based on the presence of information with the subsidy offer. As shown in Table B.4, those taking up the subsidy when it is offered with information have statistically significantly ($p < 0.10$) higher baseline knowledge of profit in nearby parishes and lower savings than those taking up the subsidy without information. They also have longer commutes ($p = 0.11$).[17] These differential characteristics of compliers have implications for the impact of the subsidy, which I discuss further in Section 6.2.

[17] I analyze complier characteristics using the approach laid out in Abadie (2002) and Angrist et al. (2023), where I instrument for compliance with treatment assignment and use 2SLS to analyze when baseline characteristics differ because of complier of status. Note that the never taker mean in Table B.4 is solely descriptive: it is the average value observed for those who were offered the CCT but did not take it up. The complier mean, however, is identified using variation in complier status that results from treatment assignment.

Using the data collected from entrepreneurs during CCT verification, I find that firms taking up the CCT do not solely move the minimum distance required: the median distance moved is 4.8 km.[18] Entrepreneurs also experiment with several new locations. The average entrepreneur taking up the CCT moves to five different parishes in the eight-day intervention period. Only 9% of firms receiving both the CCT and information ever move to a parish about which they were informed, suggesting that to the extent that information may influence outcomes, it is not by directing entrepreneurs to locate in the particular parishes about which they were informed. Together with the fact that those taking up the subsidy when it is offered with information have higher baseline knowledge of profits across the city suggests that any impact of information in combination with the subsidy does not come from informing entrepreneurs about average differences in profit, but perhaps from a higher dimensional moment, such as variability in perceptions about profit across the city.

Of those assigned to the UCT only group, 90% take it up, while 87% of those in the UCT+Info group take it up (also not statistically significantly different between groups). Entrepreneurs who were unreachable during the treatment allocation phase account for the imperfect take-up of the UCT: as discussed in Section 4.2, if an entrepreneur could not be reached for mobile phone number verification, then the study team did not send the transfer.[19]

5.2 Estimation Strategy

I estimate treatment effects using the following OLS specification, in which I regress each outcome of interest on treatment assignment. For firm j in stratum s, the intent-to-treat (ITT) specification is as follows:

$$Y_{js} = \beta_0 + \beta_1 info_j + \beta_2 CCT_j + \beta_3 (info_j \times CCT_j) + \beta_4 UCT_j + \beta_5 (info_j \times UCT_j) + \delta X_j + \phi_s + \epsilon_{js} \quad (6)$$

where Y_{js} is an outcome for firm j in stratum s, $info_j$=1 if the firm is randomly assigned to the information arm, CCT_j=1 if the firm is randomly assigned to the CCT arm, UCT_j=1 if the firm is randomly assigned to the UCT arm, X_j is an optional vector of baseline characteristics, and ϕ_s are strata fixed effects.[20] I use double-selection lasso to select which of 28 pre-specified baseline controls are included in X_j, with strata fixed effects automatically included as non-penalized controls. Standard errors are heteroskedasticity-robust. I

[18] Note that Section 5.1 reports descriptions of the moves made by those taking up the moving subsidy, not the effect of treatment, which I discuss beginning in Section 5.2.

[19] Recall that this was a cost savings measure, as well as for comparability with the CCT arm. If an entrepreneur assigned to receive the CCT could not be reached during the treatment allocation phase, then they would not have known about their eligibility and thus could not take up the subsidy.

[20] Recall that randomization was stratified over participation cohort, geographic division, business sector, and gender.

winsorize all continuous outcomes to the 2.5^{th} and 97.5^{th} percentiles, to mitigate the possibility of outliers driving average effects.

The β terms are the coefficients of interest, where β_1 is the effect of receiving information alone, β_2 is the effect of the CCT offer alone, β_3 is the differential effect of receiving information and a CCT offer together, β_4 is the effect of the UCT offer alone, and β_5 is the differential effect of receiving information and a UCT offer together. While β_1, β_2, and β_4 indicate the total effect of being assigned to the information only, CCT only, or UCT only treatment arms, respectively, $\beta_1 + \beta_2 + \beta_3$ indicates the total effect of being assigned to the CCT with information arm, and $\beta_1 + \beta_4 + \beta_5$ indicates the total effect of being assigned to the UCT with information arm. β_3 alone indicates whether the CCT and information are substitutes (–), complements (+), or neither. Likewise, β_5 alone indicates whether the UCT and information are substitutes (–), complements (+), or neither.

Local Average Treatment Effect. I also estimate the local average treatment effect (LATE) by instrumenting take-up with treatment assignment in a two-stage least squares (2SLS) setup. I consider an entrepreneur as having taken up the CCT if they took up the subsidy by moving three or more kilometers on at least one day of the intervention period. I consider an entrepreneur as having taken up the UCT if our study team was able to reach the entrepreneur immediately before the intervention to verify their mobile money phone number, through which the transfer will be sent.[21] I assume 100% compliance, or take-up, with the information treatment in that there was no relevant take-up decision: anyone randomized to the information arm was exposed to the information, as information was provided verbally, on a written card, and through text message, regardless of whether or not the study team could reach the entrepreneur during the treatment allocation phase. In this experiment, there is no possibility of "always taking" – that is, there is no possibility that the CCT or UCT was delivered to someone not assigned to the CCT or UCT arm, respectively, because the study team only made mobile money transfers to the set of phone numbers associated with respondents assigned to the relevant arm. Thus, the local average treatment effect (LATE) is the same as the treatment-on-treated (ToT) effect.

The exclusion restriction must hold for the LATE to yield an unbiased treatment effect for compliers: the offer of the CCT must only affect outcomes through take-up of the CCT, and the offer of the UCT must only affect outcomes through take-up of the UCT. I consider an entrepreneur to have taken up the CCT if they moved three or more kilometers and received the subsidy at *any point* during the intervention period. Even if an entrepreneur only took up the incentive for one day of the eight day intervention period, they are considered as having fully taken up the incentive (in the same way that an entrepreneur who takes up

[21] If the entrepreneur could not be reached, then the transfer was not sent, such that the entrepreneur did not take up the transfer, for the reasons described in Section 4.2.

the CCT on every day of the intervention is considered as having taken up the incentive). Conceivably, an experience moving one day could affect outcomes on another day when the entrepreneur does not take up the subsidy, and so this threat to the exclusion restriction is mitigated by considering anyone who took up the subsidy on any single day of the experiment as having fully taken it up. Concerns that exclusion might be violated for those offered the CCT with information – if information together with the offer of the CCT somehow influenced behavior even without taking up the CCT – are alleviated by the lack of an impact of the information intervention alone. It is unlikely that information alone has no impact but information with the offer of the CCT has an impact absent taking up the CCT. Entrepreneurs assigned to the UCT arm only failed to take it up when they could not be reached during the treatment allocation phase, and so they were unaware of their eligibility. Their random assignment to the UCT arm, thus, is unlikely to affect outcomes absent taking it up, given that those who did not take up the UCT did not know they were eligible for it. The second stage estimating equation that yields the ToT effect is given in Appendix B.

By instrumenting take-up with random assignment to the CCT arm, the treatment-on-treated effect enables me to measure the size of the revenue and profit effects for those entrepreneurs who did in fact move in response to the CCT, the set of entrepreneurs who, by revealed preference, have a positive net value of moving when offered the subsidy. This is useful for determining the cost-effectiveness of the subsidy, as the cost of paying out the subsidy is only incurred for compliers. For those in the UCT arm, the ToT indicates the effect of actually receiving cash. The ToT, thus, identifies the effect of taking up the CCT for those complying with the CCT and, separately, the effect of taking up the UCT for those complying with the UCT, but these complier groups could be different. As a result, a difference in the effect of taking up the CCT relative to the effect of taking up the UCT could reflect either an effect of moving only realized through the CCT or differences in returns for the type of entrepreneur who takes up the CCT versus the UCT.

Machine Learning to Predict Take-Up with Baseline Characteristics. To address this, and to better understand how the effect of moving compares to the returns to cash for the set of people likely to take up the moving subsidy, I use lasso to predict which entrepreneurs are likely to take up the subsidy, when it is offered with information and, separately, when it is offered without information. I then construct a subgroup of "likely compliers", as predicted with baseline characteristics, on which I test for heterogeneity in intent-to-treat effects. Consistent with the characterization of compliers in Table B.4, lasso selects commute time and knowledge of spatial variation in profits as important predictors of taking up the subsidy when it is offered with information, but not when it is offered without information. Likelihood of incurring transit costs is the sole lasso-selected predictor of take-up that is common to both groups. The results of the lasso analysis are shown in Table 4.

Differences in complier characteristics for those taking up the subsidy with information relative to without suggests that the presence of information changes the characteristics of who chooses to take up the subsidy. Conducting heterogeneity analysis on the machine learning-predicted "likely complier" subgroup allows me to test this directly, by comparing the differential effects for the group that is likely to comply with the CCT+Info relative the differential effects for the group that is likely to comply with the CCT alone. It also enables me to have a more direct comparison between the returns to cash in a new business location (i.e., the profit gains of taking up the CCT) and the returns to cash in general (i.e., the profit gains of taking up the UCT), all within the subgroup that is likely to take up the moving subsidy if offered it.

5.3 Effect on Business Location During the Intervention

Table 5 shows the effect of each treatment group on business location during the intervention. Note that columns 1 - 4 compose mutually exclusive groups: an entrepreneur either left Kampala, stayed in their same parish (within Kampala) as before the intervention, moved to a parish with lower average profits within Kampala, or moved to a parish with higher average profits within Kampala. Column 5 is the average profit for businesses of the entrepreneur's same sector in the parish where an entrepreneur locates during the intervention, computed using baseline survey data, and so provides a continuous measure of the profitability of the places where entrepreneurs move.[22]

Focusing first on the intent-to-treat effects in the upper panel A: column 1 shows that about 8% of the total sample leaves Kampala during the intervention, and this likelihood does not change as the result of treatment assignment, indicating that moving outside of Kampala is unrelated to the entrepreneur's treatment group during the intervention. Column 2 shows that 54% of the control group remains in their same parish from baseline. Receiving information or a CCT offer, or both together, does not have a statistically significant effect on the likelihood of staying in the same parish, though those who receive the UCT only are 6 percentage points ($p < 0.10$), or 11%, less likely to stay in their baseline parish.[23] Those receiving the UCT with information are 7 percentage points ($p < 0.10$) less likely to stay in their baseline parish, and this rate is not statistically significantly different from those receiving the UCT alone. This suggests that those receiving unconditional cash may use it to leave their home parish – perhaps indicative of a general desire for mobility, which the UCT can fund – but entrepreneurs receiving the UCT alone are also 6 percentage points, or 32%, more likely than the control group to move into a lower profit parish (column 3). This effect is

[22] I have no data on typical profits outside of Kampala, as the baseline sample consisted entirely of entrepreneurs located within Kampala's boundary. Thus, expected profits, in column 5, for any location outside of Kampala is computed as the average profits realized for entrepreneurs in the control group who left Kampala during the intervention. If this assumption is inaccurate, it will not bias treatment effects, as the likelihood of leaving Kampala does not vary with treatment assignment.

[23] Note that the average city parish in Kampala is 2 square kilometers, so it's plausible that an entrepreneur taking up the moving subsidy could move 3 kilometers (as measured by road travel distance, which is typically longer than Euclidean distance, while staying within their baseline parish).

undone for entrepreneurs offered the UCT and information together, as they are no more or less likely than those receiving information alone to move into a lower profit parish, and neither those receiving information alone nor the UCT with information are statistically significantly more or less likely than the control group to move into a lower profit parish. Like those offered the UCT alone, those offered the CCT alone are also statistically significantly more likely ($p < 0.10$) to move into a lower profit parish, but again this is undone by the differential effect of receiving information and the CCT together, which reduces likelihood of moving into a lower profit parish by an additional 9 percentage points ($p < 0.05$).

The results in column 2 and 3 show that those offered the CCT or UCT alone are more likely than the control group to move out of their baseline parish, but they are also more likely than the control group to move into a parish with lower average profits, an impact which is undone when the subsidy is combined with information, suggesting that information is impactful in driving entrepreneurs to move strategically. This role of information is further underscored by the results in column 4. While the differential effect is not statistically significant, those receiving information in addition to the CCT are 5 percentage points more likely than those receiving information or the CCT alone to move into a higher profit parish, and in total they are 4 percentage points ($p < 0.10$), or 21%, more likely than the control group to move into a higher profit parish. The differential impact of combining the UCT with information is also positive, but neither the differential impact nor the total effect relative to the control group is statistically significantly different from zero. Finally, column 5 coalesces the extensive margin impacts documented in columns 1-4 into a single continuous measure of parish profitability and shows that those offered the CCT with information move to parishes with differentially higher profits ($p < 0.05$) than those offered information or the CCT alone. On average, those offered the CCT with information locate in parishes with profits that are only about 430 UGX ($p = 0.12$), or 2%, higher than average profits in the parishes where the control group locates.

The bottom panel B depicts treatment-on-treated effects, which only change meaningfully for those offered the CCT, where take-up is not universal (as is the case for information) or nearly universal (for the UCT). Column 3 of panel B shows that those taking up the CCT while receiving information are 10 percentage points ($p < 0.05$) less likely to move into a parish with lower average profits than those taking up the CCT without information or those receiving information alone. Only those taking up the CCT and receiving information are statistically significantly more likely to move into a parish with higher average profits: they are 7 percentage points ($p < 0.05$), or 37%, more likely to move into a parish with higher average profits than the control group. Average profits of the parishes where firms in the CCT with information group move are also 1,386 UGX, or 6%, higher than those in parishes where the CCT only group moves.

I also analyze the effect of each intervention on distance, in kilometers of road travel distance, from the pre-intervention business location. The distribution of distance traveled is right-skewed, with a small number

of entrepreneurs moving very far distances. To avoid a small fraction of the sample driving the average treatment effect, I use distribution regressions to analyze the effect of treatment on distance traveled, in Figure 4. These distribution regressions show the effect of taking up each treatment on the probability that distance moved exceeds X kilometers, where X spans the support of distance moved from the pre-intervention location, truncated at X=6 km, the 90^{th} percentile. Figure 4 shows that entrepreneurs taking up the CCT revert towards their pre-intervention location, even during the intervention period. Those taking up the CCT without information are more likely than the control group to locate more than 1.5 km from their pre-intervention location, but they are less likely than the control group to locate more than 3.5 km from their pre-intervention location.[24] These probabilities are imprecise and never statistically significantly different from zero, again underscoring that entrepreneurs who take up the CCT and move vary in how long and where they stay during the intervention period. For those taking up the CCT with information, the effect of the intervention on the probability of moving more than X km from their pre-intervention location is positive for all X >1.5 km, suggesting that their willingness to locate further away may be higher than those taking up the CCT alone. The distribution regressions of those taking up the UCT, with or without information, are similar to those taking up the CCT, which may indicate access to liquidity in general increases mobility.

Reversion back towards the pre-intervention location, even for those taking up the CCT, whose GPS location verifies that they moved more than 3 kilometers at some point during the intervention, could happen for several reasons. First, bodas in particular may use the subsidy to initially catch customers in a new location, for example during rush hour, but then return to their pre-intervention location between customers. Second, an entrepreneur could take up the CCT on some days but not others, and the midline survey may or may not take place on the particular day on which they took up the CCT, leading to high levels of variance in the impact of taking up the CCT on distance moved. Third, the 3 kilometer condition for taking up the moving subsidy may be inefficient: perhaps entrepreneurs would like to move, but not the full 3 kilometers (supported by the positive, though insignificant, effect of taking up the UCT on the probability of locating more than X km from the pre-intervention location, for small values of X). If the net value of the subsidy is positive despite this inefficiency, then entrepreneurs may take it up, temporarily operate elsewhere, and then move to the place where they would actually prefer to locate, which is less than 3 km from their initial location. The extensive margin impacts of the intervention on likelihood of locating in a more profitable parish indicate that the subsidy did influence place of business operation. Together with the muted impacts on distance traveled, these results provide evidence that entrepreneurs are willing to move but prefer to stay

[24] That is, the effect of taking up the CCT without information on the probability of locating more than X km from their pre-intervention location is positive for $X = 1.5$, but negative for $X = 3.5$.

relatively close to their individually-chosen pre-intervention business location. This is consistent with a large role for idiosyncratic preferences in entrepreneurs' location decisions.

In sum, the combination of cash (either the CCT or the UCT) with information appears to mitigate the likelihood of making "bad moves," as those offered information with cash are differentially less likely to move into lower profit parishes than those offered cash alone. But only those offered the CCT and receiving information are statistically significantly more likely than the control group to move into an on average higher profit parish than the control group. The magnitude of the impact is large: those taking up the subsidy and moving are 37% more likely than the control group to move into a parish with higher average profits than their pre-intervention parish.

5.4 Effect on Financial Outcomes During the Intervention

After examining the impacts of the intervention on location choice, I turn to financial outcomes, to test the effect on more "downstream" outcomes, after the entrepreneur does (or does not) move business locations. In Table 6, I show impacts of each intervention on entrepreneurs' mobile money balance, revenues, costs, profit, fraction of expected parish profit that is realized, hours spent working per day, and profit per hour. Beginning with the ITT effects in panel A, column 1: here, I show how the intervention impacted mobile money balances. The CCT and UCT each delivered 7,000 UGX per day to entrepreneurs who took them up. The amount held in the mobile money account, thus, reflects to what extent entrepreneurs retained elevated balances by saving some part of the transfer or withdrew it. Entrepreneurs who were offered the CCT alone, the UCT alone, and the UCT with information hold statistically significantly higher mobile money balances during the intervention. Those offered the CCT alone have a 3,220 UGX ($p < 0.05$), or 48%, higher balance than the control group, those offered the UCT alone have a 4,727 UGX ($p < 0.01$), or 71%, higher balance than the control group, and those offered the UCT with information have a 5,922 UGX ($p < 0.01$), or 89%, higher balance than the control group. This indicates that for those in these three groups, funds received from the subsidy and transfers were not spent right away and did result in elevated balances, at least in the short run. In contrast, those offered the CCT with information do not retain a statistically significantly higher balance than the control group. Given that this is the only group that was more likely than the control to move into higher average profits, this may reflect that a greater portion of the subsidy was spent on investment in location than was spent by other groups.

Turning next to the effects on revenue, cost, and profit, I show that only those offered the CCT with information have statistically significantly greater revenue than the control group (column 2). Their daily revenue is 5,309 UGX ($p < 0.05$), or 14%, higher than in the control. No other treatment group realizes

statistically significant revenue gains. I do not find a statistically significant effect on costs for any group relative to the control group (column 3), suggesting that to the extent that the intervention changed financial outcomes, it was on the demand side rather than supply side. In column 4, I show that the combination of information with both the CCT and UCT differentially increases profits relative to those receiving information, or either the CCT or UCT, alone. Those offered the CCT and information together realize 7,396 UGX ($p < 0.05$) greater profit per day than those receiving either the CCT or information alone, and those offered the UCT and information together realize 7,999 UGX ($p < 0.10$) greater profit per day than those receiving either UCT or information alone. The total ITT effect on profit for those in the CCT and information group, as well as those in the UCT and information group, is positive but not statistically significant.

In addition to realizing differentially higher profits, those offered CCT or UCT together with information also realize differentially higher profit per hour (column 6) and a differentially higher fraction of expected parish profit (column 7), without working differentially more hours (column 5). The outcome in column 7 is constructed as an entrepreneur's individually realized daily profit (in column 4 of Table 6) as a fraction of average profit for businesses of their same sector in the parish where they choose to locate during the intervention (in column 5 of Table 5). Together, these results suggest that entrepreneurs offered liquidity (either the CCT or UCT) with information are able to realize differentially higher profits than those receiving liquidity or information alone, and without simply working differentially longer hours. The differential increase in profit per hour may be reflective of differential improvements in productivity – particularly since revenue and profit increases occur without an increase in costs – and the differential increase in the fraction of expected parish profit that is realized could reflect a better entrepreneur-location match, where liquidity and information together enables entrepreneurs to move to parishes where they are able to capture a larger fraction of the location-specific profit premium.

Turning to panel B, which contains ToT estimates, I show that only entrepreneurs taking up the moving subsidy while also receiving information realize statistically significantly greater revenue, profit, and profit per hour than the control group. They earn 9,732 UGX ($p < 0.01$), or 26%, more in revenue and 7,705 UGX ($p < 0.05$), or 45%, more in profits than the control group. There is no statistically significant effect on costs, and because revenue increases without a proportionate increase in costs, the percent gain in profit is higher than the percent gain in revenue. They also earn 613 UGX ($p < 0.10$), or 41%, more in profit per hour than the control group, and the small positive effect on hours worked per day is not statistically significantly different from zero. Even accounting for the additional 0.36 hours worked on average by those taking up the CCT with information, would only explain 759 UGX (=(1,495 UGX/hour + 613 UGX/hour)*0.36 hours), or less than 10% of the total profit effect, underscoring that the profit gains do not come from working longer hours. The total revenue and profit impacts for those receiving the UCT and information together are

also positive, though about half the size as those for the CCT and information group and not statistically significant at conventional levels. As discussed in Section 5.2, a difference in ToT effect of the CCT relative to the UCT could reflect an effect of moving not realized by those taking up the UCT, or a difference in complier characteristics – that the set of people taking up the CCT are different on average than the set of people taking up the UCT. To gain insight into this issue, I will test for heterogeneous treatment effects for the machine learning-predicted "likely complier" group in Section 6.

In sum, only those taking up the CCT while receiving information realize statistically significant revenue and income gains during the intervention. This is consistent with their tendency to move into higher profit parishes, though they are also differentially likely to realize a higher fraction of expected profit in the parishes where they move, suggesting that higher profit is not just the result of moving to more profitable places, but also moving to places which make a more profitable idiosyncratic entrepreneur-location match.

5.5 Persistence: Effect of Treatment After the Intervention Ends

The impacts of the intervention fade quickly after the subsidies and cash transfers cease. In Table 7, I show the effect of each intervention on the expected profit of the parish where an entrepreneur locates, the entrepreneur's revenue, and the entrepreneur's profit at the first endline (1 week after the intervention) and the second endline (1-2 months after the intervention). In the first week after the intervention, entrepreneurs in the CCT+Info group differentially locate in parishes with higher average profits: they locate in parishes with 851 UGX ($p < 0.05$) greater profits than entrepreneurs receiving offered the CCT or information alone. This differential effect, however, has faded by the second endline, 1-2 months after the intervention. In the first week after the intervention, both those offered the CCT+Info as well as those offered the UCT+Info earn higher revenues than the control group: those in the CCT+Info group earn 5,038 UGX ($p < 0.05$), or 12%, greater revenue than the control group, while those in the UCT+Info group earn 4,948 UGX ($p < 0.10$), also about 12%, more in revenue than the control group. While the effect of both the CCT+Info and the UCT+Info on profit during the week after the intervention is positive, neither point estimate is statistically significantly different from zero. By one month after the intervention — one month after moving subsidies have ended — the total effect on revenue is statistically indistinguishable from zero, for both the CCT+Info group and the UCT+Info group. The differential effect on the profitability of the parishes in which entrepreneurs locate, observed during and one week after the intervention for those offered the CCT with information, is also statistically indistinguishable from zero, and no effects emerge for other groups, on any dimension.

The financial outcomes during the intervention show that entrepreneurs can make highly profitable moves: those taking up the moving subsidy when it is offered with information realize 45% higher profits.

This indicates that entrepreneurs can capture location-specific profit premia when moving is subsidized and information frictions are relieved. These impacts are not sustained after subsidies cease, but they do not entirely dissipate immediately upon the conclusion of the intervention. One week after the intervention, entrepreneurs receiving the CCT with information still differentially move into parishes with higher average profits, where they realize higher revenues. The mechanism through which entrepreneurs realized higher profits, thus, must entail both a non-durable role of the subsidy, which fades eventually but not immediately after the intervention ends, and a complementarity between the subsidy and information that uniquely unlocks an entrepreneur's ability to make profitable moves.

6 Mechanisms

I have shown that there is a large and significant positive effect on revenue and profit of taking up the moving subsidy when it is offered with information. The effect of receiving the UCT with information, meanwhile, is smaller and imprecise, but still positive. Liquidity and information constraints were alleviated for those receiving the UCT with information to at least the same extent as those taking up the CCT with information. Both groups received the same information intervention, while the UCT group received cash that could be used for any purpose. Even if all entrepreneurs desire liquidity primarily for moving, those receiving the UCT are free to accept the funds and move, in exactly the same fashion as those taking up the CCT. Understanding the reason for differences in the average treatment-on-treated effect of the CCT with information relative to the UCT with information illuminates the role of the subsidy and information.

6.1 Moving During the Intervention: Profitable or Preferable?

Differences in the treatment-on-treated (ToT) effect of the CCT+Info versus the UCT+Info may reflect a large fraction of the sample who can make profitable moves but have a small negative valuation of moving to a new destination, $V_d \in$ (-7000 UGX, 0 UGX], which is overcome when they are offered the 7,000 UGX subsidy. In this case, moving would be profitable but not welfare-maximizing absent the subsidy, and entrepreneurs should only make profitable moves when the subsidy makes the net valuation of moving positive. Entrepreneurs taking up the UCT would not move, as the unconditional cash that they receive does not change the valuation of moving. The small and imprecise, but positive, effect of the UCT and information would then reflect that the welfare-maximizing use of cash is less profitable than moving, such that the role of the subsidy was to induce moves that were profitable but not preferable. Alternatively, the differences in the effect of taking up the CCT with information relative to the UCT with information could reflect differences in complier characteristics between the two groups. The ToT is the treatment effect for those taking up the

treatment (which in this experiment is perfectly analogous to the treatment effect for those complying with the treatment), and compliance varies between those taking up the CCT and the UCT. While anyone who could be reached by the enumerator team takes up the UCT, only those who, by revealed preference, have a positive net valuation of moving when offered the subsidy take it up.

Did the subsidy induce profitable moves by entrepreneurs who, absent the subsidy would rather not move, or do differences in the characteristics of the complier groups drive differences in the average effect taking up each liquidity intervention? To answer this question, I use lasso to predict compliance with the CCT, separately when it is offered with information and without, using baseline characteristics. Table 4 shows the characteristics which lasso selects as the most important in predicting compliance. The 55% of the sample who appear most likely on baseline characteristics to comply with the treatment compose a group that I term "likely compliers". I separately construct "likely CCT+Info compliers" and "likely CCT only compliers". Those likely to comply with the CCT with information treatment have longer commutes, higher baseline knowledge of profits across the city, and are more likely located in lower profit parishes, among other characteristics in Table 4. Those likely to comply with the CCT alone are more likely to incur transit costs and have higher savings. Note that this indicator is orthogonal to treatment, as it is predicted solely from baseline characteristics.

If differences in average ToT effects between those taking up the CCT+Info relative to those taking up the UCT+Info reflect an effect of moving only realized in response to the subsidy, then I should see no differential effect for the group of likely CCT+Info compliers in response to taking up the UCT+Info. When presented with the UCT+Info, they would have used it for a different purpose than those taking up the CCT+Info. If, in contrast, the CCT+Info and UCT+Info function similarly and differences in ToT effects reflect differences in complier characteristics, then the differential effect of the UCT+Info as a likely CCT+Info complier should be similar to that of the CCT+Info. I test this directly in Table 8. I find evidence in support of the latter: in response to both the CCT+Info and the UCT+Info, likely CCT+Info compliers experience significant and positive differential effects of similar magnitude on revenue, profit, fraction of expected profit that is realized, and profit per hour. The total effect on daily profit for likely CCT+Info compliers offered the CCT+Info is 8,825 UGX ($p < 0.05$), and the total effect on daily profit for likely CCT+Info compliers offered the UCT+Info is a remarkably similar 8,743 UGX ($p < 0.05$). Like the average effects in Table 6, likely CCT+Info compliers offered the CCT+Info or UCT+Info experience no effect on number of working hours. In total, likely CCT+Info compliers offered the CCT+Info locate in parishes with 640 UGX higher profits ($p < 0.10$), though the differential effect is not significant. Likely CCT+Info compliers offered either the UCT+Info or information alone also locate in parishes with higher average profits, though neither the total nor differential effect is significantly different from zero. In Figure C.1, I show that likely CCT+Info compliers

offered the CCT+Info, UCT alone, or UCT+Info are more likely than the control group to locate more than 1 km from their pre-intervention location, but this effect is not significantly different from zero. The effect of the CCT+Info and the UCT+Info on the likelihood of locating more than X km away remains positive for all values of X greater than 1 km, but again the impacts are imprecise across most of the distribution (as in Figure 4). As discussed in Section 5.3, there are many reasons why impacts on distance moved during the intervention could be noisy.

For the subgroup that is likely to take up the CCT when it is offered with information, the CCT+Info treatment and the UCT+Info treatment appear to function similarly. Whether offered the subsidy with information or the unconditional cash with information, this subgroup realizes large, statistically significant increases in revenue and profit.[25] This subgroup also moves to parishes with higher average profits and may move further distances (though both of these impacts are imprecisely estimated). For this subgroup, moving appears both profitable and welfare-maximizing, as those offered the UCT+Info did not have to move but chose to do so anyway. The 3 km conditionality of the moving subsidy, however, may inefficient, given that entrepreneurs realize similar profit gains whether or not they are subject to it, and entrepreneurs in the CCT+Info group revert to a business location within 3 km of their pre-intervention location.

6.2 Role of Information: Inducing High-Return Entrepreneurs to Move

I have documented that entrepreneurs taking up the moving subsidy, or CCT, when it is offered with information differ in their baseline characteristics from those who take up the moving subsidy without information. I have also shown that the entrepreneurs with characteristics resembling those who take up the subsidy when it is offered with information have differentially higher profit as an effect of receiving the UCT+Info. Did the presence of information serve to induce these high-return entrepreneurs to select into moving when they would not have otherwise?

To address this, I test whether "likely CCT only compliers" experience differentially positive effects of the CCT or UCT. If they do, then the role of information cannot be to induce uniquely high-return entrepreneurs to take up the subsidy. If they do not, then information may serve to induce high-return entrepreneurs to self-select into moving when they would not have otherwise. The results of this analysis are in Table 9. In contrast to likely CCT+Info compliers, likely CCT only compliers are not differentially likely to

[25]This key result is robust to multiple hypothesis corrections. In Table 8, I compute False Discovery Rate (FDR) sharpened q-values in brackets, per Anderson (2008). I apply one penalty to correct for the five tests that I conduct in my analysis of the effect of each intervention on profit (i.e., I apply one penalty across treatment arms as I test for impacts on a given outcome, to adjust for the relatively large number of tests conducted in the analysis of impacts on each outcome, due to having five treatment arms). The key result that "likely CCT+Info compliers" randomized to either the CCT+Info arm or the UCT+Info arm increase profits holds at the 10% level (q-value=0.53 for both arms). Note as well that the experiment is designed for null effects to be informative: e.g., a null effect of the CCT alone and a null effect of information alone given a statistically significantly positive effect of the CCT with information reveals a complementarity and so correcting for multiple tests across treatment arms within a single outcome may be overly conservative.

realize higher revenue or higher profit in response to the CCT or UCT, with or without information. In fact, likely CCT only compliers do not have a statistically significant differential response to the CCT or UCT (with or without information) on any dimension. This is consistent with the presence of information serving in a selection role, where it induces high-return entrepreneurs to select into moving. Without information, the subgroup that selects into taking up the subsidy and moving is no more likely than others to move into higher profit parishes, realize higher revenue, or realize higher profit.

6.3 Role of Liquidity: Insurance for Risky Moves

What was the role of the subsidy and the unconditional transfer in relieving liquidity constraints that enabled entrepreneurs to realize more than 50% higher profit, but only during the intervention? Figure 5 reveals that while those in the CCT+Info arm are more likely than the control group to realize profit in the upper tail, they are no less likely than the control to realize profit in the lower tail of the distribution; that is, it is not clear that the CCT+Info treatment first order stochastically dominates the control. In Figure 6, I focus on profit realizations by those who moved to parishes with higher average profits (across all treatment groups) relative to those who did not. While this is solely correlational, it suggests that moving to higher profit places may not dominate the alternative. This may indicate that moving is risky, and the subsidy served to insure risky moves during the intervention. In Table 10, I test the extent to which changes in profit pass through to consumption, following Townsend (1994). I find that the correlation between fluctuations in profit and fluctuations in consumption is differentially lower for those offered the CCT or the UCT, relative to those who do not receive either liquidity intervention. This is consistent with the CCT and UCT serving to insure riskiness in moving.

Once the intervention ends, entrepreneurs may be able to save profit gains from the intervention period to self-insure in the short run. Given a plausible degree of risk aversion and probability of future averse events, their ability to self-insure may dissipate in the long run. This is consistent with the pattern of results: entrepreneurs taking up the subsidy when it was offered with information, as well as the high-return "likely CCT+Info complier" subgroup offered either the UCT with information, realize higher profits during the intervention and sustain revenue gains but imprecise profit gains in the week after the intervention. A month later, all effects on movement, revenue, and profit have dissipated.

7 Model Estimation and Counterfactual Simulations

I use the model, set up in Section 3, to conduct simulations, which quantify the aggregate impacts of relieving constraints on microentrepreneur location, and to establish the features that can replicate the empirical result

of a complementarity between liquidity and information. I find that a model with limited information, fixed costs of moving, and two types of entrepreneurs, one with high returns of moving and another with low returns of moving, can rationalize the empirical results.

7.1 Assigned Parameters

I estimate the model for vendors, i.e., sector k = retail, who compose the majority of the sample. For simplicity, I will drop the k subscript from here forward, as all estimation and simulation is within sector. I assume that entrepreneurs face a liquidity threshold of $\bar{a} = 7,000$ UGX, above which they can optimally choose their location. This threshold equals the 95^{th} percentile amount of money that entrepreneurs report needing to move to a more profitable location in the baseline survey and is equivalent in value to the cash transfer in the experiment.

Recalling the initial setup in equation (2) in Section 3, entrepreneur j with incumbent business location n and sufficient liquid capital, $a_j \geq 7000$, chooses a destination location (city parish) d to maximize utility,

$$V(j,n) = \begin{cases} \max_d \dfrac{A_d z_{jd}}{c_{nd}\nu_d} \ln\left(\delta_{jd} Y_d\right), & \text{if } a_j \geq 7000 \\ \dfrac{A_n z_{jn}}{\nu_n} \ln\left(\delta_{jn} Y_n\right), & \text{otherwise} \end{cases} \tag{7}$$

where A_d, Y_d, and ν_d are the amenities, income, and coefficient of variation common to parish d, respectively, c_{nd} is the iceberg cost of moving from location n to location d, z_{jd} ~Frechet(θ) is an i.i.d. preference shock, and δ_{jd} ~Log-normal(λ_d,σ_d^2) is an i.i.d. knowledge shock such that:

$$\mathbb{E}_j[\delta_{jd} Y_d] = \int \delta_{jd} Y_d \, dF_j(\delta_{jd}) = \exp(\lambda_d + \frac{\sigma_d^2}{2}) Y_d = \widetilde{Y}_d \tag{8}$$

The entrepreneur's problem yields the number of entrepreneurs in location d, N_d, and the resulting π_d, the fraction of entrepreneurs locating in d. π_d equals the probability that an entrepreneur has greater indirect utility in location d than in any other location. Following standard results (Eaton and Kortum, 2002):

$$\pi_d = \frac{\left(A_d \bar{c}_d^{-1} \nu_d^{-1} \ln\left(\widetilde{Y}_d\right)\right)^\theta}{\sum_{x \in D} \left(A_x \bar{c}_x^{-1} \nu_x^{-1} \ln\left(\widetilde{Y}_x\right)\right)^\theta} \tag{9}$$

where $\bar{c}_d = c_{nd}\pi_n$, the average cost of locating in d. I assign ν_d and c_{nd} from the values observed in baseline data. To solve for entrepreneurs' location decisions in general equilibrium, I endogenize parish profits, Y_d, as in equation (5). Taking parish profits as exogenous, i.e., fixed at their baseline level, yields entrepreneurs' location decisions in partial equilibrium.

7.2 Estimated Parameters

I use exogenous variation in business location to estimate θ, the elasticity of willingness to locate in a particular place with respect to the net benefits of locating there, V_d. I use responses to questions about knowledge of profit variation throughout the city in the baseline survey to estimate the parameters of the knowledge shock, λ_d and σ_d. I use the location realizations of entrepreneurs in the UCT+Information group, for whom liquidity and information constraints were relieved, to estimate amenities, A_d.

Estimating the Fréchet Shape Parameter, θ. Using experimental variation from the offer of conditional cash transfers, I estimate θ as the elasticity of the likelihood of locating in a destination, π_d, with respect to the net benefits of locating there, V_d, as follows,

$$\ln \pi_d = \theta \ln \Omega_d \tag{10}$$

where Ω_d is the sum of the distance-normalized value of all CCTs offered three kilometers or more from location d (i.e., offered to those for whom the CCT increased the value of locating in d). The distance-normalized value of each CCT is 7,000 UGX divided by the kilometers between destination d and the pre-intervention location of the business owner to whom the CCT was offered, thus weighting CCT offers in nearby locations more heavily. This reflects the exogenous increase in the value of moving created by the offer of a CCT (normalized by distance, which is orthogonal to the CCT offer). I estimate θ=1.4, a relatively low elasticity that implies a large role for idiosyncratic preferences. This estimate of θ is lower than the values of approximately 2.5 to 4 estimated in other low-income cities by Franklin et al. (2024) and Tsivanidis (2023). However, this is the first paper, to my knowledge, to use experimental variation to estimate willingness to move business locations by entrepreneurs, rather than workers. The additional production considerations faced by entrepreneurs—for example, sensitivity to profit variability not internalized by workers—could plausibly reduce willingness to move in response to a change in the value of doing so.

Estimating the Parameters of the Knowledge Shock, λ_d and σ_d. In the baseline survey, all entrepreneurs were asked a series of questions to assess their knowledge about profits in five randomly selected parishes near the parish in which the entrepreneur locates.[26] The question asked: "Do you think a business like yours would make more or less in parish X?" I use survey data to assess responses to this question by comparing mean sector-specific profits in parish X to those in the respondent's own parish

[26]Five additional questions of the same format asked the entrepreneur about their perceptions of profits in far away parishes (outside their geographic division, an administrative unit that is less fine than the parish), but average responses to questions about far away parishes are on par with random guessing, overall and for any subgroups of interest. Thus, only responses to questions about nearby parishes are used to estimate the parameters of the knowledge shock.

at baseline.[27] Using this scoring mechanism, I code correct responses as $misperception_d = 0$ to reflect non-distorted perceptions of profits in parish d. If the respondent overestimated profits in parish d, then $misperception_d = 1$, and if the respondent underestimated profits, then $misperception_d = -1$. I estimate λ_d as the mean value of $misperception_d$ among the respondents asked about profits in parish d. If entrepreneurs on average underestimate profits in parish d, then $\lambda_d < 0$, while $\lambda_d > 0$ for parishes where entrepreneurs on average overestimate profits. I estimate σ_d as the bootstrapped standard error when the mean is estimated over 1000 samples of size n, drawn with replacement from the original sample of n respondents asked about profits in parish d. This reflects variability in perceptions at the parish level.

Estimating Amenities, A_d. I solve for amenities using the business locations realized during the intervention by those offered the UCT and information (i.e., those for whom liquidity and information constraints were relieved). Specifically, I solve for amenities in equation 9, where π_d is the fraction of entrepreneurs of sector k offered the UCT and information who then choose to locate in parish d and $\widetilde{Y}_d$=Y_d, such that expected profits equal true profits, to reflect the easing of information constraints. Those offered the UCT and information may locate anywhere they like—unlike those offered the CCT, where receipt of the subsidy is conditional on location choice—and their location choices are realized after liquidity and information constraints have been eased. Thus, the location realizations of those in the UCT and information group reflect amenity value under minimal distortion by other frictions.

Estimated amenity values, in Figure 7, reflect utility cost. As an example, locating in a parish with amenity value of 0.86 offers 14% lower welfare than locating in a parish with amenity value of 1.00, all else equal. The estimation results reveal a distribution with a fat left tail, indicating that a large fraction of city parishes have relatively low amenities. I find that higher amenity value parishes are associated with more women entrepreneurs, more educated entrepreneurs, and more experienced entrepreneurs, groups who may have a greater idiosyncratic preference for high-amenity places. Qualitative discussions reveal that factors like tree cover and congestion may be important drivers of amenity value.

7.3 Model Simulations

I first simulate the spatial distribution of entrepreneurs under baseline conditions, where entrepreneurs face information frictions and fixed costs. In the baseline scenario, expected profit is distorted by an i.i.d. knowledge shock (with mean λ_d and variance σ_d^2), and any entrepreneur with savings less than 7,000 UGX (approximately \$2 and equivalent in value to the subsidy and unconditional transfer disbursed in the experiment) cannot move. This latter condition binds for 37% sample. The model fits the data reasonably well: the observed

[27] Results are similar if profit rankings are assessed after conditioning on other individual entrepreneur characteristics in addition to sector.

spatial distribution of entrepreneurs in the control group explains 50% of the variation in the model-simulated spatial distribution of entrepreneurs under baseline conditions, as shown in Figure 8.

I then simulate entrepreneur locations under scenarios which provide correct information and liquidity such that fixed costs do not bind:

1. Corrected information: Expected profits are equivalent to true profits, i.e., $\widetilde{Y}_d = Y_d$
2. Fixed costs do not bind: All entrepreneurs can move, as though they all have liquidity >7,000 UGX
3. The combination of (1) and (2)
4. The combination of (1) and (2), but where a group of high-return entrepreneurs realizes differentially higher returns in moving
5. Simulation (4) under improved amenities across the city, where below-median amenity values are winsorized to the median

In scenario (4), entrepreneurs have exogenous type $T \in \{H, L\}$, where they have either high returns of moving (denoted by H) or low returns of moving (denoted by L). The optimization problem of "high" types now features idiosyncratic but on average higher returns, $r_j \sim \text{Log-normal}(0.52, 0.16^2)$, to be realized in any destination where a high-return entrepreneur might move.[28] This simulation attempts to mimic the empirical finding that high-return entrepreneurs can be induced to move and realize large gains from doing so, but only in response to both information and liquidity. Given correct knowledge of profits, sufficient liquidity such that fixed costs do not bind, and differentially higher returns realized by a subset of entrepreneurs, the entrepreneur's problem in scenario (4) is as follows:

$$V(j,k,n,T) = \begin{cases} \max_d \frac{A_{kd} z_{jkd}}{c_{nd} \nu_{kd}} \ln\left(r_j Y_{kd}\right), & \text{if } T = H \\ \max_d \frac{A_{kd} z_{jkd}}{c_{nd} \nu_{kd}} \ln\left(Y_{kd}\right), & \text{if } T = L \end{cases} \tag{11}$$

These counterfactual scenarios intend to simulate the role of alleviating liquidity and information frictions and assess which features of the model are necessary to match empirical results. The simulation results appear in Table 11. The first two columns of Table 11 depict aggregate income and welfare under various counterfactual scenarios when parish profits are exogenous (partial equilibrium): they are fixed at their baseline level. The final two columns depict aggregate income and welfare when parish profits are endogenous (general equilibrium), responding to firm entry and exit across the city, per equation (5).

[28] The mean, 0.52, is estimated as the percent increase in the fraction of expected parish-sector profits realized by "likely CCT+Info compliers," those who empirically earn higher returns from moving, per the discussion in Section 6.1. The standard deviation, 0.16, is the bootstrapped standard error around the point estimate.

Providing information alone (simulation 1) offers no gain to either aggregate income or welfare. In general, entrepreneurs tend to overestimate profits in higher welfare places (higher expected profits, for example, are associated with higher true profits, as in Figure 9a), so providing corrected information may not change the outcome of their location decision. When it does, entrepreneurs trade off higher income against amenity value, as amenities are negatively associated with true profit (Figure 9b). The coefficient of variability is less negatively associated with expected profits (Figure 9c) than with true profits (Figure 9d), again suggesting that entrepreneurs tend to overestimate profits in places which are relatively more desirable on the variability dimension. Thus, correcting incorrect notions of expected profit would drive entrepreneurs into more profitable parishes, all else equal, but trades off with lower amenity value and higher variability that was suppressed by the entrepreneur's prior (incorrect) notions of expected profits.

Providing liquidity alone (simulation 2) increases aggregate welfare by 8% with no gains to aggregate income when parish profits are exogenous. This indicates that even when liquidity constraints on the ability to move are relieved, entrepreneurs face greater utility gains from moving into places with better amenities, lower variability, lower moving costs, and for which they have a higher idiosyncratic preference than into higher profit places. When parish profits are endogenous, there is no change in either aggregate income or welfare, reflecting saturation in welfare-maximizing location as profits decline in response to new entrepreneurs moving into a place. The simple additive combination of corrected information and liquidity (simulation 3) maintains this result, consistent with information alone offering no aggregate gains.

However, relieving information and liquidity constraints together can induce substantial income and welfare gains when their combination unlocks a complementarity that induces high-return entrepreneurs to move, as in simulation 4. In this simulation, 55% of entrepreneurs are a "high-return" type, where they have differentially higher returns of moving. They realize these higher returns only in response to the combination of information and liquidity. The differentially higher return means that they now face greater utility gains from moving into higher profit places than before, resulting in a willingness to accept lower amenity values, higher variability, and greater moving costs, as well as a willingness to move into places for which they have a lower idiosyncratic preference. In this simulation, aggregate income increases by 39% and aggregate welfare increases by 10%, if parish profits are fixed at their baseline levels. When parish profits decline as additional entrepreneurs move into a place, aggregate income increases by 37% but the aggregate welfare gain declines to just over 1%. This reflects congestion in high-welfare locations and indicates that profit gains are traded off against other components of the entrepreneur's objective function. Nonetheless, this result underscores the spatial misallocation of entrepreneurs: even if profits decline as more entrepreneurs move into a place, it is possible to increase aggregate income without reducing welfare.

In simulation 5, I show that improving urban amenities in low-amenity places reduces the welfare drop-off from partial equilibrium to general equilibrium that is seen in simulation 4. Simulation 5 maintains the large aggregate income gains of simulation 4 while increasing aggregate welfare by 9% in general equilibrium, only a 2.5 percentage point reduction from partial equilibrium. This emphasizes that low amenity values across the city dampen welfare gains in simulation 4, as entrepreneurs must trade off higher profits against amenities.

In sum, a model with fixed monetary costs of moving, information frictions, and heterogeneous returns to moving can rationalize the empirical results. I find large aggregate income gains of relieving liquidity and information frictions at scale. Welfare only increases marginally, due to low amenities in high-profit places.

8 Conclusion

I document large spatial variation in profits earned by observationally similar entrepreneurs within Kampala and then use an experiment and structural model to show that spatial profit gaps reflect, at least in part, spatial misallocation of entrepreneurs due to simultaneous financial and information frictions. When liquidity and information constraints are relieved together, entrepreneurs move into city parishes with higher average profits and realize higher profits of their own. Neither liquidity nor information alone is sufficient, indicating a complementarity between the two in overcoming the frictions that otherwise restrict entrepreneurs' location decisions. Entrepreneurs do not, however, sustain impacts on their location, revenues, or profits after the intervention ends. Impacts fade out gradually within a month after the liquidity interventions cease. These results are consistent with liquidity providing insurance for profitable but risky moves during the intervention and risk-averse entrepreneurs gradually losing the ability to self-insure as they face adverse events over time. The role of information is consistent with a selection tool: the presence of information changes the characteristics of the entrepreneurs who move locations, and these entrepreneurs realize differentially higher returns to moving and to cash in general.

The complementary nature of liquidity and information frictions in constraining firm location decisions, and the possibility of using information as a screening tool, are useful insights for policy. Existing work finds low average effects of programs that relieve liquidity constraints, such as microcredit, for microentrepreneurs. Perhaps other contexts and investment decisions also require liquidity together with information to unlock benefits. Information provision as a possible tool to screen for high-return entrepreneurs is an attractive possibility in its own right, since identifying high growth potential microentrepreneurs has proven difficult. In addition, information provision tends to be inexpensive relative to other development programs, and when

information can be used to induce take up by those with the highest returns, additional savings arise from the more efficient allocation of resources.

I show that a spatial equilibrium model that features fixed costs of moving, limited knowledge about profit variability, and a complementarity between relieving liquidity and information constraints that leads high-return entrepreneurs to move can replicate the empirical results. I estimate large aggregate income gains of relieving liquidity and information constraints simultaneously, demonstrating spatial misallocation of microentrepreneurs.

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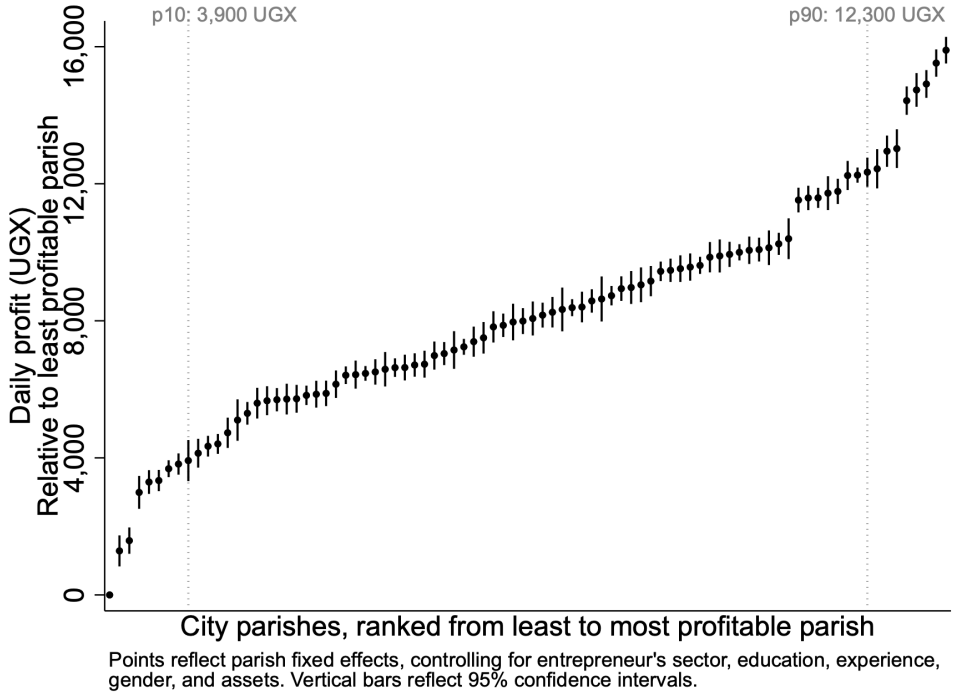
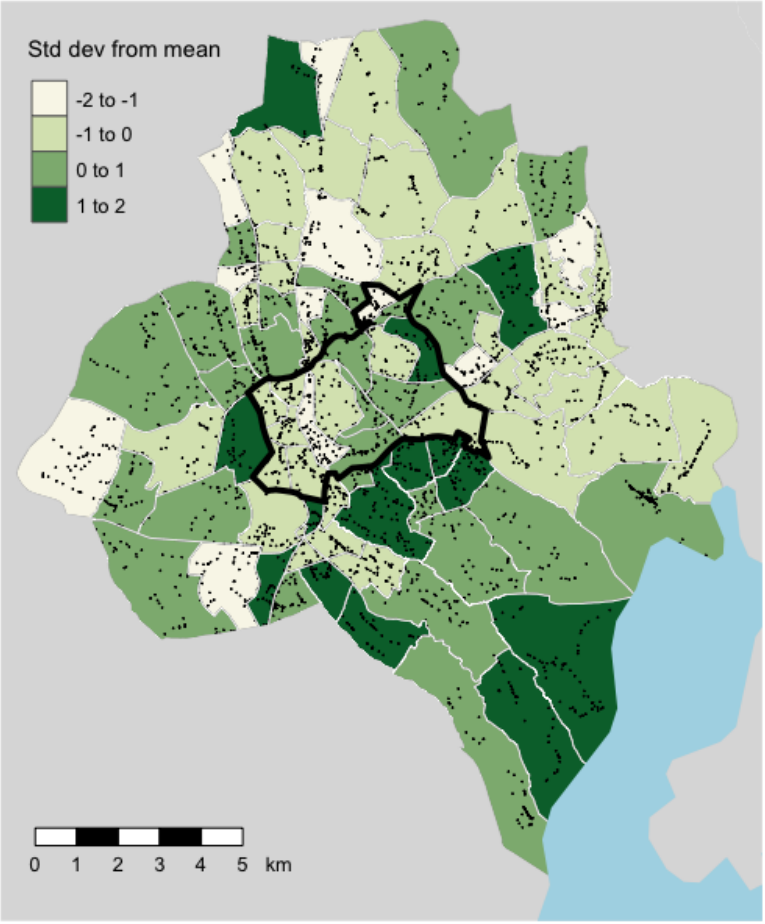
Figures

Figure 1: Between-Parish Profit Variation for Observationally Similar Microenterprises



Notes. This figure graphs the profit in Ugandan shillings (UGX) associated with locating in each city parish, relative to the least lucrative parish. The circular markers correspond to parish fixed effects (where the bars are 95% confidence intervals) from a regression that predicts profit with parish fixed effects, conditional on the business owner's sector, education, experience (in years and years squared), and asset stock. The city parish is the parish in which the business was located prior to the experiment.

Figure 2: Parish Profits at Baseline



Notes. Map depicts average parish profits, in terms of standard deviations above or below the mean. Dots reflect baseline survey locations, and the bold black outline is the central business district.

Figure 3: Example of Information Treatment Allocation

Information card personalized for: _____ FID: _____

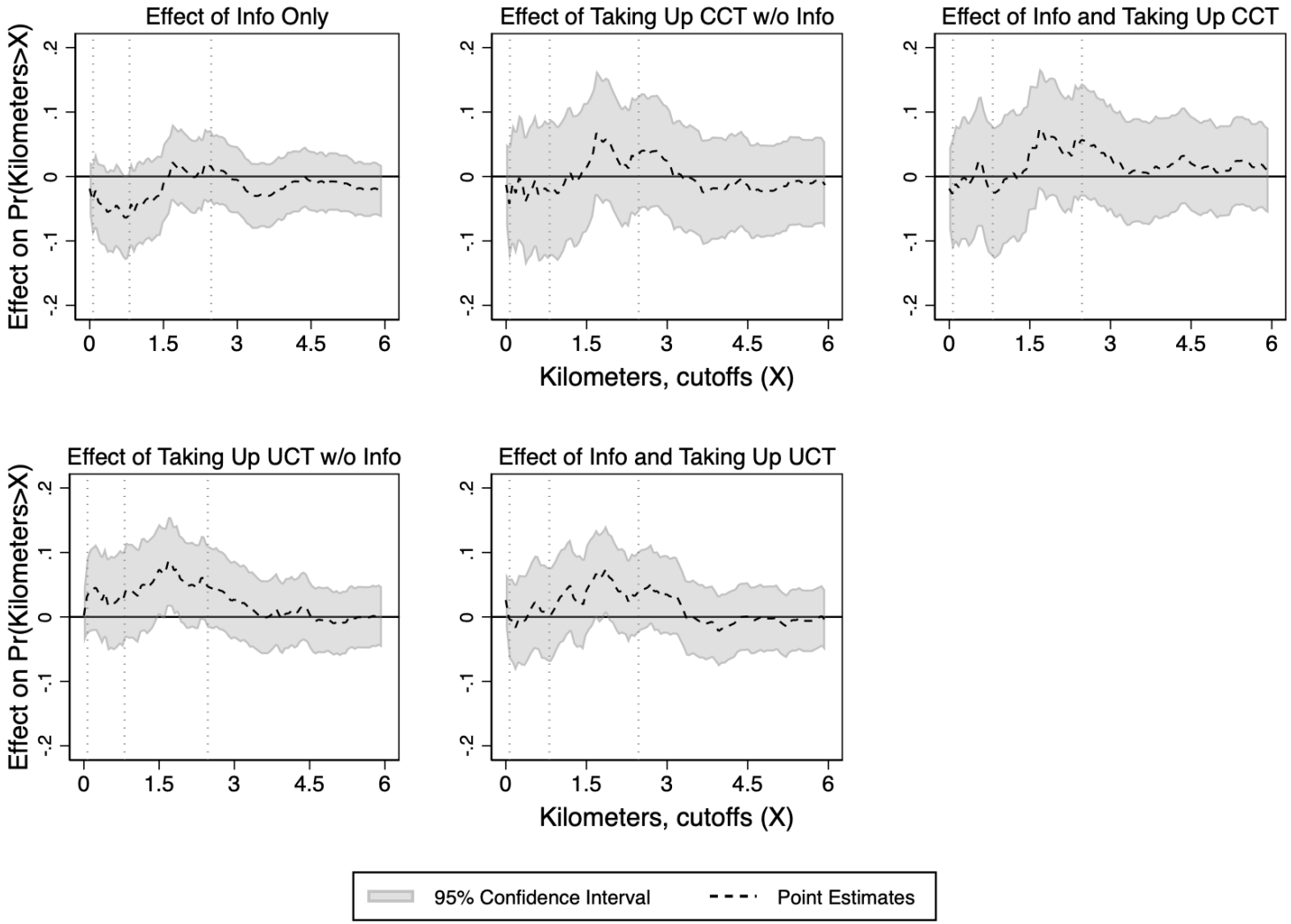
Businesses like yours report higher profits in other places. For example:

- Businesses locating in **LUNGUJJA** parish (the area around **Uganda Youth Football Association**) typically earn **2,200 UGX** more than businesses in your parish.
- Businesses locating in **KAMWOKYA I** parish (the area around **City oil**) typically earn **9,300 UGX** more than businesses in your parish.
- Businesses locating in **BWAISE III** parish (the area around **Babu plaza**) typically earn **6,900 UGX** more than businesses in your parish.
- Businesses locating in **BUGOLOBI** parish (the area around **Bugolobi flats**) typically earn **5,900 UGX** more than businesses in your parish.

*These numbers are estimates and do not represent a guaranteed higher profit in another place.

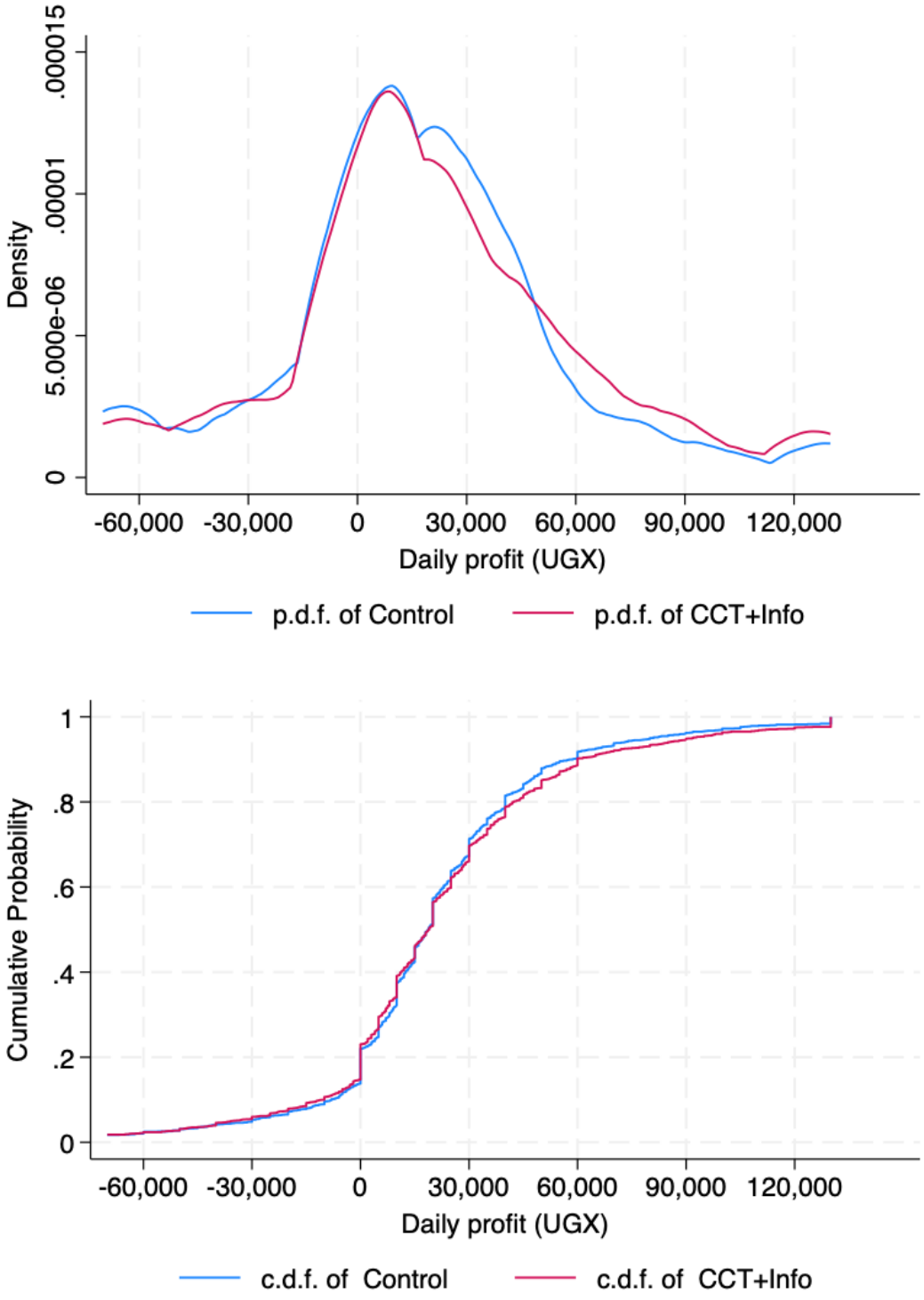
If you have any questions, please contact our study team at: **0702 935 679** or **0773 450 160**

Figure 4: Distribution Regressions: Effect of Treatment on Probability of Locating >X Kilometers from Pre-Intervention Business Location



Notes: Vertical dashed lines reflect the 25th, 50th, and 75th percentile of the outcome. Plots depict treatment on the treated (TOT) effects in distribution regressions, where take-up is instrumented with indicators for random assignment to the CCT, CCT with information, UCT, and UCT with information arms. Standard errors are heteroskedasticity-robust and all estimating equations include controls selected via double-selection (DS) lasso, as well as non-penalized strata FEs.

Figure 5: Profit Distributions During the Intervention



Note: Control mean = 17,000 UGX

Figure 6: Profit Distributions: Moving to a Higher Profit Parish Versus Not

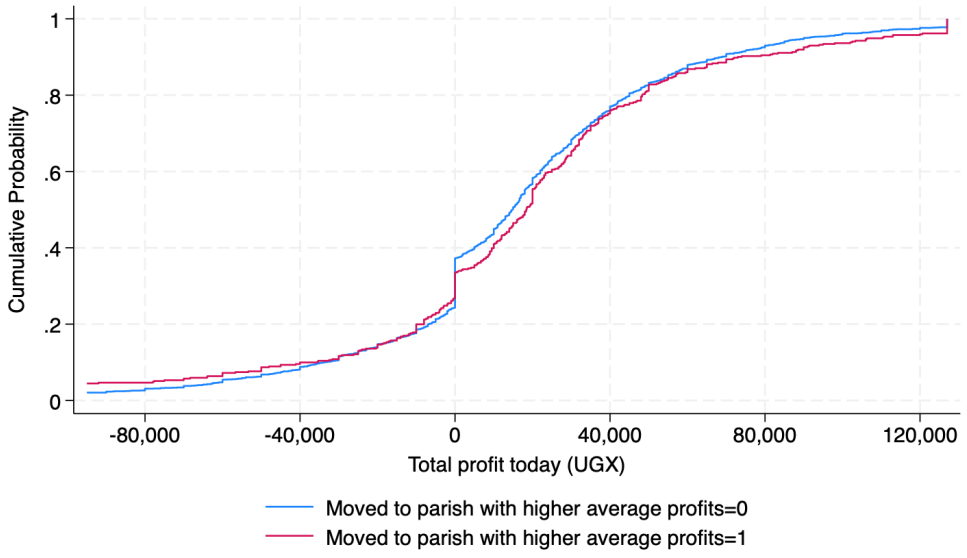
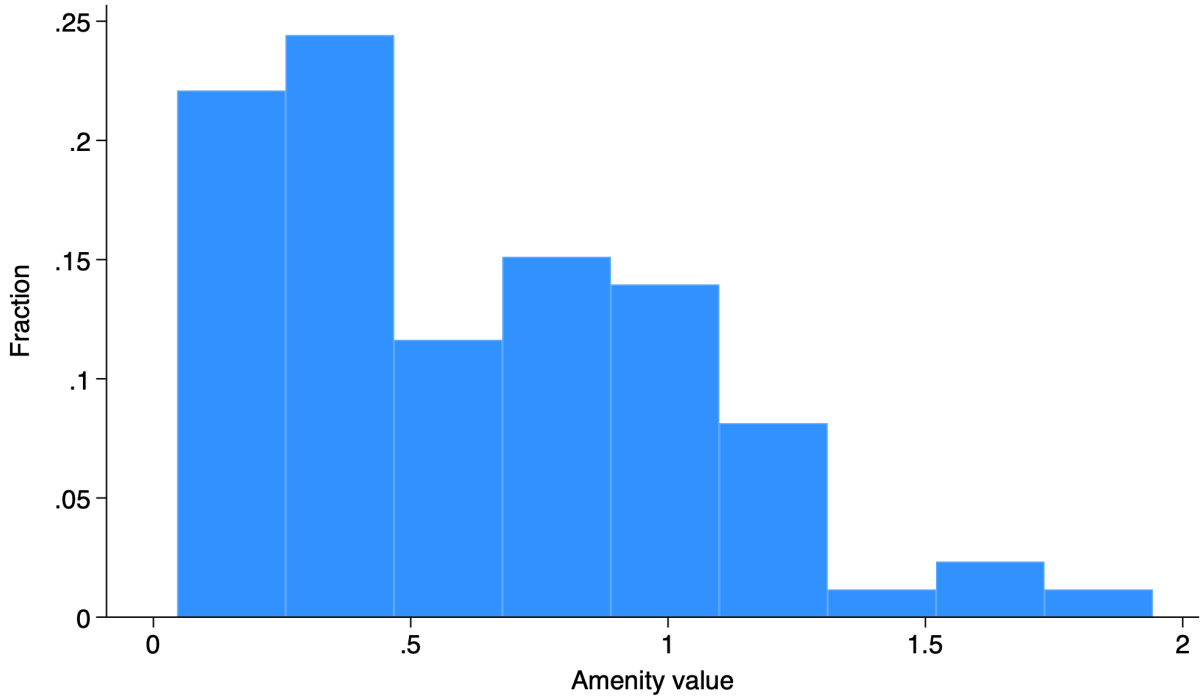


Figure 7: Distribution of Parish Amenities



Notes. This figure shows the distribution of parish-level amenities estimated in the model. Values are in terms of utility cost, e.g., a parish with amenity value of 0.50 reduces welfare by 50% relative to a parish with amenity value of 1.00, all else equal.

Figure 8: Model Fit

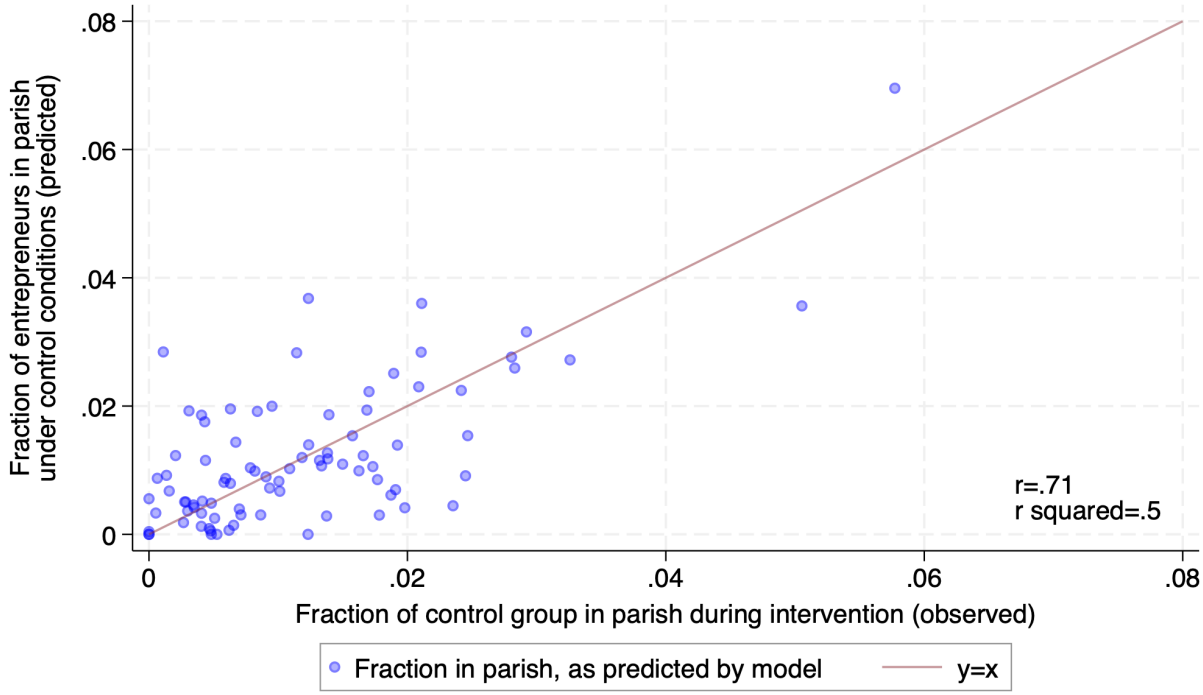
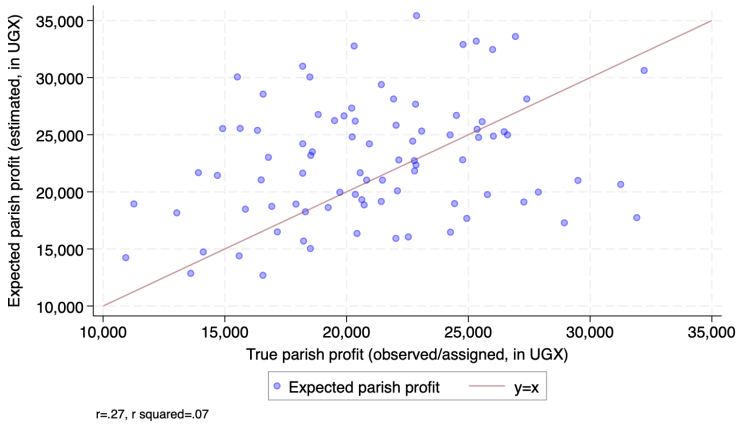
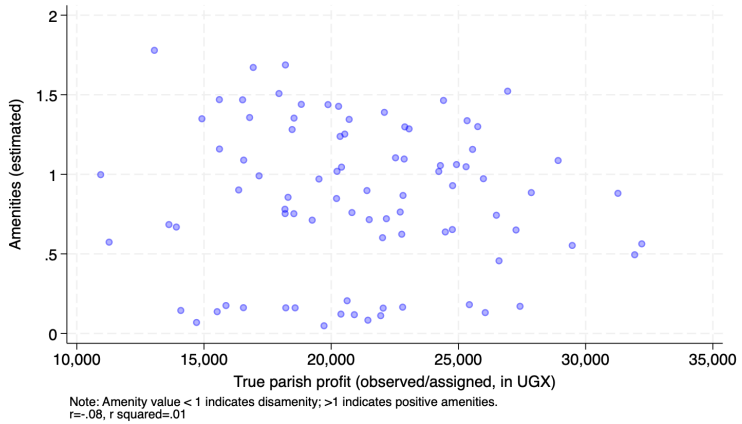


Figure 9: Correlations Between Estimated and Assigned Parameters

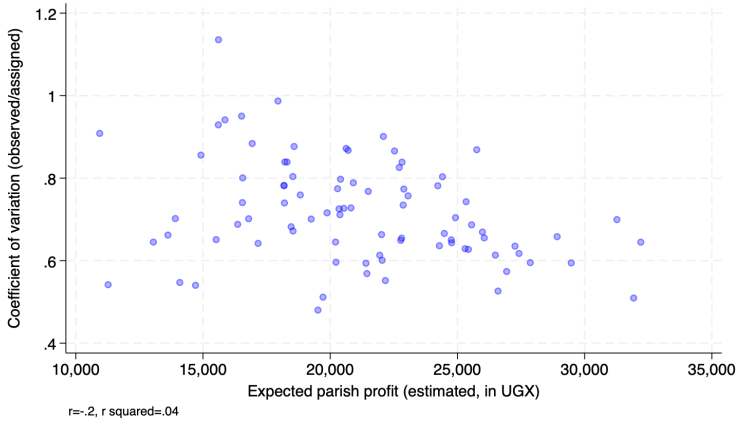
(a) Expected Profit v. True Profit



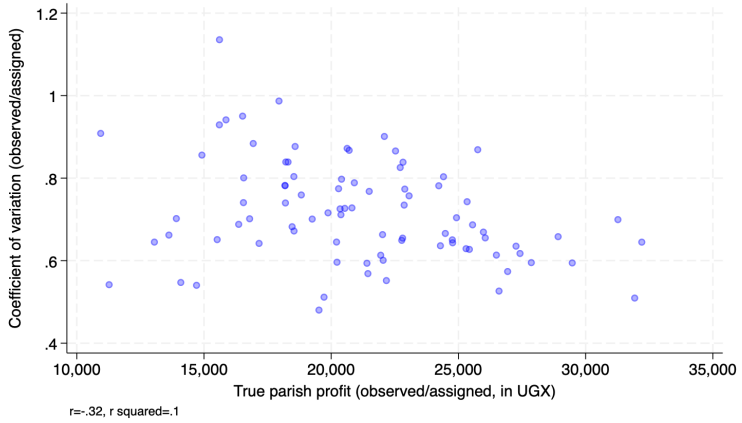
(b) Amenities v. True Profit



(c) Coefficient of Variation v. Expected Profit



(d) Coefficient of Variation v. True Profit



Tables

Table 1: Baseline Sample Characteristics

	All	Vendors	Bodas
Business Location			
Commute (min) from home to business location	34	37	25
Formally registered business with authority=1	.068	.025	.17
Primarily relies on repeat customers=1	.22	.25	.15
Thinks could be more profitable elsewhere=1	.66	.67	.62
Primary constraint to moving is cash=1 †	.62	.67	.49
Anticipated daily moving costs (UGX) to more profitable location †	3,433	3,105	4,285
Fraction correct on quiz about spatial profit dispersion§	.49	.48	.49
Business Owner Demographics			
Female=1	.25	.35	0
Business owner age	30	30	31
Years running any business	4.8	4.5	5.5
Completed primary school=1	.68	.64	.78
Completed secondary school=1	.15	.13	.2
Business Finances			
Daily revenue (UGX)	60,223	65,437	47,716
Daily costs (UGX)	34,239	40,655	18,852
Daily profit (UGX)	22,820	21,177	26,761
Asset stock (UGX)	1,011,321	187,800	2,986,427
Type of Costs Incurred			
Pays for labor=1	.0043	.0061	0
Pays for inventory=1	.66	.94	0
Pays for fuel or transport=1	.45	.23	.98
Pays any sort of rent to use space=1	.066	.09	.01
Own hours worked per week	67	62	78
Personal Finances			
Has any savings=1	.61	.6	.64
Total savings (UGX)	280,107	212,242	442,871
Has any credit=1	.22	.19	.31
Total credit (UGX)	201,123	63,246	531,802
Observations	3,745	2,643	1,102

Notes: 1 USD ≈ 3,700 UGX at time of baseline survey (November 2022). †These are the only dimensions where the mean is computed over a subsample of the total reported in the bottom row: only those who responded positively to the prior question on whether the entrepreneur believed she could be more profitable elsewhere were asked the questions on the primary constraint to moving and anticipated moving costs. All other variables reflect responses from the entire sample, of the size noted in the last row. §A score of 50% on the quiz is the expected score under random guessing.

Table 2: Experimental Design

	No Information	**Information**	
No Subsidy/Transfer	*Pure Control* n=499	*Information Only* n=498	**997**
Moving Subsidy a.k.a. Conditional Cash Transfer (CCT)	*CCT Only* n=585	*CCT + Info* n=586	**1,171**
Unconditional Cash Transfer (UCT)	*UCT Only* n=354	*UCT + Info* n=361	**715**
	1,438	**1,445**	**2,883**

Table 3: Balance Table

Variable	(1) Control Mean/SE	(2) Info Only Mean/SE	(3) CCT Only Mean/SE	(4) CCT+Info Mean/SE	(5) UCT Only Mean/SE	(6) UCT+Info Mean/SE	(7) Total Mean/SE	F-test for joint orthogonality
Daily profit (UGX)	21,377	21,499	21,931	20,817	22,421	21,582	21,551	.64
	(626)	(617)	(582)	(605)	(744)	(758)	(264)	
Daily revenue (UGX)	60,632	62,108	60,992	58,363	60,282	60,687	60,463	.79
	(1,918)	(2,056)	(1,792)	(1,736)	(2,225)	(2,397)	(811)	
Daily costs (UGX)	35,597	37,570	35,354	33,915	33,126	36,018	35,296	.26
	(1,528)	(1,647)	(1,425)	(1,316)	(1,611)	(1,769)	(628)	
Incurs transport costs=1	.44	.41	.4	.39	.39	.44	.41	.052*
	(.022)	(.022)	(.02)	(.02)	(.026)	(.026)	(.0092)	
Inventory value (UGX)	83,150	89,627	79,871	82,750	78,234	88,573	83,598	.39
	(5,075)	(5,520)	(4,615)	(4,937)	(5,854)	(6,483)	(2,177)	
Total bus. asset value (UGX)	894,124	928,042	907,286	889,718	901,381	879,512	900,820	.94
	(61,682)	(61,029)	(56,997)	(56,690)	(73,265)	(70,661)	(25,491)	
Total savings value (UGX)	199,783	239,753	186,252	253,299	197,408	209,064	215,690	.027**
	(14,657)	(17,922)	(13,421)	(17,414)	(18,216)	(19,805)	(6,875)	
Has formal savings=1	.45	.43	.42	.46	.41	.45	.44	.57
	(.022)	(.022)	(.02)	(.021)	(.026)	(.026)	(.0092)	
Has any credit=1	.23	.23	.22	.2	.23	.21	.22	.78
	(.019)	(.019)	(.017)	(.017)	(.022)	(.021)	(.0077)	
Hours worked per week	67	66	66	68	66	67	67	.42
	(.93)	(.96)	(.85)	(.9)	(1.2)	(1.1)	(.4)	
Num competitors in eyesight	4	3.8	3.7	3.3	3.3	3.8	3.6	.15
	(.35)	(.33)	(.3)	(.23)	(.32)	(.42)	(.13)	
Age of entrepreneur	32	31	31	32	31	32	31	.8
	(.41)	(.4)	(.39)	(.36)	(.5)	(.51)	(.17)	
Years as a business owner	5.5	5.3	5.2	5.2	5.3	5.6	5.3	.92
	(.23)	(.25)	(.22)	(.23)	(.31)	(.29)	(.1)	
Completed primary school=1	.64	.69	.68	.68	.68	.67	.67	.57
	(.022)	(.021)	(.019)	(.019)	(.025)	(.025)	(.0088)	
Commute to work (min)	33	32	33	32	33	32	32	.96
	(1.1)	(1.1)	(1.1)	(1.1)	(1.4)	(1.4)	(.48)	
Walks to work=1	.61	.6	.61	.59	.62	.62	.61	.92
	(.022)	(.022)	(.02)	(.02)	(.026)	(.026)	(.0091)	
Desire to expand=1	.95	.94	.93	.92	.92	.91	.93	.19
	(.01)	(.011)	(.01)	(.011)	(.014)	(.015)	(.0048)	
Patient=1	.2	.24	.26	.26	.21	.27	.24	.027**
	(.018)	(.019)	(.018)	(.018)	(.022)	(.023)	(.008)	
Time-inconsistent=1	.11	.13	.13	.13	.099	.12	.12	.66
	(.014)	(.015)	(.014)	(.014)	(.016)	(.017)	(.0061)	
N	499	498	585	586	354	361	2883	

Notes: Standard errors are heteroskedasticity-robust. Strata fixed effects are included in all estimation regressions. Asterisks denote statistical significance as follows: ***1%, **5%, *10%.

Table 4: Lasso-selected characteristics of compliers

	CCT+Info	CCT Only
Minutes from home to business location	.041	
Percent score on info quiz about nearby parishes (50%=guessing)	.030	
Total daily fuel costs (UGX)	.028	
In below median profit parish=1	.021	
Number of competitors	.021	
Has credit=1	.020	
Profit per hour	-.017	
Female=1	-.014	
Completed secondary school=1	.011	
Incurs transit costs=1	.009	.021
Completed primary school=1	.008	
Wants to expand business=1	-.005	
Years working on this business	.003	
More transient=1	-.002	
Total asset value		.028
Total savings		.013
Years of experience as a business owner		.001

Notes: Table displays standardized penalized coefficients selected by lasso, in desccending order. Penalty parameter selected using cross-validation with 10 folds.

Table 5: Effect on Location During the Intervention

	(1) Left Kampala=1	(2) Same parish as baseline=1	(3) Moved to lower profit parish=1	(4) Moved to higher profit parish=1	(5) Expected (avg) profit in current parish
Panel A. Intent-to-Treat (ITT):					
Info=1	-0.02	-0.01	0.03	-0.002	-110.8
	(0.02)	(0.03)	(0.03)	(0.03)	(287.8)
CCT=1	-0.02	-0.02	0.04*	-0.007	-310.0
	(0.02)	(0.03)	(0.03)	(0.02)	(268.7)
Info=1 × CCT=1	0.02	0.02	-0.09**	0.05	853.3**
	(0.02)	(0.05)	(0.04)	(0.03)	(377.8)
UCT=1	-0.01	-0.06*	0.06*	0.02	110.9
	(0.02)	(0.04)	(0.03)	(0.03)	(358.9)
Info=1 × UCT=1	0.03	0.006	-0.06	0.02	265.1
	(0.03)	(0.05)	(0.04)	(0.04)	(476.8)
Info+CCT+Info*CCT	-0.02	-0.01	-0.01	0.04	432.47
P-value: I+C+I*C=0	0.29	0.66	0.62	0.08	0.12
Info+UCT+Info*UCT	0.00	-0.07	0.03	0.03	265.22
P-value: I+U+I*U=0	0.93	0.06	0.26	0.26	0.40
Num. of DS Lasso Controls	0	0	2	1	2
Panel B. Treatment-on-Treated (ToT):					
Info=1	-0.02	-0.01	0.03	-0.002	-110.9
	(0.02)	(0.03)	(0.03)	(0.02)	(285.0)
Took up CCT=1	-0.03	-0.03	0.07*	-0.01	-507.4
	(0.03)	(0.05)	(0.04)	(0.04)	(437.9)
Info=1 x Took up CCT=1	0.03	0.03	-0.1**	0.08	1386.4**
	(0.04)	(0.07)	(0.06)	(0.06)	(610.8)
Took up UCT=1	-0.02	-0.06*	0.06*	0.02	114.7
	(0.02)	(0.04)	(0.03)	(0.03)	(364.8)
Info=1 x Took up UCT=1	0.04	0.006	-0.06	0.02	278.5
	(0.03)	(0.05)	(0.04)	(0.04)	(488.0)
Info+CCT+Info*CCT	-0.02	-0.01	-0.04	0.07	768.06
P-value: I+C+I*C=0	0.43	0.76	0.23	0.04	0.04
Info+UCT+Info*UCT	0.00	-0.07	0.03	0.03	282.23
P-value: I+U+I*U=0	0.90	0.05	0.27	0.24	0.38
Control Mean	0.08	0.54	0.19	0.19	21,946.10
Observations	2,410	2,410	2,410	2,410	2,410

Notes: Columns 1 - 4 compose mutually exclusive groups. Heteroskedasticity-robust standard errors in parentheses. Any non-binary (or otherwise bounded) outcomes are winsorized to the 2.5 and 97.5 percentiles, and any financial outcomes are in Ugandan shillings (UGX). Controls are selected via double-selection (DS) lasso, where lasso selects from among 28 pre-specified baseline controls, given the inclusion of strata FE's as non-penalized controls. ***1%, **5%, *10%.

Table 6: Effect on Financial Outcomes During the Intervention

	(1) Mobile money balance	(2) Daily revenue	(3) Daily costs	(4) Daily profit	(5) Work hours per day	(6) Profit per hour	(7) Fraction of exp. profit realized
Panel A. Intent-to-Treat (ITT):							
Info=1	-425	-1,880	703	-3,773	-.37*	-411	-.21
	(1,400)	(2,535)	(2,008)	(2,745)	(.21)	(282)	(.14)
CCT=1	3,220**	3,232	2,458	-300	.12	-47	-.012
	(1,414)	(2,464)	(1,944)	(2,537)	(.2)	(258)	(.14)
Info=1 × CCT=1	-1,663	3,958	-2,318	7,396**	.34	681*	.32*
	(1,924)	(3,512)	(2,698)	(3,698)	(.29)	(375)	(.19)
UCT=1	4,727***	-88	1,039	-841	.23	-106	-.046
	(1,342)	(2,839)	(2,153)	(3,020)	(.22)	(303)	(.16)
Info=1 × UCT=1	1,620	6,145	-1,785	7,999*	.47	724*	.5**
	(2,014)	(4,127)	(3,032)	(4,348)	(.31)	(438)	(.23)
Info+CCT+Info*CCT	1,132	5,309	842	3,323	.083	222	.1
P-value: I+C+I*C=0	0.39	0.03	0.65	0.20	0.68	0.39	0.44
Info+UCT+Info*UCT	5,922	4,176	-43	3,385	.32	207	.24
P-value: I+U+I*U=0	0.00	0.16	0.98	0.27	0.12	0.50	0.14
Num. of DS Lasso Controls	0	2	1	0	1	0	0
Panel B. Treatment-on-Treated (ToT):							
Info=1	-423	-1,868	704	-3,769	-.37*	-411	-.21
	(1,387)	(2,509)	(1,988)	(2,718)	(.21)	(279)	(.14)
Took up CCT=1	5,295**	5,324	4,041	-471	.2	-76	-.019
	(2,299)	(3,986)	(3,160)	(4,134)	(.32)	(420)	(.22)
Info=1 x Took up CCT=1	-2,786	6,275	-3,823	11,945**	.54	1,100*	.52*
	(3,103)	(5,653)	(4,353)	(5,980)	(.46)	(606)	(.31)
Took up UCT=1	4,862***	-91	1,067	-843	.24	-107	-.046
	(1,363)	(2,884)	(2,188)	(3,073)	(.23)	(308)	(.16)
Info=1 x Took up UCT=1	1,752	6,393	-1,851	8,311*	.49	752*	.52**
	(2,061)	(4,227)	(3,107)	(4,454)	(.32)	(449)	(.23)
Info+CCT+Info*CCT	2,086	9,732	922	7,705	.36	613	.29
P-value: I+C+I*C=0	0.25	0.00	0.72	0.04	0.19	0.09	0.10
Info+UCT+Info*UCT	6,191	4,434	-80	3,699	.35	234	.26
P-value: I+U+I*U=0	0.00	0.14	0.97	0.23	0.09	0.45	0.11
Control Mean	6,650	37,604	21,253	17,130	10	1,495	.77
Observations	2,410	2,410	2,410	2,410	2,410	2,410	2,410

Notes: Heteroskedasticity-robust standard errors in parentheses. Any non-binary (or otherwise bounded) outcomes are winsorized to the 2.5 and 97.5 percentiles, and any financial outcomes are in Ugandan shillings (UGX). Controls are selected via double-selection (DS) lasso, where lasso selects from among 28 pre-specified baseline controls, given the inclusion of strata FE's as non-penalized controls. ***1%, **5%, *10%.

Table 7: Effect on Location and Financial Outcomes After the Intervention

	Endline 1: A Week Post-Intervention			Endline 2: ≈ A Month Post-Intervention		
	(1) Expected (avg) profit in current parish	(2) Daily revenue	(3) Daily profit	(4) Expected (avg) profit in current parish	(5) Daily revenue	(6) Daily profit
Panel A. Intent-to-Treat (ITT):						
Info=1	-329	2,868	1,655	77	33	1,946
	(294)	(2,596)	(2,509)	(123)	(2,349)	(2,256)
CCT=1	-622**	2,931	-66	39	1,113	1,087
	(289)	(2,397)	(2,329)	(120)	(2,234)	(2,273)
Info=1 × CCT=1	851**	-760	1,671	35	286	-4,879
	(392)	(3,552)	(3,444)	(170)	(3,274)	(3,196)
UCT=1	-399	-876	-3,089	46	-2,499	-2,929
	(329)	(2,534)	(2,591)	(141)	(2,456)	(2,565)
Info=1 × UCT=1	747	2,956	5,600	-3.7	2,116	751
	(456)	(3,873)	(3,904)	(191)	(3,565)	(3,584)
Info+CCT+Info*CCT	-100	5,038	3,260	151	1,432	-1,846
P-value: I+C+I*C=0	0.74	0.04	0.18	0.22	0.55	0.43
Info+UCT+Info*UCT	18	4,948	4,166	119	-350	-232
P-value: I+U+I*U=0	0.96	0.08	0.14	0.35	0.89	0.93
Num. of DS Lasso Controls	1	2	0	2	2	0
Panel B. Treatment-on-Treated (ToT):						
Info=1	-329	2,880	1,659	77	41	1,939
	(291)	(2,567)	(2,483)	(122)	(2,327)	(2,236)
Took up CCT=1	-998**	4,715	-98	66	1,841	1,765
	(462)	(3,802)	(3,703)	(197)	(3,644)	(3,711)
Info=1 x Took up CCT=1	1,372**	-1,218	2,701	58	474	-8,080
	(629)	(5,665)	(5,502)	(280)	(5,367)	(5,255)
Took up UCT=1	-420	-920	-3,248	49	-2,624	-3,092
	(343)	(2,642)	(2,706)	(147)	(2,557)	(2,673)
Info=1 x Took up UCT=1	798*	3,159	5,966	-2.4	2,197	695
	(482)	(4,103)	(4,137)	(203)	(3,802)	(3,819)
Info+CCT+Info*CCT	45	6,377	4,262	201	2,356	-4,376
P-value: I+C+I*C=0	0.91	0.07	0.22	0.25	0.49	0.19
Info+UCT+Info*UCT	49	5,119	4,377	123	-386	-457
P-value: I+U+I*U=0	0.89	0.08	0.14	0.36	0.89	0.87
Control Mean	22,222	40,692	21,466	22,025	45,804	22,926
Observations	2,500	2,500	2,500	2,596	2,596	2,596

Notes: Heteroskedasticity-robust standard errors in parentheses. Any non-binary (or otherwise bounded) outcomes are winsorized to the 2.5 and 97.5 percentiles, and any financial outcomes are in Ugandan shillings (UGX). Controls are selected via double-selection (DS) lasso, where lasso selects from among 28 pre-specified baseline controls, given the inclusion of strata FE's as non-penalized controls. ***1%, **5%, *10%.

Table 8: Heterogeneity in Treatment Effects on Profit During the Intervention: By Likelihood of Complying with the CCT+Info

	(1) Expected (avg) profit in current parish	(2) Daily revenue	(3) Daily costs	(4) Daily profit	(5) Frac. of exp. profit realized	(6) Work hours per day	(7) Profit per hour
Info Only × Likely CCT+Info complier=1	957	4,690	-3,462	8,453	.42	.24	1,028*
	(589)	(5,236)	(4,188)	(5,659)	(.29)	(.44)	(585)
CCT Only × Likely CCT+Info complier=1	457	1,792	-5,289	6,350	.3	.66	681
	(568)	(5,069)	(4,035)	(5,272)	(.28)	(.41)	(535)
CCT+Info × Likely CCT+Info complier=1	454	12,312**	-787	12,839**	.69**	.39	1,129**
	(570)	(5,005)	(3,874)	(5,347)	(.27)	(.4)	(530)
UCT Only × Likely CCT+Info complier=1	-253	6,614	99	4,353	.38	-.13	583
	(753)	(5,813)	(4,441)	(6,177)	(.32)	(.45)	(622)
UCT+Info × Likely CCT+Info complier=1	201	10,119*	-2,747	12,588**	.65*	.11	1,512**
	(671)	(6,091)	(4,440)	(6,272)	(.34)	(.43)	(629)
Info Only	-618	-5,100	2,592	-9,056*	-.47*	-.52*	-1,046**
	(485)	(4,222)	(3,430)	(4,621)	(.24)	(.32)	(487)
CCT Only	-567	1,790	5,133	-4,086	-.19	-.25	-459
	(460)	(4,034)	(3,314)	(4,305)	(.23)	(.31)	(442)
CCT+Info	185	-2,045	1,136	-4,015	-.29	-.14	-430
	(473)	(3,786)	(3,098)	(4,167)	(.22)	(.3)	(415)
UCT Only	237	-3,981	971	-3,541	-.26	.31	-459
	(613)	(4,459)	(3,541)	(4,832)	(.25)	(.32)	(498)
UCT+Info	153	-1,637	1,503	-3,845	-.13	.27	-659
	(561)	(4,780)	(3,526)	(4,924)	(.26)	(.33)	(500)
Likely CCT+Info complier=1	-492	-660	2,864	-2,213	-.071	-.08	-319
	(520)	(4,229)	(3,368)	(4,470)	(.24)	(.32)	(446)
Info+Info*Het	338	-410	-870	-603	-.048	-.28	-18
P-val [q-val]: Info+Info*Het=0	0.32 [0.786]	0.89 [0.667]	0.71 [1.000]	0.85 [1.000]	0.77 [0.859]	0.34 [0.667]	0.96 [1.000]
CCT Only+CCT Only*Het	-111	3,582	-156	2,264	.1	.4	222
P-val [q-val]: CCT Only+CCT Only*Het=0	0.73 [1.000]	0.24 [0.316]	0.95 [1.000]	0.45 [0.819]	0.53 [0.770]	0.12 [0.667]	0.46 [0.852]
(CCT+Info)+(CCT+Info)*Het	640	10,268	349	8,825	.4	.26	700
P-val [q-val]: (CCT+Info)+(CCT+Info)*Het=0	0.05 [0.334]	0.00 [0.001]	0.88 [1.000]	0.01 [0.053]	0.02 [0.053]	0.33 [0.667]	0.03 [0.082]
UCT Only+UCT Only*Het	-16	2,632	1,070	812	.12	.18	124
P-val [q-val]: UCT Only+UCT Only*Het=0	0.97 [1.000]	0.48 [0.563]	0.69 [1.000]	0.83 [1.000]	0.58 [0.770]	0.57 [0.667]	0.74 [1.000]
(UCT+Info)+(UCT+Info)*Het	354	8,483	-1,243	8,743	.52	.37	853
P-val [q-val]: (UCT+Info)+(UCT+Info)*Het=0	0.33 [0.786]	0.02 [0.042]	0.64 [1.000]	0.02 [0.053]	0.01 [0.053]	0.16 [0.667]	0.02 [0.082]
Control Mean (Level)	21,946	37,604	21,253	17,130	.77	10	1,495
Observations	2,410	2,410	2,410	2,410	2,410	2,410	2,410

Notes: The table depicts mutually exclusive indicators of treatment assignment (i.e., these are intent-to-treat effects) interacted with an indicator for likelihood of complying with the CCT and information treatment (as predicted by baseline characteristics). "Het" is an abbreviation for the heterogeneity variable of interest. Heteroskedasticity-robust standard errors in parentheses. Any non-binary (or otherwise bounded) outcomes are winsorized to the 2.5 and 97.5 percentiles, and any financial outcomes are in Ugandan shillings (UGX). Likelihood of complying is predicted with lasso from baseline covariates. Controls are selected via double-selection (DS) lasso, where lasso selects from among 28 pre-specified baseline controls, given the inclusion of strata FE's as non-penalized controls. Brackets indicate FDR q-values, where one penalty is applied in the analysis of each outcome to correct for multiple testing *across treatment arms*. ***1%, **5%, *10%.

Table 9: Heterogeneity in Treatment Effects on Profit During the Intervention: By Likelihood of Complying with the CCT Only

	(1) Expected (avg) profit in current parish	(2) Daily revenue	(3) Daily costs	(4) Daily profit	(5) Frac. of exp. profit realized	(6) Work hours per day	(7) Profit per hour
Info Only × Likely CCT Only complier=1	-29	4,466	-3,709	10,158*	.51*	.5	1,109*
	(585)	(5,238)	(4,260)	(5,694)	(.3)	(.44)	(584)
CCT Only × Likely CCT Only complier=1	120	655	-1,799	5,417	.18	.65	586
	(550)	(5,060)	(4,003)	(5,244)	(.28)	(.4)	(533)
CCT+Info × Likely CCT Only complier=1	-668	5,760	-442	7,327	.26	.56	591
	(561)	(4,968)	(3,863)	(5,337)	(.27)	(.4)	(528)
UCT Only × Likely CCT Only complier=1	-764	1,007	-505	2,749	.12	.44	387
	(738)	(5,792)	(4,403)	(6,221)	(.33)	(.46)	(622)
UCT+Info × Likely CCT Only complier=1	-218	-2,085	-351	-994	-.3	.32	137
	(652)	(6,062)	(4,391)	(6,237)	(.34)	(.42)	(623)
Info Only	-103	-4,649	2,481	-9,508**	-.49**	-.64*	-1,040**
	(445)	(4,138)	(3,570)	(4,561)	(.25)	(.33)	(471)
CCT Only	-364	2,770	3,575	-3,473	-.12	-.22	-395
	(429)	(4,024)	(3,223)	(4,141)	(.23)	(.3)	(423)
CCT+Info	797*	1,597	928	-1,165	-.06	-.22	-155
	(443)	(3,759)	(3,071)	(4,150)	(.22)	(.3)	(414)
UCT Only	536	-761	1,209	-2,424	-.11	.0013	-332
	(560)	(4,551)	(3,520)	(4,948)	(.27)	(.36)	(494)
UCT+Info	380	5,386	360	3,625	.4	.14	1.0e+02
	(517)	(4,690)	(3,411)	(4,847)	(.27)	(.32)	(486)
Likely CCT Only complier=1	234	1,104	8,880**	-10,210**	-.46*	-.62*	-1,118**
	(537)	(4,657)	(3,782)	(5,005)	(.27)	(.34)	(507)
Info+Info*Het	-132	-183	-1,228	650	.015	-.14	69
P-val: Info+Info*Het=0	0.73	0.95	0.60	0.85	0.93	0.62	0.84
CCT Only+CCT Only*Het	-245	3,425	1,776	1,944	.062	.43	191
P-val: CCT Only+CCT Only*Het=0	0.47	0.26	0.45	0.54	0.70	0.10	0.55
(CCT+Info)+(CCT+Info)*Het	129	7,356	486	6,162	.2	.34	436
P-val: (CCT+Info)+(CCT+Info)*Het=0	0.71	0.02	0.83	0.07	0.22	0.20	0.18
UCT Only+UCT Only*Het	-228	246	705	324	.0071	.44	55
P-val: UCT Only+UCT Only*Het=0	0.63	0.95	0.79	0.93	0.97	0.12	0.88
(UCT+Info)+(UCT+Info)*Het	161	3,300	9.1	2,630	.093	.45	237
P-val: (UCT+Info)+(UCT+Info)*Het=0	0.68	0.39	1.00	0.50	0.64	0.09	0.54
Control Mean (Level)	21,946	37,604	21,253	17,130	.77	10	1,495
Observations	2,410	2,410	2,410	2,410	2,410	2,410	2,410

Notes: The table depicts mutually exclusive indicators of treatment assignment (i.e., these are intent-to-treat effects) interacted with an indicator for likelihood of complying with the CCT only treatment (as predicted by baseline characteristics). "Het" is an abbreviation for the heterogeneity variable of interest. Heteroskedasticity-robust standard errors in parentheses. Any non-binary (or otherwise bounded) outcomes are winsorized to the 2.5 and 97.5 percentiles, and any financial outcomes are in Ugandan shillings (UGX). Likelihood of complying is predicted with lasso from baseline covariates. Controls are selected via double-selection (DS) lasso, where lasso selects from among 28 pre-specified baseline controls, given the inclusion of strata FE's as non-penalized controls. ***1%, **5%, *10%.

Table 10: How Pass Through of Profit to Consumption Varies by Treatment Group (Panel)

	(1) Spending on irregular expenses in past week	(2) Spending on irregular expenses in past week	(3) Spending on irregular expenses in past week
Typical daily profit, past week	0.31	0.49	0.49
	(0.35)	(0.53)	(0.53)
Daily profit x offered any cash (CCT or UCT)	-0.97**	-1.08*	
	(0.43)	(0.64)	
Daily profit x received info		-0.37	
		(0.69)	
Daily profit x offered cash and received info		0.23	
		(0.87)	
Profit interacted with mutually exclusive treatment dummies:			
Daily profit x Info only			-0.37
			(0.69)
Daily profit x CCT only			-1.16*
			(0.69)
Daily profit x CCT+Info			-1.19*
			(0.72)
Daily profit x UCT only			-0.95
			(0.81)
Daily profit x UCT+Info			-1.25
			(0.76)
Total effect of (any) cash	-0.66		
P-value in F-test	0.01		
Total effect of cash only		-0.59	
P-value in F-test		0.11	
Total effect of info only		0.12	0.12
P-value in F-test		0.79	0.79
Total effect of cash + info		-0.72	
P-value in F-test		0.05	
Total effect of CCT only			-0.67
P-value in F-test			0.13
Total effect of CCT+Info			-0.70
P-value in F-test			0.15
Total effect of UCT only			-0.46
P-value in F-test			0.46
Total effect of UCT+Info			-0.76
P-value in F-test			0.17
Firm FE's	Yes	Yes	Yes
Outcome mean in control	68,632	68,632	68,632
R^2	0.16	0.16	0.16
No. of Unique Firms	2,666	2,666	2,666
Observations	5,096	5,096	5,096

Notes: Table depicts panel regressions of firms surveyed at endline 1 and 2, as consumptive expenditures were only collected in the endlines. Outcomes are in UGX and winsorized to the 2.5 and 97.5 percentiles. ***1%, **5%, *10%.

Table 11: Simulation Results

	Partial equilibrium		*General equilibrium*	
	Aggregate income (1)	Aggregate welfare (2)	Aggregate income (3)	Aggregate welfare (4)
0. Baseline: Firms face info frictions and fixed costs	1.000	1.000	1.000	1.000
1. Provide correct info †	1.002	0.997	0.999	0.934
2. Provide liquidity to relieve fixed costs †	0.998	1.083	0.989	0.995
3. (1) + (2) †	1.001	1.078	0.989	0.992
4. (1) + (2) + high-return movers induced to move	1.388	1.100	1.371	1.014
5. (4) + improved amenities	1.403	1.118	1.390	1.093

Notes: "Improved amenities" sets the amenity value in parishes with below-median amenities to the median. †Changes of less than 0.005 (or less than half of a percentage point) reflect a loss of precision due to computing aggregate outcomes as the fraction of entrepreneurs located in each of 86 parishes times the income or welfare associated with each parish and should not be thought of as meaningful differences (in other words, they are rounding errors). For example, entrepreneurs redistribute across city locations to hold income and welfare constant in partial equilibrium in simulation 1.

A Derivation of Profit Response to Firm Entry in Equilibrium

In equilibrium, as parish-level demand curves are downward-sloping, profits will be determined by jointly solving the consumer's problem and firm's problem, which I model as follows:

Consumer's Problem. Households are assigned to exogenous locations d. Their total expenditure is divided between sectors $k \in \{\text{Retail}, \text{Transport}, \text{Other}\}$.[29] Given prices $p_{kd}(j)$ and exogenous expenditure I_{kd}, households choose the quantity $x_{kd}(j)$ to purchase from each firm j:

$$\begin{aligned} U_{kd} &= \max\left(\int x_{kd}(j)^{\frac{\sigma-1}{\sigma}} dj\right)^{\frac{\sigma}{\sigma-1}} \\ &\text{subject to } \int p_{kd}(j)\, x_{kd}(j)\, dj \leq I_{kd} \end{aligned} \tag{1}$$

where σ is the elasticity of substitution between goods sold by different firms. This yields the following first order condition:

$$\begin{aligned} \text{FOC:} \quad U_{kd}^{1/\sigma} x_{kd}(j)^{-1/\sigma} &= \lambda_{kd} p_{kd}(j) \qquad (2) \\ U_{kd}^{1/\sigma} x_{kd}(j)^{1-1/\sigma} &= \lambda_{kd} p_{kd}(j) x_{kd}(j) \\ U_{kd}^{1/\sigma} \int x_{kd}(j)^{1-1/\sigma} dj &= \lambda_{kd} \int p_{kd}(j) x_{kd}(j) dj \\ U_{kd} &= \lambda_{kd} I_{kd} \\ \implies p_{kd}(j) &= x_{kd}(j)^{-1/\sigma} U_{kd}^{1/\sigma - 1} I_{kd} \qquad (3) \end{aligned}$$

Firm's Problem. Given prices $p_{kd}(j)$ and cost function $C(\cdot)$, firms choose quantity $x_{kd}(j)$:

$$\begin{aligned} Y_{kd} &= \max p_{kd}(j)\, x_{kd}(j) - C(x_{kd}(j)) \qquad (4) \\ &= \max \Delta_{kd} x_{kd}(j)^{1-1/\sigma} - C(x_{kd}(j)) \\ \text{where } \Delta_{kd} &= U_{kd}^{1/\sigma - 1} I_{kd} \qquad (5) \end{aligned}$$

This yields the following first order condition:

$$\text{FOC:} \quad \frac{\sigma - 1}{\sigma} \Delta_{kd} x_{kd}(j)^{-1/\sigma} = MC(x_{kd}(j)) \tag{6}$$

[29] Their utility function over these sectors is given by:

$$\begin{aligned} W_d =& \alpha_R \ln(X_{Rd}) + \alpha_T \ln(X_{Td}) + (1 - \alpha_T - \alpha_R) \ln(X_{Od}) \\ &\text{subject to } E_d = P_{Rd} X_{Rd} + P_{Td} X_{Td} + P_{Od} X_{Od} \\ \implies & \alpha_k E_d = P_{kd} X_{kd} \equiv I_{kd} \end{aligned}$$

The FOC can be rewritten as:

$$\begin{aligned} \frac{\sigma-1}{\sigma} p_{kd}(j) &= MC(x_{kd}(j)) \\ \frac{p_{kd}(j)}{MC(x_{kd}(j))} &= \frac{\sigma}{\sigma-1} \equiv \text{Markup}_{kd}(j) \end{aligned} \tag{7}$$

Suppose that marginal cost, $MC(x_{kd}(j))$, is of the form:

$$MC(x_{kd}(j)) = \delta x_{kd}(j)^{\theta} \tag{8}$$

Then, substituting between (6) and (8) yields:

$$\frac{\sigma-1}{\sigma} \Delta_{kd} x_{kd}(j)^{-1/\sigma} = \delta x_{kd}(j)^{\theta} \tag{9}$$

$$\implies x_{kd}(j) = \left(\frac{\sigma-1}{\sigma}\frac{\Delta_{kd}}{\delta}\right)^{\frac{\sigma}{1+\sigma\theta}} \tag{10}$$

Note that $MC(x_{kd}(j)) = \delta x_{kd}(j)^{\theta}$ implies:

$$\begin{aligned} C(x_{kd}(j)) &= \frac{\delta}{1+\theta} x_{kd}(j)^{1+\theta} \\ &= \frac{x_{kd}(j)}{1+\theta} MC(x_{kd}(j)) \end{aligned} \tag{11}$$

Recall the objective function of the firm:

$$\begin{aligned} Y_{kd} &= p_{kd}(j)\, x_{kd}(j) - C(x_{kd}(j)) \\ &= \left(p_{kd}(j) - \frac{MC(x_{kd}(j))}{1+\theta}\right) x_{kd}(j) \\ &= \left(\text{Markup}_{kd}(j) - \frac{1}{1+\theta}\right) MC(x_{kd}(j)) x_{kd}(j) \\ &= \delta \frac{1+\sigma\theta}{(\sigma-1)(1+\theta)} x_{kd}(j)^{1+\theta} \\ &= \delta \frac{1+\sigma\theta}{(\sigma-1)(1+\theta)} \left(\frac{\sigma-1}{\sigma}\frac{\Delta_{kd}}{\delta}\right)^{\frac{\sigma(1+\theta)}{1+\sigma\theta}} \\ \text{where } \Delta_{kd} &= U_{kd}^{1/\sigma-1} I_{kd} = \left(\int x_{kd}(j)^{\frac{\sigma-1}{\sigma}} dj\right)^{-1} I_{kd} \end{aligned} \tag{12}$$

All firms of sector k in parish d make the same decision, so by symmetry:

$$\Delta_{kd} = \left(\frac{\sigma-1}{\sigma}\frac{\Delta_{kd}}{\delta}\right)^{\frac{1-\sigma}{1+\sigma\theta}} I_{kd}/N_{kd} \tag{13}$$

$$\Delta_{kd}^{\frac{\sigma(1+\theta)}{1+\sigma\theta}} = \left(\frac{\sigma-1}{\sigma\delta}\right)^{\frac{1-\sigma}{1+\sigma\theta}} I_{kd}/N_{kd}$$

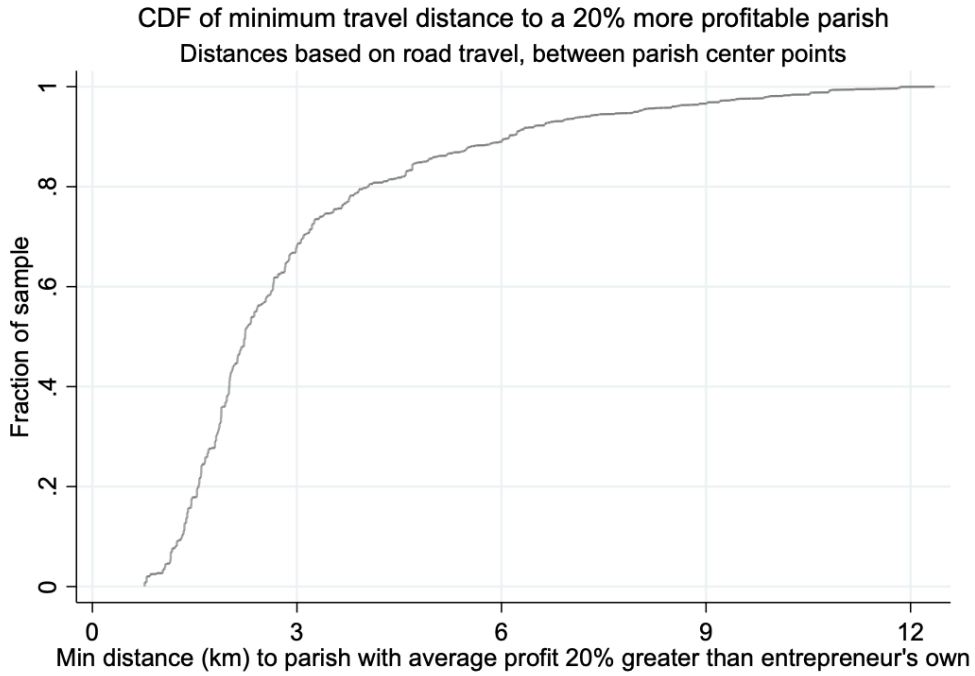
Therefore, the profit response to firm entry in equilibrium depends on a location-specific parameter, Φ_{kd}, which captures the baseline profitability of a parish, and the number of firms, N_{kd}, in parish d:

$$\begin{aligned} Y_{kd} &= \delta\frac{1+\sigma\theta}{(\sigma-1)(1+\theta)}\left(\frac{\sigma-1}{\sigma}\frac{\Delta_{kd}}{\delta}\right)^{\frac{\sigma(1+\theta)}{1+\sigma\theta}} \quad (14) \\ &= \Phi_{kd}/N_{kd} \\ \text{where } \Phi_{kd} &= \delta\frac{1+\sigma\theta}{(\sigma-1)(1+\theta)}\left(\frac{\sigma-1}{\sigma\delta}\right)^{\frac{\sigma(1+\theta)}{1+\sigma\theta}}\left(\frac{\sigma-1}{\sigma\delta}\right)^{\frac{1-\sigma}{1+\sigma\theta}} I_{kd} \quad (15) \\ \ln(Y_{kd}) &= \ln(\Phi_{kd}) - \ln(N_{kd}) \quad (16) \end{aligned}$$

B Data Appendix

B.1 The Conditional Cash Transfer

Figure B.1: Distance to More Profitable Parishes



Verifying Compliance with the 3-Kilometer Rule of the CCT. Entrepreneurs assigned to the CCT arm receive contact information for enumerators on the study team whose responsibility is to verify compliance with the CCT. Upon moving to a business location that is three or more kilometers from their pre-intervention location, the respondent calls the study team to report that they are ready for verification. The verification enumerators are located throughout the city such that one is likely to be able to reach the respondent fairly quickly, typically within 1-2 hours. The slight lag, i.e., that verification is not immediate, helps to prevent gaming, e.g., where the entrepreneur tries to take up the subsidy for a brief time during their standard commute. With a lag, the entrepreneur must actually stay in their new location long enough for the verification enumerator to arrive. Upon arrival, the enumerator uses Google Maps to measure the distance between the entrepreneur's new business location, where they are currently located, and the entrepreneur's pre-intervention GPS location, of which the enumerator has a record. Enumerators are instructed to allow for up to a 10% deviation in compliance with the three kilometer condition, allowing any distance of 2.7 kilometers or more to "pass" verification. The enumerator must also verify that the business is truly in operation at the new location.

For example, if the respondent sells tomatoes, then the enumerator verifies that the tomatoes are on display to be sold. After verifying that the respondent has complied with the moving requirement, the enumerator submits an electronic record of compliance, including the respondent's new GPS location and a screenshot of the Google Maps distance from the entrepreneur's pre-intervention location. I then initiate an 7,000 UGX mobile money transfer and double check compliance with the three kilometer condition remotely, using road travel distance between the entrepreneur's current and pre-intervention GPS locations, as computed by the Open Source Routing Machine (OSRM).

B.2 Estimating Treatment-on-Treated Effects

The second stage estimating equation that yields the local average treatment effect for compliers (which in this case is also the treatment-on-treated effect, as there is no possibility of always-taking) is as follows:

$$\begin{aligned} Y_{js} = \gamma_0 + \gamma_1 info_j + \gamma_2 \widehat{TookUpCCT}_j + \gamma_3 \widehat{TookUpCCTwithInfo}_j \\ + \gamma_4 \widehat{TookUpUCT}_j + \gamma_5 \widehat{TookUpUCTwithInfo}_j + \delta X_j + \phi_s + \epsilon_{js} \end{aligned} \tag{1}$$

where $TookUpCCT_j$=1 if an entrepreneur took up the CCT (when offered either alone or with information), $TookUpCCTwithInfo_j$=1 if the entrepreneur took up the CCT when it was offered with information, $TookUpUCT_j$=1 if an entrepreneur took up the UCT (when offered either alone or with information), and $TookUpUCTwithInfo_j$=1 if the entrepreneur took up the UCT when it was offered with information. Thus, the γ terms retain the same additive interpretation as the β terms in equation (6). For example, γ_2 is the effect of taking up the CCT alone, while $\gamma_1 + \gamma_2 + \gamma_3$ is the effect of receiving information and taking up the CCT. Four first stage regressions for each outcome X_{js},

$$X_{js} \in \{TookUpCCT_{js}, TookUpCCTwithInfo_{js}, TookUpUCT_{js}, TookUpUCTwithInfo_{js}\}$$

take the same form as the primary ITT specification given in equation (6):

$$X_{js} = \beta_0 + \beta_1 info_j + \beta_2 CCT_j + \beta_3 (info_j \times CCT_j) + \beta_4 UCT_j + \beta_5 (info_j \times UCT_j) + \delta X_j + \phi_s + \epsilon_{js} \tag{2}$$

These first stage regressions yield the predicted values $\widehat{TookUpCCT}_j$, $\widehat{TookUpCCTwithInfo}_j$, $\widehat{TookUpUCT}_j$, and $\widehat{TookUpUCTwithInfo}_j$ in equation (1).

Data Appendix Tables

Table B.1: Experimental Sample:
Composition along Stratification Variables

	Male	Female	Total
Vendors	1,058	742	1,800
	59%	41%	100%
Boda bodas	750	0	750
	100%	0%	100%
Other services	211	122	333
	63%	37%	100%
Total	2,019	864	2,883
	70%	30%	100%

Table B.2: Attrition by Treatment Arm

	(1) Attrit at midline=1
Info Only	.028
	(.024)
CCT Only	.013
	(.023)
CCT+Info	-.00091
	(.022)
UCT Only	-.026
	(.024)
UCT+Info	-.022
	(.025)
P-value in F test for joint orthogonality	0.23
Overall Attrition Rate	.16
Observations	2,883

Notes: Heteroskedasticity-robust standard errors in parentheses.
***1%, **5%, *10%.

Table B.3: Take-Up of the Intervention

	(1) Took up CCT=1	(2) Took up UCT=1
Info=1	-0.00	0.00
	(0.00)	(0.00)
CCT=1	0.54***	0.00
	(0.02)	(0.00)
Info=1 × CCT=1	0.02	-0.00
	(0.03)	(0.00)
UCT=1	-0.00	0.90***
	(0.00)	(0.02)
Info=1 × UCT=1	0.00	-0.03
	(0.01)	(0.02)
Info+CCT+Info*CCT	0.56***	-0.00
P-val: I+C+I*C=0	0.00	0.89
Info+UCT+Info*UCT	0.00	0.87***
P-val: I+U+I*U=0	0.87	0.00
Strata FE's	Yes	Yes
Control Mean (Level)	0.00	0.00
R squared	0.44	0.86
Observations	2,883	2,883

Notes: Heteroskedasticity-robust standard errors in parentheses. ***1%, **5%, *10%.

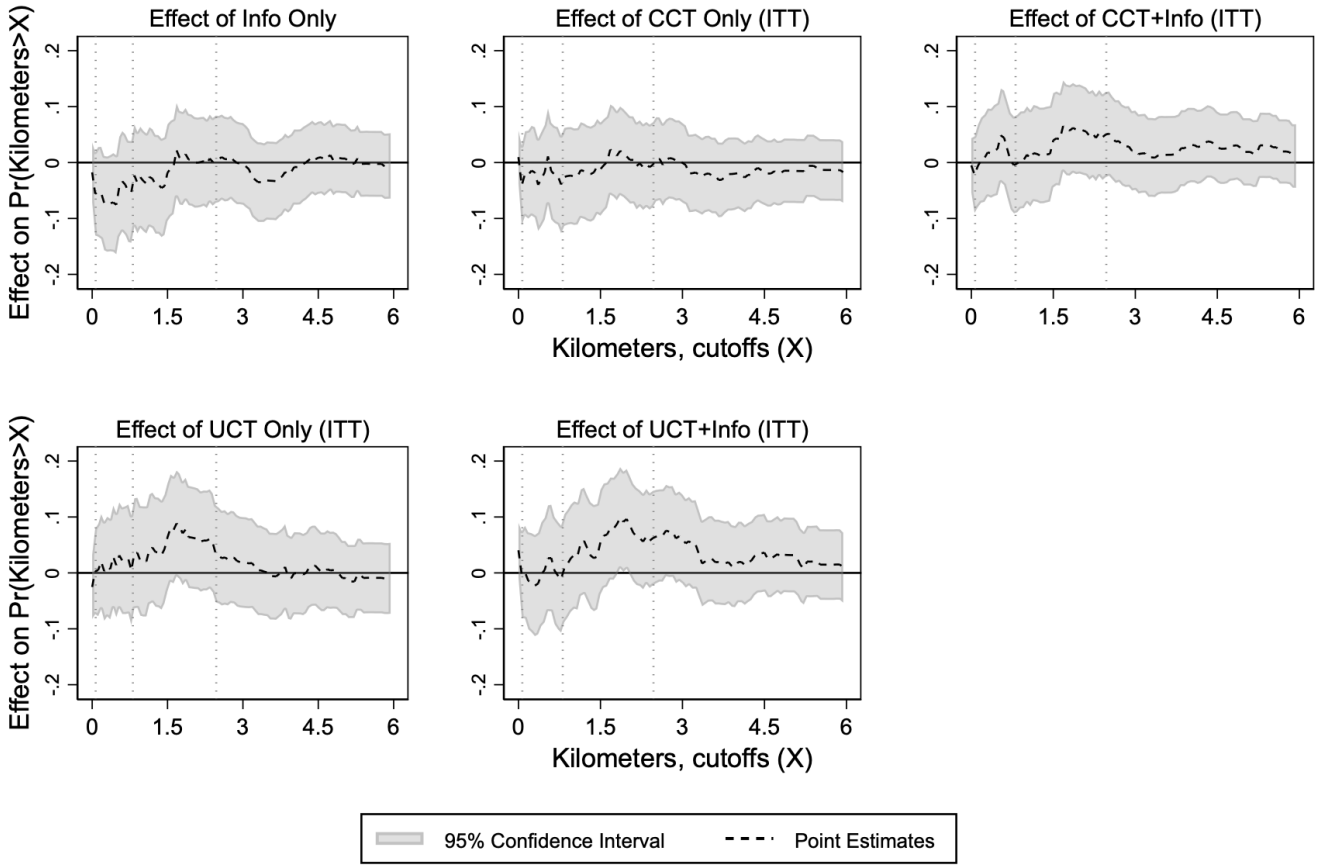
Table B.4: Baseline Characteristics of Compliers

	CCT+Info			CCT Only			
	Complier Mean	Never Taker Mean	P-Value: Complier = Never Taker	Complier Mean	Never Taker Mean	P-Value: Complier = Never Taker	P-Value: CCT+Info Complier = CCT Only Complier
Demographics							
Boda=1	.33	.18	0	.33	.18	0	.97
Female=1	.25	.36	0	.27	.33	.09	.49
Business owner age	32	31	.9	32	31	.1	.41
Completed primary school=1	.7	.64	.08	.69	.66	.44	.54
Completed secondary school=1	.15	.1	.03	.15	.11	.12	.81
Replacement respondent=1	.39	.45	.1	.41	.41	.85	.38
Business chracteristics							
Years running current business	5	4.2	.04	5	4.2	.03	.97
Years running any business	5.5	5	.24	5.8	4.7	0	.4
Min to bus. location from home	36	29	0	33	33	.97	.11
Number of competitors in eyesight	4.3	2.4	0	4.3	2.9	0	.83
Hrs worked last week	67	67	.84	67	65	.34	.85
Revenue, costs, and profit							
Daily revenue (UGX)	63,655	63,326	.95	61,481	66,288	.25	.56
Daily costs (UGX)	38,469	35,879	.49	36,937	38,959	.56	.6
Incurs transport costs=1	.47	.33	0	.48	.32	0	.69
Total daily transport spending	6,095	3,617	0	6,135	3,530	0	.93
Daily profit (UGX)	22,350	22,033	.82	22,546	22,897	.8	.87
Profit per hour	2,186	2,448	.22	2,306	2,402	.53	.37
Below median profit parish=1	.52	.44	.05	.49	.54	.16	.28
Assets and financial services							
Inventory value	96,254	104,736	.66	96,977	101,442	.76	.96
Total asset value	1,080,060	726,433	0	1,133,984	680,349	0	.54
Total savings	221,623	378,303	.12	312,205	146,022	0	.06
Mobile money balance	17,583	25,398	.42	21,632	14,286	.13	.46
Has formal savings=1	.44	.45	.83	.47	.38	.02	.35
Has any credit=1	.26	.16	0	.24	.2	.19	.42
Total credit	223,222	94,291	.01	208,240	133,286	.15	.74
Aspirations and knowledge							
Would like to expand business=1	.91	.94	.16	.92	.94	.16	.7
Patient=1	.26	.24	.55	.24	.26	.47	.52
Time-inconsistent=1	.12	.13	.84	.13	.12	.81	.69
Pct score on info quiz: Close parishes	.54	.45	0	.49	.53	.18	.01
Pct score on info quiz: Far parishes	.51	.48	.15	.48	.52	.1	.14
Pct score on info quiz: Total	.53	.47	0	.49	.52	.11	.02

Notes: There is no possibility of always-taking.

C Mechanisms Appendix

Figure C.1: Distribution Regressions: Effect of Treatment on Probability of Locating >X Kilometers from Pre-Intervention Business Location, Among Likely CCT+Info Compliers



Notes: Vertical dashed lines reflect the 25th, 50th, and 75th percentile of the outcome. Plots depict intent-to-treat effects for the "likely CCT+Info complier" subgroup. Standard errors are heteroskedasticity-robust and all estimating equations include controls selected via double-selection (DS) lasso, as well as non-penalized strata FEs.