The Efficiency Gains from Cash Transfers: Experimental Evidence from Kenya

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Abstract

Cash transfer advocates have argued that they can both function as temporary poverty relief and potentially an economic development strategy, but there is limited direct evidence supporting the latter view. This paper shows in four steps how large, unconditional cash transfers can allow households to alleviate the distortionary effects of frictions in rural markets, diversify into additional economic activities, and improve their economic welfare. First, panel analysis shows that poorer households make production decisions that are distorted by market frictions, while wealthier households can avoid these frictions and engage in more capital-intensive forms of production. Second, experimental analysis shows that cash transfers allow poorer households to increase their capital stock and use of labour, intermediate inputs, and technology, partly by diversifying their forms of production. Third, experimental analysis shows that cash transfers lead households to supply more labour, especially in their newly diversified and more capital-intensive economic activities, a pattern that is not consistent with the higher leisure that would occur with frictionless markets. Fourth, combined panel and experimental analysis shows that cash transfers also allow these poorer households to avoid the distortionary effects of market frictions. These results suggest that cash transfers can improve households' economic welfare both directly – through wealth effects – and indirectly – by enabling more efficient production decisions.

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1 Introduction

Understanding the structure of rural economies has been a central question in the field of development economics since its formation. Researchers have assessed the roles of frictions in a wide range of markets including those for land, labour, agricultural inputs, credit, and insurance. This long-standing investigation has important implications for the design of development policy. One approach to policy emphasizes targeted interventions to address specific market frictions. Another approach emphasizes the importance of cash, asset, or income transfers. Transfer advocates have proposed them as both a way to alleviate poverty in the presence of market frictions and perhaps as a way to help households become more productive despite market frictions (Bastagli et al., 2016). Direct evidence for the latter view is limited, despite very large increases in the prevalence of transfer programmes in low- and middle-income countries in recent years (World Bank, 2015).

In this paper, we provide evidence that unconditional cash transfers can allow households to alleviate the distortionary effects of frictions in rural markets, diversify into additional economic activities, and improve their economic welfare. We study a group of roughly 5,000 households living in varying degrees of poverty in 209 villages in rural Western Kenya. People in these households engage in multiple forms of economic production: they do casual work outside their household, grow crops, raise light livestock such as chickens and heavy livestock such as cattle, and run non-farm enterprises such as small retail or service stores. Within the sample, wealthier households are more likely to raise cattle and run non-farm enterprises, forms of production that use more capital and generate higher revenue.

We provide a four-step argument to support our main claim. First, we we use panel data and theory-motivated tests to show that poorer households in this setting face market frictions that distort their economic decisions, while slightly less poor households are able to avoid these frictions. Our test builds on the idea that households are both economic producers and consumers. The influential model proposed by Singh, Squires and Strauss (1986) shows that when markets are frictionless, households' production decisions should depend only on market conditions such as input and output prices, and be independent of their consumption preferences. We follow work testing one key implication of this model: that households' labour use should be independent of their size and demographic composition (Benjamin, 1992; LaFave and Thomas, 2016). For example, households with large land or livestock holdings should be able to hire labour from households with smaller holdings. We find that this prediction fails on average in our sample: larger households use more labour, conditional on a rich set of fixed effects and covariates. But this average conceals important

within-sample heterogeneity: the prediction holds for the wealthier households with cattle or enterprises, but fails for the poorer households. This shows that market frictions are present in this setting and that wealthier households are able to avoid the consequences of these markets.[1] This does not mean that poorer and wealthier households in this setting operate in fundamentally different markets. Rather, it means that wealthier households are able to adopt offsetting behaviours that allow them to avoid the distortionary effects of market frictions. It does not show which frictions occur, a question we explore in ongoing work on this project. And it does not show if these households are able to avoid frictions because they are already wealthier or become wealthier because some other attribute allowed them to avoid these frictions, a question we address in the next stage of the argument.

Second, we show that cash transfers allow households to enter into more capital-intensive forms of production. In half of the 209 villages we study, poorer households are offered large, once-off unconditional cash transfers by the non-governmental organisation GiveDirectly.[2] The transfers equal roughly 55% of mean annual household consumption and 145% of mean non-land assets, so they represent a large wealth shock to the recipients. The cash transfers cause substantial diversification of production into more capital-intensive activities: recipient households are more likely to own cattle and run non-farm enterprises. Transfers also increase households' capital stock and use of labour, intermediate inputs, and new production technologies/methods, with these increases occurring almost entirely in their new activities of heavy livestock and non-farm enterprises. This pattern of results suggests the possibility that cash transfers allow poorer households to avoid the effects of market frictions and enter into higher-capital, more valuable forms of production.

Third, we show that cash transfers cause households to supply more labour. This increase is driven by a large increase in labour in their new, high-capital cattle and non-farm enterprises and by a modest reduction in the type of labour that requires the least household capital: casual work for other households or businesses. We use

[1]It may seem intuitively obvious that there exist *some* frictions in rural markets, raising questions about the value of tests such as these. However, this is a test for whether market frictions distort households' production decisions, perhaps a less obvious and more policy-relevant question than whether frictions exist. The test takes into account the possibility that households facing market frictions may be able to adopt offsetting behaviours to avoid these frictions distorting their decisions. For example, households may engage in network-based insurance, saving, and borrowing to offset distortions caused by frictions in financial markets.

[2]Our data were collected as part of a four-armed randomised controlled trial described by Orkin et al. (2023). That paper evaluates a psychological intervention offered in one arm of the randomised controlled trial and benchmarks its effects relative to the cash transfer arm. We use only two arms of the trial: the control group and the cash transfer group. We ask an entirely different research question, use mostly different variables, and introduce the tests for market frictions. We thus view this as entirely distinct work from Orkin et al. (2023) that simply happens to use some of the same data.

additional data collected from wealthier transfer-ineligible households and on village-level wages to show that these shifts in household labour supply are not driven by changes in wages or labour demand by other households. This pattern of results is not consistent with a frictionless world, in which cash transfers should lead to lower labour supply as households use some of their new wealth to consume leisure. But it is consistent with households facing market frictions that are alleviated by cash transfers and with capital-labour complementarity in household production, which crowds in household labour supply to work their new capital.

Fourth, we present direct evidence that cash transfers allow households to alleviate the distortionary effects of market frictions. We replicate the tests from our first stage, now examining households in villages that receive cash transfers. For these households, labour use is independent of household size and demographic composition, so we fail to reject the separation property predicted by complete markets.

This four-stage argument shows that there are frictions in these rural markets, and that they distort the production decisions of poorer households, but that some slightly less poor households are able to avoid these distortions. Cash transfers allow households to alleviate the consequences of market frictions and diversify into additional, higher-capital forms of production. This raises the possibility that cash transfers can improve households' economic welfare both directly – through wealth effects – and indirectly – by enabling more efficient production decisions. We find that cash transfers do indeed increase consumption, a common proxy for economic welfare, but we cannot quantify how much of this reflects direct versus indirect channels without strong structural assumptions.

Our results do not identify which specific market frictions are distorting market frictions: capital, labour, land, etc. We explore this further in ongoing work and in the meantime propose one example of a model that can explain our results. In this model, households produce using capital and labour, which are technical complements in production, and can also supply labour to the market as casual wage work. Capital market frictions constrain some households' capital stock, either through high interest rates or capital rationing. This is motivated by extensive work on capital market frictions in rural markets (e.g. Jayachandran 2006). At the same time, households cannot perfectly substitute own and hired labour in production, potentially due to hard-to-observe effort (e.g. Rosenzweig and Wolpin 1993). Low-capital households therefore under-supply labour relative to a frictionless market. Cash transfers allow households to acquire capital despite the market frictions, raising the marginal revenue product of labour due to complementarity, and increasing household labour supply due to imperfect substitutability.

This paper provides one of the first bridges between the literature studying the economic impacts of cash transfers and the literature modeling and empirically evaluating frictions in rural markets. In particular, to the best of our knowledge, this is the first paper to study how a cash transfer programme can change the results of classic separation tests used to detect the presence of market failures. Bridges such as this are crucial for understanding both when cash transfers can have different types of economic effects and the relative effectiveness of different development policies in the presence of market frictions.

There is an extensive literature documenting the impacts of cash, asset, or income transfers on consumption, assets, productive activities, and labour supply over a wide of settings (Crosta et al., 2024). Our work extends a recent strand of this literature that uses cash transfer programmes to shed light on economic structures. For example, Balboni et al. (2022) show conditions under which bundled asset transfers can lift households out of poverty traps, a finding that is also consistent with our results, although we do not observe outcomes over as long a time horizon. Egger et al. (2022) and Walker et al. (2024) show that cash transfers can generate positive spillovers by boosting demand without raising prices in settings where capital and/or labour is underutilised. Cunha, De Giorgi and Jayachandran (2019) and Filmer et al. (2023) show that cash transfers can raise prices and potentially generate negative spillovers of goods with inelastic local supply. We contribute to this literature by showing how the presence of market frictions shapes how cash transfers are invested in different productive activities. We also provide a concrete mechanism for the common finding that cash transfers in low-income settings do not lower labour supply (Baird, McKenzie and Ozler, 2018; Banerjee et al., 2017).

Another extensive literature models and empirically evaluates frictions in rural markets in developing economies. One strand studies specific frictions, often using either experimental relaxation of a potentially binding constraint or more model-driven approach (Bustos, Caprettini and Ponticelli, 2020; Giné, Goldberg and Yang, 2012; Jayachandran, 2006; Jones et al., 2019; Kaur, 2019). Another strand uses separation-style tests like the ones we employ to test for the presence of market frictions under weak assumptions, but without identifying which specific frictions are present (Benjamin, 1992; Dillon, Brummund and Mwabu, 2019; Kebede, 2022; LaFave and Thomas, 2016; LaFave, Peet and Thomas, 2025). We contribute to the latter strand by showing one approach to combining those tests with experimental or policy variation.

Our findings are also relevant to work on structural transformation of developing economies. We show how positive capital infusions can shift the mix of productive activities toward higher-capital and more market-oriented activities. While households do not exit lower-capital crop agriculture and light livestock, they diver-

sify their production activities to include higher-capital heavy livestock and non-farm enterprises, as well as increasing the share of their crop and livestock production they sell to the market rather than consuming at home. This contributes to an extensive literature studying frictions that inhibit structural transformation and how these might be addressed by development policy, reviewed by Gollin and Kaboski (2024) amongst others.

The paper is organised into four sections. We describe the economic context and sample in Section 2. In Section 3 we describe the theory, methods, and results of the tests for separation of production decisions. In Section 4 we examine effects of the cash transfers, including the separation test results within the cash transfer group. We discuss the implications of these findings and describe a model that can explain them in Section 5.

2 Economic Environment

2.1 Context

We study rural households in two counties in Western Kenya near Lake Victoria: Home Bay and Siaya. The area is fairly densely populated, with 395 people per km^2, compared to 91 for the whole of Kenya. Individual villages contain 96 households on average, are relatively spread out, and are typically not far from neighbouring villages. Villages have reasonable market access: most are less than 3 hours' drive of Kisumu, a city of roughly 600,00 people, and closer to smaller towns. Roughly one in two villages contains a primary school, one in three contains a market, and one in six contains a healthcare clinic.

2.2 Data Collection

The data we use were collected for another study of households living in poverty in this region (Orkin et al., 2023). To construct the data, that study conducted a census of over 20,000 households in 209 villages and collected data for a simple proxy means test. The proxy means test is based on straightforward measures of household composition (e.g. whether the household is widow-headed), housing (e.g. whether the house is built of organic materials, which are cheaper but less durable), and asset ownership. The proxy means test was largely developed by GiveDirectly, the organisation providing the cash transfers. Using this test, 43% of censused households were classified as living in poverty. Out of the households classified as poor on the means test, 89% have per capita consumption below the World Bank's 2018 poverty line for Kenya in the more detailed survey collected later.

Our dataset contains 4,097 households sampled from the eligible group and 1,525 households sampled from the wealthier ineligible group.[3] After the census, we observe two waves of surveys. We call these the baseline and endline surveys. Surveys are completed by an adult female household member, typically the household head in a female-headed households or the female spouse in a couple-headed household. They are on average 22 months apart. 87% of baselined households are successfully surveyed at endline. Attrition is uncorrelated marginally lower for larger households but otherwise unrelated to baseline household characteristics (Table A1).

The surveys cover household-level demographics variables such lists of all members' age, sex, education, and relationships with each other; investment in different types of economic activities described in the next section; revenue from these activities; asset holdings; and consumption. We measure both the quantity and value of all goods produced and consumed, allowing us to recover unit-level prices at which the households sold or bought these goods. We also conduct surveys in local markets to recover market prices for the same goods.

2.3 Sample Description

We focus this description on the endline characteristics of eligible households who complete both the baseline and endline and surveys, and who were not assigned to receive cash transfers. We discuss differences between the eligible and ineligible households later in the paper. All statistics are shown in Table 1.

At endline, the average household has 2.8 members. Half of them are children. The average survey respondent is 41 years old with an interdecile range of 23-65. which includes biological and non-biological children of younger respondents and grandchildren of older respondents. Only 43% of survey respondents have completed primary education.

Households have five ways to generate income in this setting. 40% do casual or salaried work outside the household; 98% of households grow crops, most commonly maize; 87% raise light livestock, mostly chickens and sometimes sheep and goats; 42% raise heavy livestock, i.e., cattle; and 44% operate a non-farm enterprise, most often retail (45%), forestry, fishing, light manufacturing, or services (12-15% each).

In these activities, the average household supplies 602 days of labour a year, spends 857 USD PPP on intermediate inputs for production, and generates 2,101 USD

[3]The dataset excludes polygamous households (roughly 11% of all households) and households without an adult female member (roughly 4.5% of all households). These restrictions were imposed by GiveDirectly and the original research team collecting the data.

PPP in revenue per year. This allows them to consume 4,177 USD PPP each year and hold non-land assets worth 1,529 USD PPP.[4]

Two activities – heavy livestock and enterprises – are associated with much 'better' economic positions. The average household with an enterprise or heavy livestock has revenue, consumption, and non-land assets of respectively 2,672, 4,517 and 1,926 USD PPP, which are respectively 185%, 30%, and 168% higher than for households without an enterprise or heavy livestock. These activities are also substantially more capital-intensive forms of production. Conditional on engaging in each activity, the average household non-land capital stock in each activity is 0 USD PPP for casual/salaried work, 106 for crops, 113 for light livestock, 373 for non-farm enterprises, and 1,059 for heavy livestock.[5] These differences are visible throughout the distributions of capital, consumption, and revenue, not just at the means (Table 1, panels C–E).

This shows a clear link between engaging in capital-intensive activities and higher revenue and consumption. This pattern is *consistent with* market frictions that prevent low-capital households from borrowing to invest in more capital-intensive forms of production that generate more revenue and allow more consumption. But these data do not yet allow us to evaluate that hypothesis against an alternative in which households have heterogeneous preferences or productivities and hence optimally choose to engage in different activities. We return to this distinction throughout the paper.

We focus mainly on non-land capital in this section and throughout the paper for several reasons. First, only one activity – growing crops – requires dedicated land. Livestock are generally kept around the household's dwelling or grazed on communal land, non-farm enterprises are either run in communal spaces (e.g. fishing, forestry) or from the home (e.g. retail, services), and casual/salaried labour naturally does not require land. Second, land is traded infrequently and more often acquired through inheritance or marriage. Fewer than 1% of the sample purchase land between the baseline and endline and much of this is land for housing rather than for crops. Third, the thinness of land markets and heterogeneity in quality of land makes it difficult to reliable measure the value of land. We therefore view non-land capital as the primary type that is used in most forms of production, can be acquired or lost over the timeframe of several years, and can be reliably measured.

[4]All monetary values in the paper are reported in 2018 USD adjusted for purchasing power parity. These data show higher annual consumption than revenue for most households. This is a common pattern in agricultural household surveys (e.g. Bandiera et al. 2017; Egger et al. 2022). The value of goods produced for home consumption is included in both the consumption and revenue measures.

[5]There is considerable variation in capital stock between enterprise types (Table 6). All except forestry (81 USD PPP) are higher than crops or light livestock and they range up to 1,166 for fishing. More capital-intensive enterprise types are associated with higher household-level revenue and consumption.

Ineligible households are unsurprisingly wealthier than eligible households. They have higher revenue, non-land assets, and consumption. They are also more likely to raise heavy livestock and own non-farm enterprises. However, there is substantial overlap in outcomes between these two groups, reflecting the fact that no simple proxy means test like the one used in this setting is perfectly correlated with all economic outcomes.

2.4 Experimental Design and Implementation

In 105 of the 209 study villages, eligible villages were offered large, unconditional, once-off cash transfers by the non-governmental organisation GiveDirectly. Each household was offered 2,237 USD PPP equal to 54% of mean annual household consumption or 146% of the value of mean non-land assets. The transfers were delivered as mobile money (commonly used in rural Kenya) in three tranches at roughly monthly interviews.[6]

Treatment assignments are uncorrelated with village- and household-level characteristics (Table A2). Attrition is unrelated to treatment assignments and to treatment assignments $\times$ baseline household characteristics (Table A2). 79% of the endlined households received the transfers they were offered.

3 Motivating Evidence for Market Failures

In this section we describe several tests for the presence of production decisions that are distorted by market failures in this context and sample. We first informally describe the theory behind these tests, then explain how we implement the tests, and finally discuss their results. We use this to further motivate the possibility of market frictions and then proceed in Section 4 to examine whether cash transfers can help households to avoid the distortionary effects of these market failures.

3.1 Conceptual Framework: Market Frictions and Separation Tests

We extend a along tradition in development economics building on the agricultural household model of Singh, Squires and Strauss (1986). This model treats households as both producers and consumers. As producers, they choose which income-generating activities to undertake and how to invest in both labour and intermediate goods in or-

[6]The total transfer amount is comparable to current government pilot programmes targeted at the ultra-poor in other regions: the government's Hunger Safety Net Programme pays out the equivalent of the GiveDirectly transfer in 21 months (Kenya National Social Protection Secretariat, 2022).

der to maximise profits. As consumers, they choose consumption of leisure and goods subject to their static or intertemporal budget constraint in order to maximise utility. The model's key assumption is that if all but one market is *complete* or *frictionless*, and the key prediction is that production and consumption decisions are *separable*. The exact definition of *complete/frictionless* markets depends on the specific formulation of the model but this informally captures conditions such as no missing markets for goods, labour, land, credit, savings, insurance; no pricing power in any of these markets; and no information asymmetries or other features that drive wedges between prices and marginal values in any of these markets. Decisions are *separable* if production decisions do not depend directly household preferences and consumption decisions depend on production only through income of profit.

Consider a simple but concrete example: an agricultural household has endowments of land and labour; and engage in farming on their own land and/or wage work for other farmers; has productivity in both farming and wage work; and has preferences over consumption and leisure. When markets for land and labour are complete, households with low land endowments and either high labour endowments or low preferences for leisure can either rent additional land or provide casual labour on other households' farms, while households with high land endowments and either low labour endowments or high preferences for leisure can either rent out their land or hire others to work their land. If the land market has frictions, then trades of labour endowments are still possible. If the labour market has frictions, then trades of land endowments are still possible. In either case, the remaining market may still allow the economy to allocate endowments to production that maximises utility via maximising profits. If both the land and labour markets have frictions, then production decisions will be distorted. In the extreme case where frictions are so severe that the market unravels, then all households may have to produce inefficiently using only their own endowments.

Crucially, the model shows that *if* markets and complete/frictionless, *then* consumption and production decisions are separable. It does not prove the converse statement. Consumption and production decisions may be separable even when markets face frictions because households find non-market mechanisms to avoids these frictions. For example, extensive work shows that households provide some mutual insurance within family or social networks when formal insurance markets are weak (e.g. Townsend 1994). This means that separation tests are effective ways to identify if households are behaving as though there are market frictions but ineffective ways to rule out the presence of market frictions.

This framework delivers multiple testable implications. In this paper we focus on a production-side prediction that has been the centrepiece of several influential papers

(e.g. Benjamin 1992; LaFave and Thomas 2016): households' labour demand in their production should be independent of their labour endowments. In ongoing work, we conduct additional tests of the framework's predictions, by comparing market prices to prices facing individual farmers to test for price wedges, following LaFave, Peet and Thomas (2025).

3.2 Empirical Framework for Separation Tests

Our empirical approach to testing if household labour demand is separable from production closely follows existing work (Benjamin, 1992; LaFave and Thomas, 2016). For each household i in each village v in survey wave t, we construct total labour demand L_{ivt}^{D} across all of its activities: crops, light and heavy livestock, and non-farm enterprises. We also construct multiple measures of the size and composition of the household's labour endowment, N_{ivt}. We regress the natural log of labour demand on labour endowment

$$\ln(L_{ivt}^{D}) = N_{ivt}\,\theta + X_{ivt}\,\Gamma + \tau_i + \tau_{vt} + \epsilon_{ivt}, \tag{1}$$

where τ_i are household fixed effects and τ_{vt} are village-by-wave fixed effects. X_{ivt} includes month-of-interview fixed effects, education of the household head and spouse interacted with wave, and quintiles of non-land assets, cultivated land and capital assets for agriculture, light livestock, cattle and enterprises. The fixed effects and covariates are included to control for household or market-level factors that might be correlated with both labour endowments and labour demand. In practice, our results are quite sensitive to the household fixed effects in ways that we explain later but largely unaffected by all other fixed effects and covariates.

We follow the existing literature in defining three variants of the vector for household demographic composition, N_{ivt}. First, we include the log of household size as the only household demographic variable. Second, we include the log of household size and shares of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender, with males aged 0-14 as the omitted group. Third, we include the number of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender, the specification preferred in LaFave and Thomas (2016) for its ease of interpretation for each coefficient, which is a semi-elasticity of demand.

Households behave as if markets are complete if $\theta = 0$. We evaluate this using an F-statistic to jointly test for the significance of the vector household demographic composition variables. Standard errors are clustered at the household level and allow for arbitrary heteroskedasticity.

3.3 Separation Results in Control Villages

We present results from our regressions of labour demand on household demographic composition variables for control villages in Table 2. We document three stylised facts, that motivate our paper.

First, relatively poor households that are eligible for the cash transfers behave as if markets are not complete (column 1). In Panel A, the coefficient on the log of household size is 0.382 and is highly significant. The magnitudes of the effects are large, and comparable to those in LaFave and Thomas (2016). Separation is also rejected in Panels B and C, where we include a larger set of household demographics with nearly identical F-statistics of 2.549 and 2.322, with corresponding p-values less than 0.01. Combined, this provides evidence that the relatively poor households face market frictions and that there are indeed separation failures in our setting.

Second, there is a subsample of the relatively poor households with "upgraded" economic activities, for which we fail to reject the separation hypothesis. We define an "upgraded" households as one which was engaged in either cattle rearing (heavy livestock) or operates a non-farm enterprise at baseline. Approximately 43% of households were not upgraded at baseline, meaning that their only household economic activities were crop agriculture and light livestock, which require less non-land capital assets. For these non-upgraded households, separation is rejected across all specifications, with p-values all below 0.01 (column 2). In contrast, for the upgraded households, we fail to reject separation at the 5% significance level for all specifications (column 3). In Panel A, the coefficient on log household size is also substantially larger for non-upgraded households at 0.601, relative to a much smaller point estimate of 0.157 for upgraded households. These results are not driven by a loss in statistical power from splitting the sample, especially since there are actually relatively fewer non-upgraded households.

Third, relatively wealthier households that are ineligible for cash transfers behave as if markets are complete. We fail to reject the separation hypothesis across all specifications at conventional significance levels. The coefficient on log household size in Panel A is precisely estimated close to zero. Our inference does not reflect a concern about statistical power, as we have data available only for a subset of ineligible households in each village. This is because the sample size of 554 ineligible households is relatively comparable to the 635 non-upgraded eligible households. Moreover, for Panels B and C, the F-statistics are relatively comparable between ineligible households and upgraded eligible households.

All of these findings are robust to omitting almost all fixed effects and conditioning variables. The only exception is the vector of household fixed effects: omitting

these means that we are more likely to reject separation in most samples and subsamples. This likely reflects the many unobserved household-level characteristics such as preferences and productivities that may be correlated with labour demand and with household size and composition. This means that our results in practice are identified by intertemporal changes in household size and composition. There is substantial intertemporal variation: 37% of households add at least one member from baseline to endline and 22% of households lose at least one member. The most common reasons for moves are education and marriage, followed by death and work.

These results imply that poorer, but not wealthier households show separation failures. We also find that separation is rejected for non-upgraded poor households, but not for those with upgraded economic activities. This evidence suggests that there are market frictions present, but that either wealthier or upgraded households are able to avoid frictions and hence achieve separation, or that there are some other attributes that allow these households to avoid frictions, and hence accumulate higher wealth and upgrade their activities. The former explanation implies that wealth is a prerequisite for separation, while the latter explanation indicates that certain factors allow households to achieve separation, and thus generate more wealth and upgrade. To the extent that separation is an indicator of households' scope to allocate resources more efficiently and hence generate more wealth from their economic activities, the former interpretation is suggestively consistent with poverty traps, and provides a stronger motivation for cash transfers than the latter interpretation. Our motivating evidence is unable to easily separate these different interpretations.

4 Empirical Results

In order to distinguish between the different interpretations of our separation results in control villages, we evaluate whether cash transfers, as wealth shocks, can allow households to either upgrade their activities, avoid market frictions, or both. Using our randomised controlled trial, the empirical result section proceeds as follows.

We begin by presenting evidence on patterns of treatment effects across household production, labour supply, and consumption decisions, which we interpret through the lens of our motivating evidence. This distinction between household production and consumption decisions follows directly from our separation framework, where these should be separate if households are able to behave as if markets are complete. This is also particularly relevant for our setting as virtually all households are producers, in addition to being consumers.

Labour supply, in a frictionless setting, should therefore be viewed as part of the consumer's decision, as they choose the optimal quantity of leisure according to a standard tradeoff between consumption and leisure. However, due to separation failures as documented in Section 3.3, these decisions may be distorted. Therefore, we analyse labour supply results apart from production and consumption. Overall, these treatment effects shed light on how household decisions change in response to a wealth shock.

Lastly, we run equivalent regressions of labour demand on household demographic composition for households in cash villages, and find that the transfer helps households to achieve separation. This analysis allows us to evaluate the extent to which cash transfers are able to alleviate market frictions faced by households. Combined, these results provide insights into the role of cash transfers and market frictions.

4.1 Estimation

We estimate the following intention-to-treat treatment effects of cash on outcome y_{iv}:

$$y_{iv} = \beta Cash_v + X_{iv}\Gamma + \varepsilon_{iv}, \tag{2}$$

where i is household and v is village. X_{iv} includes the baseline values of y_{iv}, strata fixed effects, month-of-interview fixed effects, respondent education and age, a proxy respondent indicator and baseline measures of household size, asset value, a self-beliefs index. If a baseline covariate is missing, we replace the missing values with the sample mean and include a missing data indicator. β is our coefficient of interest. Standard errors are clustered at the village level and allow for arbitrary heteroskedasticity.

To estimate heterogeneous treatment effects for a binary dimension Het_{iv}, we estimate:

$$y_{iv} = \beta_0 Cash_v + \lambda Het_{iv} + \beta_1 (Cash_v \times Het_{iv}) + X_{iv}\Gamma + \varepsilon_{iv}, \tag{3}$$

where the coefficient β_1 measures the differential treatment effect. The treatment effect for households with $Het_{iv} = 0$ is β_0, while the treatment effect for households with $Het_{iv} = 1$ is $\beta_0 + \beta_1$. The vector of covariates X_{iv} is unchanged between regressions.

4.2 Impacts on Production Decisions

The household as a *producer* operates the household firm, which chooses from a set of non-mutually exclusive economic activities for production. These fall broadly into three main activities: crop agriculture, livestock and non-farm enterprises, although the choice for which crops to grow, livestock to rear, and types of enterprise to operate

are also important. The household then demands capital, labour (both within and outside of the household), land and other inputs used for production.

4.2.1 Economic Activities

We first begin by documenting how cash transfers impact the set of household economic activities. In Panel A of Table 3, there is a clear pattern: households expand into livestock and non-farm enterprises by 3.9pp and 6.0pp respectively, with no effect on crop agriculture. Table 4 shows that the cash transfer enables households to engage in multiple household economic activities, with not a single negative coefficient for any combination of activities. Households are 5.6pp more likely to be involved in all of our main activities (crop agriculture, livestock and non-farm enterprises).

While households expand their livestock across both light livestock animals (poultry, goats and sheep) and heavy livestock animals (cattle), the largest extensive margin effects are for cattle (Table 5, Panel A). Households are 11pp more likely to rear cattle, relative to much smaller effects for light livestock. As the livestock results are driven by expansion into cattle rearing, we find that households are 8.5pp more likely to have household activities with at least cattle or enterprises (Table 4, Panel B, column 5).

The most common type of enterprise operated by households are retail businesses, with 20.3% of control households operating such a business. It is thus not surprising that the majority of the expansion into non-farm enterprises is into the retail sector, with a 5.4pp effect (Table 6, column 6). The other enterprise type for which we find extensive margin effects is fishing, although this is relatively smaller at 2.1pp.

Households are *diversifying* their production into livestock and enterprises, rather than switching out of crop agriculture. These set of results are neither consistent with households using the cash to continue the status quo, nor using cash to switch out of crop agriculture.

4.2.2 Capital and Labour

Given that households expand their economic activities, we find that total capital and labour demanded by households rise substantially by 29% and 9% respectively (Table 3, Panels B and C, column 4). The pattern of treatment effects is consistent with the results on the household's set of economic activities, with large increases in capital and labour demand for livestock and enterprise activities, with no effects for crop agriculture. Proportionately, the effects are larger for enterprise activities relative to livestock activities, a consistent pattern throughout our set of treatment effects.

These effects on capital demand for livestock are driven by heavy livestock (Table 5, Panel B, column 4). Even though there are small effects on light-livestock assets,

they are quantitatively much less. The treatment effect on cattle assets is 125 USD PPP, which is at least four times larger than for all other light livestock types combined. This is unsurprising as cattle is substantially more capital-intensive than other forms of livestock. For enterprises, we see that there are significant increases in retail assets, but also for enterprises in the services sector which include drivers, restaurants and barbers (Table 6, Panel B, columns 6-7). The most capital-intensive sector is fishing, with average capital assets exceeding 1,000 USD PPP for control households that fish (Table 6, column 2). Although we do not see statistically significant effects on fishing capital assets, the fact that there are significant extensive margin expansions into this sector is consistent with households diversifying towards relatively more capital-intensive activities.

Beyond the average treatment effect on capital assets, there are also distributional effects of the cash transfer. At baseline, the distribution of productive capital is bimodal for eligible households in both control and cash villages (Figure 1, Panel A). These modes map closely to the set of household economic activities, with households engaged in cattle or enterprises at the higher mode, and those involved in neither at the lower mode. The gap between the low and high mode is approximately 1,000 USD PPP, which is 45% of the cash transfer. Treatment induces a shift from the low mode to the high mode at endline, resulting in a unimodal distribution (Figure 1, Panel B). Moreover, the capital distribution of eligible households in cash villages converges to the distributions of ineligible households in both control and cash villages (Appendix Figure A1).

While hired labour accounts for approximately 5% of total labour demand, we do see that total hired demand increases by 8.8 labour days (Table 3, Panel D, column 4), accounting for approximately 17% of the additional 52 labour days demanded by households (Table 3, Panel C, column 4). While the coefficients are positive across all household activities, they are only marginally significant for crops and livestock. The majority of the increase in labour comes from household members, which we discuss in more detail in Section 4.3.

We highlight three main results on capital and labour demand. First, the pattern of higher capital and labour demand for livestock and enterprise activities is consistent with our diversification and expansion results. Second, these results are consistent with *capital-labour complementarity* in household production, as capital and labour demand both move in the same direction. Capital investments are not displacing labour in our setting. If capital and labour were substitutes, then we would observe opposite effects for capital and labour demand, which we do not. Lastly, the household is becoming relatively more capital-intensive. This is reflected in not only the profile of activities into which the household is expanding, but also by the fact that the pro-

portionate increase in capital demand is substantially higher than the proportionate increase in labour demand.

4.2.3 Technology and Intermediate Inputs

Households can also expand their productive activities by investing in technology and increasing their intermediate input expenditures. We find that there are large and statistically significant increases in both of these measures (Table 3, Panels E and F, column 4). The pattern of treatment effects is again relatively consistent with the results on the household's set of economic activities, with increases concentrated in livestock and enterprise activities, and smaller effects for crop agriculture.

Our measures of technology adoption are sums of binary variables related to activity-specific modernisation effects such as irrigation, fertiliser and improved seeds for agriculture and vaccinations for livestock. For enterprises, we focus on efforts directed towards introducing new products or services and expanding into new markets to access new customers. The pattern of treatment effects for technology adoption is consistent with the results on the household's set of economic activities, with increases for livestock and enterprise activities and no effect for crop agriculture (Table 3, Panel E).

Intermediate input expenditures vary by economic activity. For agriculture, intermediate inputs can include fertiliser, seeds, insecticide, bags and storage, farm implements, irrigation equipment and other farm machinery. For livestock, these can include animal feed, veterinary services, medicines and vaccines. For enterprises, expenses also include spending on stocks and inventory. The results for intermediate input expenditures exhibits a slightly different pattern from our previous results. Across all three activities, there are statistically significant increases, including for crop agriculture (Table 3, Panel F). However, the quantitive magnitudes are negligible for crop agriculture and livestock, with the effect size for enterprise accounting for 97% of the aggregate effect.

By investing in technology and intermediate inputs, households are further diversifying into livestock and enterprise activities, beyond increasing capital and labour, but also other inputs to production. All of these results provide additional evidence for the diversification pattern of household economic expansion.

4.2.4 Land

In our setting, households are relatively land abundant, with 87.6% of the relatively poor cash transfer eligible households in control villages owning their own land. Our setting therefore differs sharply from population-dense villages in South Asia, where

land ownership is less common and a key marker of wealth. Land transactions are rare, like in most other agricultural settings, with only 0.4% of control households purchasing land. However, we do find statistically significant modest increases in land ownership and acreage in response to the cash transfers (Appendix Table A3, columns 1 and 4). There is no clear pattern distinguishing between compound and non-compound plots, with increases for both.

However, to what extent are these increases in land assets being used for household production? Relative to capital and labour demand, alongside the other investments, we identify three reasons which suggest that these *additional* land assets are not significant contributors to the expansion of household economic production. First, we find no extensive margin effect on households with cultivated land, with a small impact of less than 10% on acres of land cultivated, which would most likely be used for crop agriculture (Appendix Table A3, columns 5-6). Second, livestock generally doesn't have dedicated land as they overnight in the compound (including cattle) and predominantly graze in communal land. Third, non-farm enterprises generally do not have separate premises either, with retail businesses run in a rented space near the village centre and other types of enterprises such as basket production being operated out of the compound. Given the abundance of land ownership in this setting, we thus focus on capital and labour demand as the key factors of production which drive the household's economic expansion.

4.2.5 Revenues

The pattern of treatment effects on the inputs to production translates into large effects on household output, with treated households earning 33% higher revenues from their household economic activities (Table 3, Panel G, column 4). This result is almost entirely driven by higher revenues from enterprise activities, which rise by 50%. While there are positive point estimates for crop agriculture and livestock, these are not statistically significant, and reflect gains of less than 10%. This is mostly to be expected for crop agriculture, given that we observe very limited increases in factors of production for this activity. The relatively small effects for livestock is more surprising, and likely reflects difficulty in valuing livestock production, especially cows when they are still appreciating and maturing.

However, we do find positive effects of market-oriented livestock sales. In Appendix Table A4, we divide our crop agriculture and livestock revenues into home and market sales. In this case, we see significantly significant increases for market-oriented livestock revenues of 37%, with virtually no corresponding effect on livestock production directed towards home consumption. We see small differential effects for crop agriculture, but these are not statistically significant. We are unable to make this

type of distinction for non-farm enterprise revenues, although we expect the vast majority of this to be market-oriented. This additional set of results further highlights that households are deviating from the status quo by moving towards greater market-oriented production and less subsistence farming.

Overall, we document a very clear pattern of treatment effects, with households substantially expanding their economic activities into heavy livestock and enterprises. The increases in capital and labour demand, alongside other investments towards technology and intermediate input expenditures into these activities, results in significantly higher production and revenues. Households are diversifying their activities, with no evidence that they are switching out of crop agriculture.

4.3 Impacts on Labour Supply Decisions

In settings with market frictions, household labour supply has both production and consumption aspects. From a consumer perspective, households choose optimal leisure and hence supplies labour to supplement additional income sources. However, a lack of separation may distort this decision. For example, in the complete absence of labour markets, household labour supply would have to equal labour demand for the household's activities, and separation would fail. We proceed by showing four main results on labour supply.

First, we find that households supply additional labour towards household livestock and enterprise activities, with no increase in crop agriculture along both extensive and intensive margins (Table 7, Panels A and B, columns 1-3). These results are consistent with our set of production treatment effects, with households supplying 43 additional labour days over the year to household activities, corresponding to an 8.3% increase (Table 7, Panel B, column 4). This accounts for the majority of the increase in household labour demand.

Second, households reduce the amount of labour supplied to casual and salaried work outside the household. Households are 6.4pp less likely to have a household member involved in any work outside of the household, and on average, supply 13.5 fewer labour days to non-household activities (Table 7, Panels A and B, column 5). There is a reallocation of labour towards household activities and away from outside employment as households switch the destination of their supplied labour.

Third, households increase their total labour supply by 29.6 labour days, an increase of 4.9% (Table 7, Panel B, column 6). Surprisingly, households are not using the cash transfer to buy more leisure and in fact, we find a positive labour supply effect that is statistically significant at the 5% level. Our evidence suggests that indeed this is more than just a non-negative result, that is often found in other cash transfer studies.

Fourth, there is considerable heterogeneity in the total labour supply result. Households that were not upgraded at baseline, those without activities including cattle or enterprises, increase their labour supply by 43.9 labour days, as compared to a more modest increase of only 17.2 labour days for upgraded households (Table 7, Panel C, column 6). The effect for non-upgraded households is highly significant, while it is not statistically significant for upgraded households. Although we are unable to reject the null hypothesis that the difference between these two effects is significant, the magnitudes of these effects provide suggestive evidence.

We rule out two potential explanations for this labour supply effect. If market wages at the village rise in response to the cash transfers, then this could explain the increase in total labour supply. In Appendix Table A5, we find no strong evidence of shifts in wages for different activities, consistent with other research documenting minimal inflationary effects in these settings (Egger et al., 2022). However, there may be other changes at the village level, external to the eligible households, that affect labour outcomes. We explore this by examining the labour demand and labour supply indirect treatment effects for ineligible households in cash and control villages. Any village-level shifts in cash villages that may impact labour decisions for eligible households could also potentially affect labour supply decisions of ineligible households. In Appendix Table A6, we find no strong evidence of any effects on labour demand nor labour supply for ineligible households, across a range of activities. This rules out village-level changes that would be common to both eligible and ineligible households. These two supplementary results suggest that the positive labour supply result is being driven by changes in the household-level return to labour, rather than external factors.

A positive labour supply result in response to a wealth shock is inconsistent with standard theoretical models, and provides strong evidence that there are market frictions. This is because as leisure and consumption are normal goods, it must be the case that the shadow wage earned by households has increased in order to generate this observed labour response. In frictionless markets, the returns to labour should depend on the wage, determined in the market equilibrium, and be independent of your wealth or capital stock. The fact that the labour supply results are primarily driven by non-upgraded households, who exhibit separation failures, further strengthens this point.

4.4 Impacts on Consumption Decisions

The household as a *consumer* chooses the amount of leisure to consume, a basket of goods for consumption, and how much to save. Given the pattern of treatment effects

on the expansion of household production, and the increase in total labour supply, we find corresponding increases in both consumption and savings that are relatively large. These patterns are consistent with the treatment effects on household production being welfare-enhancing.

4.4.1 Leisure

Households do not consume more leisure, as they supply more labour as outlined in Section 4.3. While this would lower household welfare, it can be offset with concurrent increases in the consumption of goods and services.

4.4.2 Goods and Services

Households are able to achieve 7.3% higher consumption 1.5 years after the cash transfers (Table 8, column 2). These gains are spread out across a wide-range of categories, including food, durable, non-durable and social expenditures, with smaller effects for education spending (Table 8, columns 3-7).

4.4.3 Savings

Households also increase their savings by 20%, although unlike consumption, this relatively large proportionate effect is in part due to relatively low savings (Table 8, column 1). Quantitatively, the higher incomes afforded to households due to their expanded economic production is being predominantly used for consumption.

4.5 Separation Results in Treated Villages

We present results from regressions of labour demand on household demographic composition variables for cash villages in Table 9 and find that cash transfers can help households achieve separation. These regression specifications are equivalent to those in Section 3.3 and Table 2 for control villages. We fail to reject separation at the 1% significance level across all samples, and only marginally reject separation at the 5% significance level for two samples in Panel A, which is the specification that does not account for additional demographic composition variables, unlike in Panels B and C, where significance never falls between the 10% threshold.

For upgraded eligible households (column 3) and the wealthier ineligible households (column 4), we mostly fail to reject separation. The results are similar across cash and control villages, with very comparable *F*-statistics. This pattern alone does not provide particular insights into understanding the interplay between cash transfers and separation, but rather that the underlying heterogeneity in separation failures

between households which we observe in control villages also features in treated villages in our sample. Importantly for the ineligible households, we should not interpret this separation as evidence of spillovers from cash because these patterns match those ineligible households in control villages.

In contrast, the relatively poor cash transfer eligible households that were not upgraded at baseline now behave as if markets are complete, unlike their counterparts in control villages. We are unable to reject the null of separation for all specifications, with the coefficient on log household size more than halving from 0.601 in control villages, down to 0.247 in cash villages. Similarly, we observe large reductions in the *F*-statistics between non-upgraded eligible households in control and cash villages, with them falling by 82% and 69% in Panels B and C respectively. Given these substantial changes, we now find that when considering the full sample of eligible households, we mostly fail to reject separation. We see that the point estimate on log household size is now relatively constant for the entire sample of eligible households, and our two subsamples. This pattern is completely different than in control villages, where we observed significant heterogeneity in this coefficient between subsamples. Moreover, the *F*-statistics in Panels B and C similarly drop by more than half relative to the eligible households in control villages.

The set of patterns for separation failures is noticeably different for households in cash villages, relative to those in control villages. These results show that the cash transfer is able to alleviate market frictions, and enable cash transfer recipient households to behave as if markets are complete, for whom we would otherwise reject separation.

5 Discussion

Our empirical results show that (1) households in this setting engage in a range of productive activities and poorer households are more likely to engage in low-capital, low-revenue forms of production, (2) the production decisions of poorer households are distorted by market frictions but less poor households are able to avoid these distortions, (3) cash transfers allow poorer households to enter the same high-capital, high-revenue activities as less poor households and to use more capital, labour, intermediate inputs, and technology in these activities, (4) cash transfers increase labour supply for poorer households in their new activities, and (5) cash transfers allow poorer households to avoid the distortionary effects of market frictions on their production decisions.

These patterns are consistent with an interpretation in which (1) households in this settings face some sort of frictions in some markets that distort their production decisions, (2) wealth shocks allow households to avoid these distortions, and (3) capital and labour are complements in production, so that the wealth shocks crowd in household labour supply. Our empirical findings do not precisely identify which frictions in which markets distort production decisions in this setting, a question we explore in ongoing work. However, we can provide one example of a model of frictional markets that can explain the results we find using both our experimental and non-experimental analysis. We present the formal model in detail in Appendix B and provide a brief, intuitive overview here. In this model, households produce using capital and labour, which are technical complements in production, and can also supply labour to the market as casual wage work. Capital market frictions constrain some households' capital stock, either through high interest rates or capital rationing. This is motivated by extensive work on capital market frictions in rural markets (e.g. Jayachandran 2006). At the same time, households cannot perfectly substitute own and hired labour in production, potentially due to hard-to-observe effort (e.g. Rosenzweig and Wolpin 1993). Low-capital households therefore under-supply labour relative to a frictionless market. Cash transfers allow households to acquire capital despite the market frictions, raising the marginal revenue product of labour due to complementarity, and increasing household labour supply due to imperfect substitutability.

These findings help to shed light on both the structure of village economics and how these structures interact with a common class of development policies that provide cash, asset, or income transfers. This provides an example of how understanding market frictions can improve our understanding of how these transfers impact households' production decisions and hence their economic welfare. This understanding comes from combining the results of a randomised experiment with classic tests for the presence of market frictions, an approach we believe is novel to this paper. These results suggest that cash transfers can improve households' economic welfare both directly – through wealth effects – and indirectly – by enabling more efficient production decisions.

References

Baird, S., D. McKenzie, and B. Ozler. 2018. "The Effects of Cash Transfers on Adult Labor Market Outcomes." *IZA Journal of Development and Migration*, 22(8): 1–20.

Balboni, Clare, Oriana Bandiera, Robin Burgess, Maitreesh Ghatak, and Anton Heil. 2022. "Why Do People Stay Poor?" *The Quarterly Journal of Economics*, 137(2): 785–844.

Bandiera, Oriana, Robin Burgess, Narayan Das, Selim Gulesci, Imran Rasul, and Munshi Sulaiman. 2017. "Labor Markets and Poverty in Village Economies." *The Quarterly Journal of Economics*, 132(2): 811–870.

Banerjee, Abhijit, Rema Hanna, Gabriel Kreindler, and Benjamin Olken. 2017. "Debunking the Stereotype of the Lazy Welfare Recipient: Evidence from Cash Transfer Programs." *World Bank Research Observer*, 32(2): 155–184.

Bastagli, Francesca, Jessica Hagen-Zanker, Luke Harman, Valentina Barca, Georgina Sturge, Tanja Schmidt, and Luca Pellerano. 2016. "Cash Transfers: What does the Evidence Say?" *Overseas Development Institute Report*, July.

Benjamin, Dwayne. 1992. "Household Composition, Labor Markets, and Labor Demand: Testing for Separation in Agricultural Household Models." *Econometrica*, 60(2): 287–322.

Bustos, Paula, Bruno Caprettini, and Jacopo Ponticelli. 2020. "Capital Accumulation and Structural Transformation." *The Quarterly Journal of Economics*, 135(2): 1037–1094.

Crosta, Tommaso, Dean Karlan, Finley Ong, Julius Rüschenpöhler, and Christopher R Udry. 2024. "Unconditional Cash Transfers: A Bayesian Meta-Analysis of Randomized Evaluations in Low and Middle Income Countries." *National Bureau of Economic Research Working Paper*, 32779.

Cunha, Jesse M., Giacomo De Giorgi, and Seema Jayachandran. 2019. "Price Effects of Cash Versus In-Kind Transfers." *The Review of Economic Studies*, 86(1): 240–281.

Deaton, Angus, and Salman Zaidi. 2002. *Guidelines for Constructing Consumption Aggregates for Welfare Analysis.* Vol. 135, World Bank Publications.

Dillon, Brian, Peter Brummund, and Germano Mwabu. 2019. "Asymmetric non-separation and rural labor markets." *Journal of Development Economics*, 139: 78–96.

Egger, Dennis, Johannes Haushofer, Edward Miguel, Paul Niehaus, and Michael Walker. 2022. "General Equilibrium Effects of Cash Transfers: Experimental Evidence From Kenya." *Econometrica*, 90(6): 2603–2643.

FAO. 1996. *A System of Economic Accounts for Food and Agriculture.* Rome:Food and Agriculture Organization.

Filmer, Deon, Jed Friedman, Eeshani Kandpal, and Junko Onishi. 2023. "Cash Transfers, Food Prices, and Nutrition Impacts on Ineligible Children." *The Review of Economics and Statistics*, 105(2): 327–343.

Giné, Xavier, Jessica Goldberg, and Dean Yang. 2012. "Credit Market Consequences of Improved Personal Identification: Field Experimental Evidence from Malawi." *American Economic Review*, 102(6): 2923–2954.

Gollin, Douglas, and Joseph Kaboski. 2024. "New Views of Structural Transformation: Insights from Recent Literature." STEG Synthesis Paper SP02.

Grosh, Margaret, and Paul Glewwe. 2000. *Designing Household Survey Questionnaires for Developing Countries: Lessons from 15 Years of the Living Standards Measurement Study.* Washington, D.C.:World Bank.

Jayachandran, Seema. 2006. "Selling Labor Low: Wage Responses to Productivity Shocks in Developing Countries." *Journal of Political Economy*, 114(3): 538–575.

Jones, Maria Ruth, Florence Kondylis, John Ashton Loeser, and Jeremy Magruder. 2019. "Factor Market Failures and the Adoption of Irrigation in Rwanda." World Bank Policy Research Working Paper 9092.

Kaur, Supreet. 2019. "Nominal Wage Rigidity in Village Labor Markets." *American Economic Review*, 109(10): 3585–3616.

Kebede, Hundanol. 2022. "Market Integration and Separability of Production and Consumption Decisions in Farm Households." *Journal of Development Economics*, 156: 102–834.

Kenya National Social Protection Secretariat. 2022. "National Safety Net Program." *https://www.socialprotection.or.ke/social-protection-components/social-assistance/national-safety-net-program*, Online; accessed 7 September 2022.

LaFave, Daniel, and Duncan Thomas. 2016. "Farms, Families, and Markets: New Evidence on The Completeness of Markets in Agricultural Settings." *Econometrica*, 84(5): 1917–1960.

LaFave, Daniel, Evan Peet, and Duncan Thomas. 2025. "Farm Profits, Prices and Household Behavior." Journal of Development Economics, forthcoming.

Orkin, Kate, Robert Garlick, Mahreen Mahmud, Richard Sedlmayr, Johannes Haushofer, and Stefan Dercon. 2023. "Aspiring to a Better Future: Can a Simple Psychological Intervention Reduce Poverty?" *Working Paper, University of Oxford*.

Rosenzweig, Mark R., and Kenneth I. Wolpin. 1993. "Credit Market Constraints, Consumption Smoothing, and the Accumulation of Durable Production Assets in Low-Income Countries: Investment in Bullocks in India." *Journal of Political Economy*, 101(2): 223–244.

Singh, Inderjit, Lyn Squires, and John Strauss. 1986. "Agricultural Household Models Extensions, Applications, and Policy." Johns Hopkins University Press.

Townsend, Robert. 1994. "Risk and Insurance in Rural India." *Econometrica*, 62(3): 539–591.

Walker, Michael, Nachiket Shah, Edward Miguel, Dennis Egger, Felix Samy Soliman, and Tilman Graff. 2024. "Slack and Economic Development." Unpublished working paper.

World Bank. 2015. *The State of Social Safety Nets 2015.* Washington, DC:World Bank Publications.

6 Tables and Figures

Table 1
Summary Statistics

			Percentiles					
	Mean	Std. Dev.	10th	25th	50th	75th	90th	Observations
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Demographics								
Household Size	5.6	2.5	2.0	4.0	6.0	7.0	9.0	1,766
Number of Children	2.8	1.9	0.0	1.0	3.0	4.0	5.0	1,766
Number of Adults	2.8	1.5	1.0	2.0	2.0	4.0	5.0	1,766
Household Head Age	40.6	16.5	23.0	28.0	36.0	50.0	65.0	1,764
At Least Primary School Education	0.43	0.49						1,759
Panel B. Household Economic Activities								
Crop Agriculture	0.98	0.15						1,767
Livestock	0.89	0.32						1,767
Light Livestock	0.87	0.34						1,767
Cattle	0.42	0.49						1,767
Enterprise	0.44	0.50						1,767
Panel C. Economic Outcomes								
Labour Supply	602	416	96	336	528	828	1,116	1,767
Revenue	2,101	3,204	165	451	1,175	2,423	4,708	1,767
Consumption	4,177	2,212	1,730	2,566	3,799	5,418	7,027	1,762
Non-land Assets	1,529	1,506	289	536	1,068	2,019	3,219	1,767
Panel D. Economic Outcomes for Households without Cattle or Enterprises								
Labour Supply	432	395	36	132	384	612	852	582
Revenue	937	1,501	67	191	477	1,214	2,151	582
Consumption	3,481	2,021	1,342	2,001	3,024	4,534	6,147	578
Non-land Assets	719	668	174	301	538	917	1,418	582
Panel E. Economic Outcomes for Households with Cattle or Enterprises								
Labour Supply	686	401	240	408	648	888	1,200	1,185
Revenue	2,672	3,636	356	774	1,679	3,175	5,902	1,185
Consumption	4,517	2,223	2,025	2,878	4,142	5,758	7,437	1,184
Non-land Assets	1,926	1,638	490	841	1,501	2,549	3,810	1,185

Notes: This table shows endline summary statistics for the eligible households in control villages. All currency values are measured in 2018 USD PPP. All flow measures except education expenditure are in annual terms. Adults are defined as being aged 16 and above. Light Livestock is defined as all non-cattle livestock and includes poultry, goats and sheep. Labour Supply is days of work on farm and non-farm household enterprises or supplied to the market, for all household members. Revenue captures the value of production sold or consumed at home from household activities, valued at farm-gate prices, and earnings from labour supplied outside the household. Consumption captures the value of purchased and home-produced food, non-durable and durable household goods, social expenditures and education expenditures following Deaton and Zaidi (2002). Non-land Assets are the estimated value, if sold, of durable assets, livestock, and stocks of dried maize, as well as cash savings. We value output and expenditure on inputs following the Living Standards Measurement Surveys (Grosh and Glewwe, 2000) and UN System of National Accounts (FAO, 1996). Panels A, B and C present statistics for all eligible households in control villages. Panel D presents statistics for the subsample of households without cattle or enterprises. Panel E presents statistics for the subsample of households with cattle or enterprises.

Table 2

Labour Demand and Household Demographic Composition in Control Villages

	Eligible Households			Ineligible Households
	All	No Cattle or Enterprise	Cattle or Enterprise	All
	(1)	(2)	(3)	(4)
Panel A. Household Size				
Log Household Size	0.382***	0.601***	0.157	0.009
	(0.128)	(0.218)	(0.152)	(0.166)
p-value	[0.003]	[0.006]	[0.301]	[0.955]
Panel B. Household Size and Shares				
F-statistic	2.549***	2.421***	1.726*	1.035
p-value	[0.002]	[0.004]	[0.057]	[0.415]
Panel C. Number of Household Members				
F-statistic	2.322***	2.278***	1.365	1.091
p-value	[0.006]	[0.008]	[0.177]	[0.365]
Households	1,499	635	854	554
Observations	2,998	1,270	1,708	1,108

Notes: This table presents results from panel regressions of household labour demand on a vector of household demographic composition variables. The sample includes all households in control villages. Column (1) includes all eligible households. Column (2) includes eligible households with neither cattle nor enterprises at baseline. Column (3) includes eligible households with at least cattle or enterprises at baseline. Column (4) includes all ineligible households. Panel A includes the log of household size as the only household demographic variable. Panel B includes the log of household size and shares of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender, with males aged 0-14 as the omitted group. Panel C includes the number of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender. All regressions control for household fixed effects, village-wave fixed effects, month-of-interview fixed effects, education of the household head and spouse interacted with wave, and quintiles of non-land assets, cultivated land and capital assets for agriculture, light livestock, cattle and enterprises. Joint tests for the significant of household demographic composition are *F*-statistics. Heteroskedasticity-robust standard errors, clustered at the household level, are in parentheses. *p*-values are in square brackets. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 3
Impacts on Household Economic Activity Outcomes

	Crops (1)	Livestock (2)	Enterprise (3)	Aggregate (4)
Panel A. Any Household Activities				
Cash	0.001	0.039***	0.060***	0.001
	(0.005)	(0.009)	(0.017)	(0.002)
Control mean	0.981	0.887	0.442	0.995
Control std. dev.	0.136	0.316	0.497	0.071
Observations	3,581	3,581	3,581	3,581
Panel B. Capital Assets				
Cash	11.3	153.8***	80.5***	243.7***
	(9.5)	(29.5)	(26.2)	(42.2)
Control mean	106.3	576.1	165.0	840.9
Control std. dev.	279.9	821.2	626.9	1,168.6
Observations	3,581	3,581	3,461	3,581
Panel C. Labour Demand				
Cash	1.4	29.4***	21.0***	52.0***
	(4.7)	(10.3)	(7.1)	(13.8)
Control mean	116.2	319.7	115.6	551.4
Control std. dev.	100.5	289.2	183.3	399.0
Observations	3,581	3,581	3,581	3,581
Panel D. Hired Labour				
Cash	1.1**	5.1*	2.0	8.8**
	(0.5)	(3.0)	(1.9)	(4.0)
Control mean	5.3	17.7	6.5	29.5
Control std. dev.	15.0	72.2	46.8	90.0
Observations	3,574	3,581	3,581	3,581
Panel E. Technology Adoption				
Cash	0.10	0.17***	0.11***	0.40***
	(0.07)	(0.04)	(0.04)	(0.12)
Control mean	2.11	0.79	0.35	3.57
Control std. dev.	1.66	0.97	0.75	2.63
Observations	3,580	3,580	3,581	3,581
Panel F. Intermediate Input Expenditures				
Cash	10.5***	9.4***	294.2***	302.8***
	(3.7)	(2.4)	(81.8)	(79.9)
Control mean	63.0	25.9	478.4	554.4
Control std. dev.	85.0	54.6	1,706.1	1,693.5
Observations	3,581	3,555	3,499	3,581
Panel G. Revenues				
Cash	29.9	39.3	413.5***	502.1***
	(19.3)	(42.3)	(128.6)	(138.2)
Control mean	266.8	458.0	829.9	1,531.7
Control std. dev.	599.9	1,228.1	2,515.3	2,929.5
Observations	3,581	3,581	3,505	3,581

Notes: This table shows household-level treatment effects of cash on household economic activity outcomes. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(3) correspond to crop agriculture, livestock rearing and non-farm enterprise household activities. Column (4) aggregates across all household activities. *Any Household Activities* is a binary variable equal to 1 if the household is engaged in the activity. *Capital Assets* for (i) crops include the value of tools and equipment used for crop agriculture; (ii) livestock include the value of all their livestock; and (iii) enterprises includes the value of all inventory and fixed assets. *Labour Demand* measures the number of labour days demanded by the activity, including from household and non-household members. *Hired Labour* measures the number of labour days from non-household members employed in the activity. *Technology Adoption* is a measure calculated by taking the sum of binary variables relating to modernisation efforts that the household is engaging in, up to 10 for crops, 4 for livestock and 8 for enterprises. *Intermediate Input Expenditures* include spending on various intermediate inputs. *Revenues* for (i) crops includes the total value of production for each crop the household grew in each of the two rainy seasons, including both production sold and production kept and consumed in-kind; (ii) livestock includes the value of sales of animals and the value of livestock production; and (iii) enterprises includes revenues from sales. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 4

Impacts on Household Multiple Economic Activities

	Crops and Livestock (1)	Crops and Enterprise (2)	Livestock and Enterprise (3)	Crops, Livestock and Enterprise (4)	Cattle and Enterprise (5)
Panel A. Household Involved in All Activities					
Cash	0.039***	0.053***	0.062***	0.056***	0.086***
	(0.011)	(0.017)	(0.017)	(0.017)	(0.014)
Control mean	0.872	0.439	0.409	0.406	0.195
Control std. dev.	0.335	0.496	0.492	0.491	0.397
Observations	3,581	3,581	3,581	3,581	3,581
Panel B. Household Involved in At Least One of the Activities					
Cash	0.001	0.008*	0.036***	0.001	0.085***
	(0.002)	(0.004)	(0.008)	(0.002)	(0.016)
Control mean	0.994	0.982	0.920	0.995	0.671
Control std. dev.	0.075	0.133	0.271	0.071	0.470
Observations	3,581	3,581	3,581	3,581	3,581

Notes: This table shows household-level treatment effects of cash on combinations of household economic activity outcomes. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Panel A is a binary variable equal to 1 if the household engaged in all listed activities. Panel B is a binary variable equal to 1 if the household engaged in at least one of the listed activities. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 5
Impacts on Livestock

	Light Livestock			Heavy Livestock
	Poultry	Goats	Sheep	Cattle
	(1)	(2)	(3)	(4)
Panel A. Any Livestock				
Cash	0.023*	0.054***	0.037***	0.110***
	(0.012)	(0.017)	(0.013)	(0.016)
Control mean	0.835	0.323	0.160	0.424
Control std. dev.	0.372	0.468	0.366	0.494
Observations	3,581	3,581	3,581	3,581
Panel B. Capital Assets				
Cash	8.5***	15.3***	6.2**	125.0***
	(2.8)	(4.4)	(2.7)	(26.1)
Control mean	59.1	57.3	25.8	432.6
Control std. dev.	57.7	117.6	82.0	727.7
Control mean $\mid > 0$	70.8	190.1	175.6	1,058.7
Control std. dev. $\mid > 0$	56.2	143.7	139.5	795.7
Observations	3,581	3,581	3,581	3,581

Notes: This table shows household-level treatment effects of cash on livestock outcomes. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(4) include different types of livestock. *Any Livestock* is a binary variable equal to 1 if the household is engaged livestock rearing. *Capital Assets* are the value of all livestock. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 6
Impacts on Enterprises

	Forestry (1)	Fishing (2)	Mining (3)	Construction (4)	Manufacturing (5)	Retail (6)	Services (7)
Panel A. Any Enterprise							
Cash	0.004	0.021**	-0.002	-0.004	-0.007	0.054***	0.012
	(0.009)	(0.009)	(0.006)	(0.002)	(0.007)	(0.014)	(0.008)
Control mean	0.058	0.052	0.014	0.010	0.057	0.203	0.068
Control std. dev.	0.234	0.222	0.118	0.098	0.231	0.402	0.252
Observations	3,581	3,581	3,581	3,581	3,581	3,581	3,581
Panel B. Capital Assets							
Cash	0.2	20.8	-6.3	-0.5	10.5*	25.5***	24.5**
	(1.1)	(16.5)	(6.1)	(0.7)	(5.8)	(9.5)	(11.5)
Control mean	4.1	46.7	7.6	1.0	13.7	48.5	31.7
Control std. dev.	52.3	410.9	208.1	19.5	137.9	271.9	228.0
Control mean $\mid > 0$	81.4	1,165.6	720.6	184.4	284.0	257.4	538.7
Control std. dev. $\mid > 0$	219.6	1,718.5	1,944.3	207.0	566.3	582.6	784.4
Observations	3,462	3,462	3,462	3,462	3,462	3,462	3,462
Panel C. Revenues							
Cash	-1.4	35.6	-23.8	-5.3	39.3	261.3***	68.2***
	(12.0)	(56.4)	(19.5)	(5.1)	(33.7)	(89.9)	(23.5)
Control mean	57.3	145.1	39.4	8.3	37.2	358.4	114.2
Control std. dev.	530.0	1,418.0	555.6	136.6	277.1	1,692.2	691.5
Control mean $\mid > 0$	1,081.7	3,894.7	3,384.2	1,773.2	840.1	2,073.2	2,156.5
Control std. dev. $\mid > 0$	2,058.9	6,321.7	3,997.9	999.1	1,036.5	3,611.5	2,161.1
Observations	3,505	3,505	3,505	3,505	3,505	3,505	3,505

Notes: This table shows household-level treatment effects of cash on enterprise outcomes. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(7) include different types of enterprises. *Any Enterprise* is a binary variable equal to 1 if the household operates an enterprise. *Capital Assets* includes the value of all inventory and fixed assets. *Revenues* includes revenues from sales. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 7
Impacts on Labour Supply

	Household Activities					
	Crops (1)	Livestock (2)	Enterprise (3)	All Household (4)	Outside (5)	Aggregate (6)
Panel A. Any Labour Supply						
Cash	-0.007	0.058***	0.056***	0.008	-0.064***	0.001
	(0.011)	(0.014)	(0.017)	(0.006)	(0.017)	(0.005)
Control mean	0.911	0.744	0.471	0.957	0.401	0.973
Control std. dev.	0.285	0.437	0.499	0.203	0.490	0.163
Observations	3,581	3,581	3,581	3,581	3,581	3,581
Panel B. Total Labour Supply						
Cash	0.3	24.2**	18.3***	43.1***	-13.5***	29.6**
	(4.6)	(10.5)	(6.4)	(13.9)	(4.7)	(14.6)
Control mean	110.8	302.0	109.1	522.0	80.2	602.2
Control std. dev.	99.5	287.0	169.9	390.6	144.7	416.1
Observations	3,581	3,581	3,581	3,581	3,581	3,581
Panel C. Total Labour Supply with Heterogeneity: Household Activities Include Cattle or Enterprises						
Cash	1.0	33.9**	21.3**	56.7***	-12.9	43.9**
	(5.1)	(14.2)	(8.4)	(17.0)	(8.1)	(19.2)
Cash + Cash × Het.	-0.2	16.0	15.2*	31.0*	-13.7**	17.2
	(5.7)	(13.1)	(8.0)	(17.7)	(6.0)	(18.8)
Cash × Het. = 0	[0.835]	[0.310]	[0.557]	[0.234]	[0.941]	[0.281]
Control mean	110.8	302.0	109.1	522.0	80.2	602.2
Control std. dev.	99.5	287.0	169.9	390.6	144.7	416.1
Observations	3,581	3,581	3,581	3,581	3,581	3,581

Notes: This table shows household-level treatment effects of cash on labour supply outcomes. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(3) correspond to crop agriculture, livestock rearing and non-farm enterprise household activities. Column (4) aggregates across all household activities. Column (5) is labour supplied outside the household to casual and salaried work. Column (6) aggregates across all household and outside activities. *Any Labour Supply* is a binary variable equal to 1 if at least one member of the household is engaged in the activity. *Total Labour Supply* is days of work supplied to the activity by all household members. Panel C presents results from a heterogeneous treatment effects specification, were the dimension of heterogeneity is a binary variable equal to 1 if the household activities include cattle or enterprises at baseline. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 8

Impacts on Savings and Consumption

			Consumption Subaggregates				
	Savings	Consumption	Food	Durable	Non-durable	Social	Education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cash	25.3***	305.1***	101.2*	80.2***	58.2**	28.1***	25.5
	(9.7)	(88.7)	(54.8)	(10.6)	(27.4)	(9.3)	(19.9)
Control mean	122.3	4,177.0	2,727.3	140.8	823.6	109.9	383.8
Control std. dev.	265.3	2,212.2	1,451.5	199.5	619.7	154.6	654.4
Observations	3,580	3,573	3,566	3,568	3,573	3,573	3,573

Notes: This table shows household-level treatment effects of cash on household savings and consumption outcomes. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. *Savings* is the total value of savings of all household members held at home, with friends and neighbours, with shopkeepers, with microcredit groups, in mobile money accounts, and in bank accounts. This includes total value of all household ROSCA savings. *Consumption* captures the value of purchased and home-produced food, non-durable and durable household goods, social expenditures and education expenditures. *Food* is the value of household consumption of 18 core food items and outside-household food consumption. *Durable* is value of household expenditure on durable items and their maintenance. *Non-durable* is the value of household consumption of nine core non-food non-durable items including household goods, fuel, hairdressing and transport fares. *Social* is the value of household expenditure on charitable donations, worship contributions, social and entertainment expenditures, weddings and bride price. *Education* includes school and activity fees, other school related supplies and uniform cost. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table 9

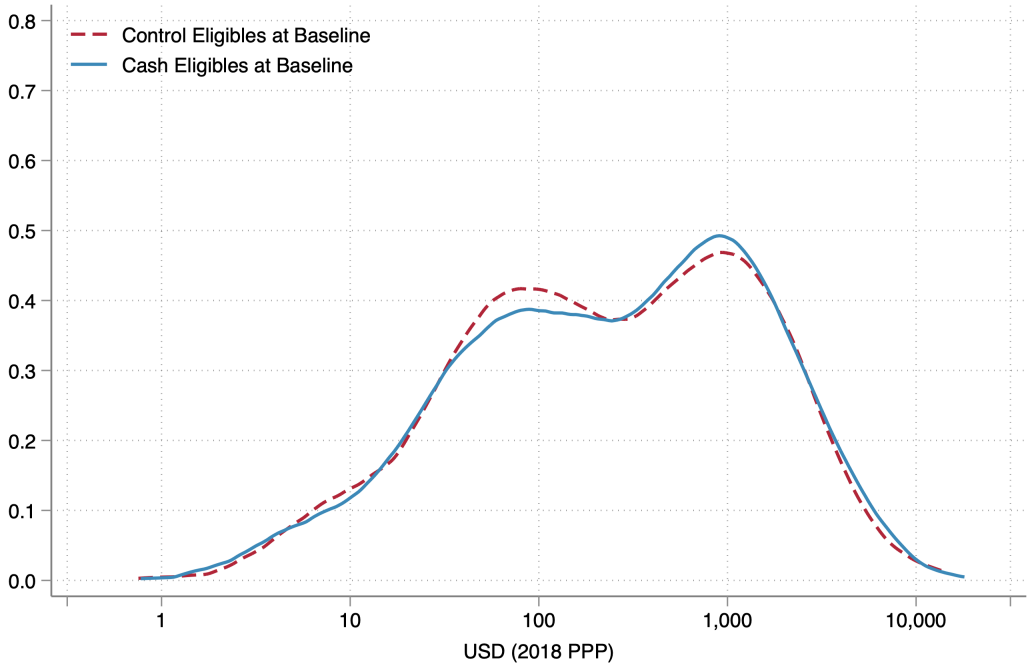
Labour Demand and Household Demographic Composition in Cash Villages

	Eligible Households			Ineligible Households
	All	No Cattle or Enterprise	Cattle or Enterprise	All
	(1)	(2)	(3)	(4)
Panel A. Household Size				
Log Household Size	0.213**	0.247	0.231**	-0.103
	(0.101)	(0.208)	(0.113)	(0.135)
p-value	[0.036]	[0.236]	[0.040]	[0.444]
Panel B. Household Size and Shares				
F-statistic	1.020	0.442	1.075	0.883
p-value	[0.427]	[0.946]	[0.378]	[0.564]
Panel C. Number of Household Members				
F-statistic	1.157	0.707	1.534	0.696
p-value	[0.309]	[0.745]	[0.106]	[0.756]
Households	1,549	584	947	603
Observations	3,098	1,168	1,894	1,206

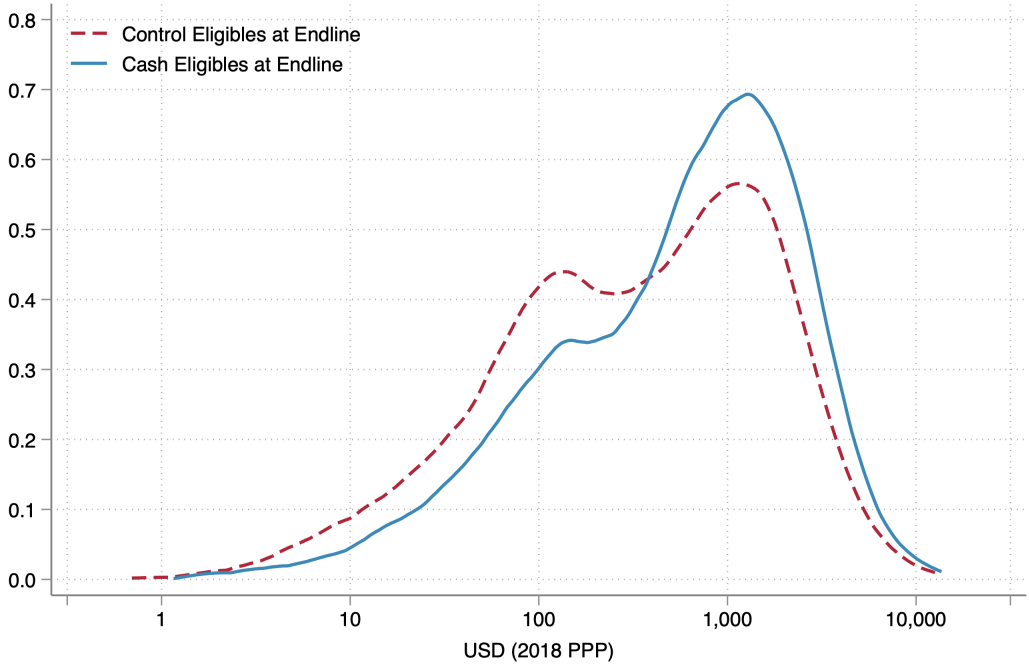
Notes: This table presents results from panel regressions of household labour demand on a vector of household demographic composition variables. The sample includes all households in cash villages. Column (1) includes all eligible households. Column (2) includes eligible households with neither cattle nor enterprises at baseline. Column (3) includes eligible households with at least cattle or enterprises at baseline. Column (4) includes all ineligible households. Panel A includes the log of household size as the only household demographic variable. Panel B includes the log of household size and shares of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender, with males aged 0-14 as the omitted group. Panel C includes the number of household members aged 0-14, 15-19, 20-34, 35-49, 50-64 and above 65 separately by gender. All regressions control for household fixed effects, village-wave fixed effects, month-of-interview fixed effects, education of the household head and spouse interacted with wave, and quintiles of non-land assets, cultivated land and capital assets for agriculture, light livestock, cattle and enterprises. Joint tests for the significant of household demographic composition are *F*-statistics. Heteroskedasticity-robust standard errors, clustered at the household level, are in parentheses. *p*-values are in square brackets. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Figure 1
Distribution of Capital Assets for Eligible Households

A. Baseline



B. Endline



Notes: This figures plot the distribution of capital assets for eligible households by treatment status. *Capital Assets* include the value of (i) tools and equipment used for crop agriculture; (ii) all livestock owned by the household; and (iii) all enterprise inventory and fixed assets. Panels A and B plot the distributions for the baseline and endline respectively. All currency values are measured in 2018 USD PPP in annual terms.

A Appendix Tables and Figures

Table A1
Attrition

	Attrition (1)	Attrition (2)	Attrition (3)
Cash	0.010		0.033
	(0.013)		(0.050)
Household Size		-0.010***	-0.007*
		(0.002)	(0.004)
Non-land Assets		0.001	0.001
		(0.004)	(0.006)
Consumption		0.001	0.001
		(0.002)	(0.003)
Age		-0.000	-0.000
		(0.000)	(0.001)
At Least Primary Education		0.009	0.004
		(0.012)	(0.015)
At Least Secondary Education		0.028	0.040
		(0.024)	(0.033)
Married		0.011	0.008
		(0.013)	(0.017)
Household Size × Cash			-0.005
			(0.005)
Non-land Assets × Cash			0.000
			(0.008)
Consumption × Cash			-0.000
			(0.004)
Age × Cash			0.000
			(0.001)
At Least Primary Education × Cash			0.009
			(0.024)
At Least Secondary Education × Cash			-0.022
			(0.048)
Married × Cash			0.005
			(0.025)
Control mean	0.122	0.122	0.122
Observations	4,095	4,095	4,095

Notes: This table shows the relationship between attrition, treatment assignment, and baseline covariates for eligible households. Attrition is a binary variable equal to 1 if the household was not surveyed at endline. Column 1 includes only Cash, a binary variable equal to 1 if the household was assigned to receive cash. Column 2 includes only baseline covariates. Column 3 includes Cash, baseline covariates, and their interactions. All regressions include strata fixed effects. The consumption and asset aggregates are measured in constant 2018 USD PPP ('000s). The self-beliefs index consists of growth mindset, self-efficacy and internal locus of control scales. If a baseline covariate is missing, we replace the missing values with the sample mean and include a missing data indicator. Heteroskedasticity-robust standard errors, clustered at village level, are reported in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table A2
Balance

	Control Mean (1)	Cash Coefficient (2)	Cash *p*-value (3)	Observations (4)
Panel A. Village-level Characteristics from Census				
Has Primary School	0.490	0.030	0.683	207
Has Market	0.288	-0.042	0.499	207
Has Clinic	0.163	-0.047	0.358	207
Number of Households	96.3	-7.72	0.231	207
Mean Household Asset Score	0.030	-0.032	0.475	207
Floor Material is Mud or Organic†	0.666	0.002	0.897	207
Roof Material is Grass, Leaves or Other†	0.054	-0.000	0.970	207
Walls Material is Unburnt Bricks or Mud†	0.846	0.010	0.429	207
Drinking Water is Piped/Well†	0.385	-0.014	0.663	207
Lighting is Electricity†	0.284	0.003	0.806	207
Panel B. Eligible Respondent Characteristics from Census				
Married	0.584	0.017	0.304	4,095
Age	40.8	-0.869	0.127	4,091
At Least Primary Education	0.423	0.021	0.202	4,073
Household Owns a Mobile Phone	0.741	0.013	0.380	3,813
Panel C. Eligible Household Characteristics from the Baseline				
Household Size	5.31	0.023	0.780	4,095
Dependency Ratio	1.35	0.018	0.613	4,095
Number of Children	2.85	0.044	0.488	4,095
Revenue	1,834	63.3	0.430	4,095
Consumption	4,735	-92.6	0.452	4,093
Investment	699	-25.4	0.735	4,095
Non-land Assets	1,230	35.1	0.572	4,095
Labour Supply	431	-0.626	0.966	4,081
Self-beliefs Index	0.000	0.035	0.396	4,078

Notes: This table reports balance tests for characteristics measured in the village census, household census, and baseline surveys for eligible households, prior to the intervention. All currency values are measured in 2018 USD PPP in annual terms. Panel A reports regressions at the village level. Panel B reports characteristics of eligible respondents who are the primary women in eligible households. Panel C reports household-level characteristics. All balance tests are implemented by regressing the characteristic on cash and strata fixed effects. The regressions use one observation per village for the village-level characteristics and one observation per household for the household- and respondent-level characteristics. Inference is performed using heteroskedasticity-robust standard errors, clustered by village for regressions with household- or respondent-level characteristics. Column (1) reports the control mean for each characteristic. Columns (2) and (3) report cash coefficients and *p*-values. Column (4) reports the number of observations. The average number of households in each village that completes the census is 75. The household asset score is constructed using principal component analysis on indicators for household ownership of a telephone, bicycle, solar panel, TV, fridge, radio, watch/clock, motorbike, truck and iron box (charcoal or electric). The dependency ratio is the number of household members under 16 divided by the number of members 16 and above. Outcomes with a † sign denote village-level proportions constructed from household-level data.

Table A3
Impacts on Land

	Land Ownership			Acreage Owned			Cultivated Land	
	All	Compound	Other	All	Compound	Other	Any	Acres
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash	0.036***	0.049***	0.035**	0.279***	0.134***	0.143***	-0.001	0.110**
	(0.010)	(0.014)	(0.016)	(0.064)	(0.049)	(0.039)	(0.010)	(0.055)
Control mean	0.876	0.800	0.297	1.459	1.055	0.402	0.942	1.285
Control std. dev.	0.330	0.400	0.457	1.537	1.215	0.984	0.233	1.253
Observations	3,581	3,581	3,581	3,547	3,549	3,577	3,576	3,576

Notes: This table shows household-level treatment effects of cash on land outcomes. Cash is a binary variable equal to 1 if the household was assigned to receive cash. *Land Ownership* is a binary variable equal to 1 if the household owns land. *Acreage Owned* measures the amount of land owned in acres. *Cultivated Land* measures land under cultivation by the household across short and long rains seasons. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table A4
Impacts on Revenues

	Crops			Livestock				
	Home	Market	Total	Home	Market	Total	Enterprise	Aggregate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash	26.9	3.1	29.9	-1.4	40.2***	39.3	413.5***	502.1***
	(17.7)	(4.5)	(19.3)	(39.4)	(13.0)	(42.3)	(128.6)	(138.2)
Control mean	226.6	40.1	266.8	343.5	114.5	458.0	829.9	1,531.7
Control std. dev.	559.5	140.5	599.9	1,146.3	306.8	1,228.1	2,515.3	2,929.5
Observations	3,581	3,581	3,581	3,581	3,581	3,581	3,505	3,581

Notes: This table shows household-level treatment effects of cash on revenues from household economic activities. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(3) correspond to crop agriculture, (4)-(6) correspond to livestock rearing, and (7) to non-farm enterprise activities. Column (8) aggregates across all household activities. *Revenues* for (i) crops includes the total value of production for each crop the household grew in each of the two rainy seasons, including both production sold and production kept and consumed in-kind; (ii) livestock includes the value of sales of animals and the value of livestock production; and (iii) enterprises includes revenues from sales. For crop agriculture and livestock activities, we divide revenues into home and market sales. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table A5
Impacts on Wages

	Wages						
	Crops (1)	Livestock (2)	Forestry (3)	Fishing (4)	Mining (5)	Construction (6)	Casual (7)
Cash	0.44*	-0.17	0.91*	-0.37	1.17	0.12	-0.03
	(0.24)	(0.38)	(0.46)	(0.41)	(1.18)	(0.23)	(0.33)
Control mean	6.14	3.59	6.25	11.28	19.85	9.64	5.08
Control std. dev.	1.86	2.63	1.56	4.01	12.19	2.27	2.74
Observations	3,581	3,581	3,581	3,581	3,581	3,581	3,581

Notes: This table shows household-level treatment effects of cash on village-level market wages. This data is collected from market surveys. Household-level covariates are omitted from this specification, so only strata fixed effects and month-of-interview fixed effects are included as covariates. All currency values are measured in 2018 USD PPP in annual terms. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(7) include different types of activities. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Table A6

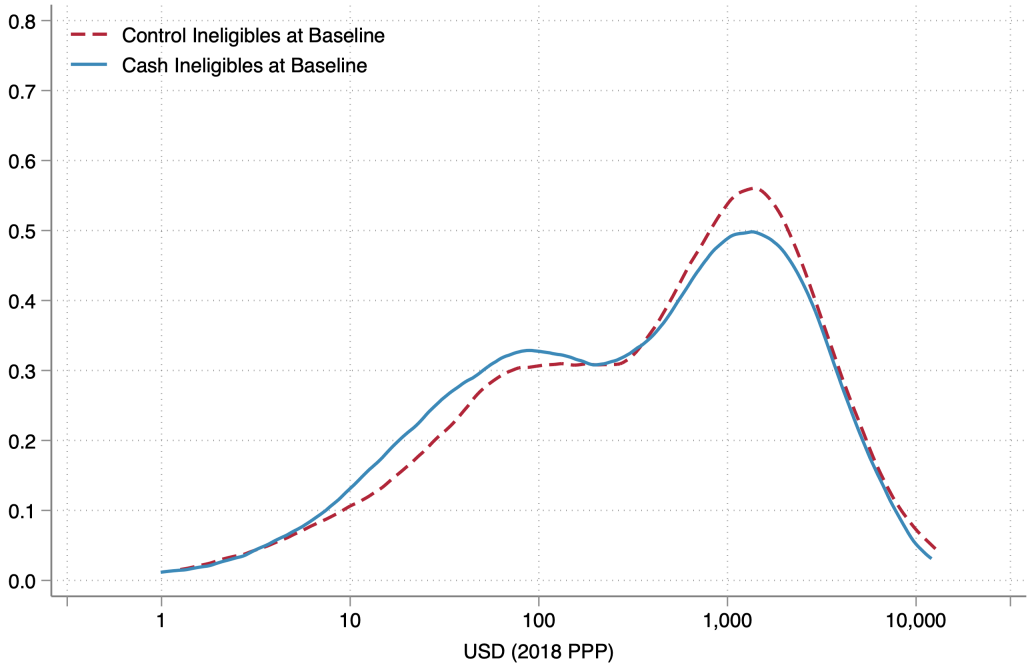
Impacts on Labour Demand and Supply of Ineligible Households

	Household Activities					
	Crops (1)	Livestock (2)	Enterprise (3)	All Household (4)	Outside (5)	Aggregate (6)
Panel A. Labour Demand						
Cash	0.7	-13.9	8.1	-8.3	-1.3	
	(6.8)	(22.9)	(9.0)	(31.0)	(5.5)	
Control mean	103.0	345.9	122.1	606.1	50.3	
Control std. dev.	96.8	359.8	189.9	499.8	114.9	
Observations	1,394	1,394	1,394	1,394	1,394	
Panel B. Labour Supply						
Cash	2.0	-13.9	4.6	-7.6	-1.6	-8.9
	(6.4)	(22.9)	(8.2)	(29.7)	(7.6)	(32.2)
Control mean	94.2	345.9	115.8	555.8	73.9	629.7
Control std. dev.	94.3	359.8	179.1	485.3	148.5	521.1
Observations	1,394	1,394	1,394	1,394	1,394	1,394

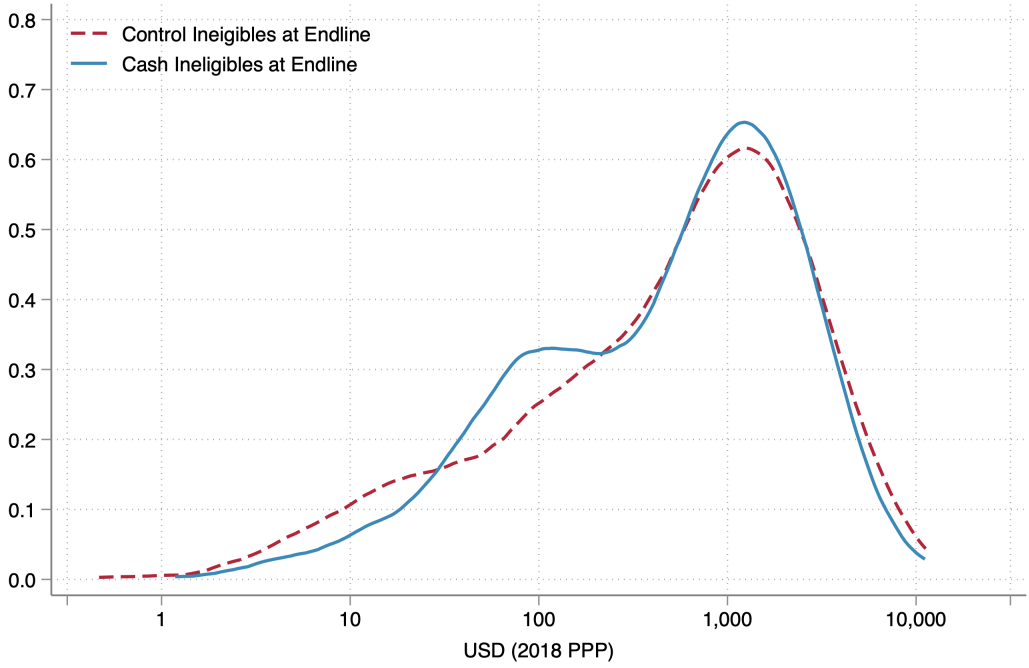
Notes: This table shows household-level treatment effects of cash on labour demand and supply for ineligible households. Cash is a binary variable equal to 1 if the household was assigned to receive cash. Columns (1)-(3) correspond to crop agriculture, livestock rearing and non-farm enterprise household activities. Column (4) aggregates across all household activities. Column (5) is labour supplied outside the household to casual and salaried work. Column (6) aggregates across all household and outside activities. *Any Labour Supply* is a binary variable equal to 1 if at least one member of the household is engaged in the activity. *Total Labour Supply* is days of work supplied to the activity by all household members. Panel C presents results from a heterogeneous treatment effects specification, were the dimension of heterogeneity is a binary variable equal to 1 if the household activities include cattle or enterprises at baseline. Heteroskedasticity-robust standard errors, clustered at the village level, are in parentheses. 1%, 5% and 10% statistical significance are indicated with ***, **, and * respectively.

Figure A1
Distribution of Capital Assets for Ineligible Households

A. Baseline



B. Endline



Notes: This figures plot the distribution of capital assets for ineligible households by treatment status. *Capital Assets* include the value of (i) tools and equipment used for crop agriculture; (ii) all livestock owned by the household; and (iii) all enterprise inventory and fixed assets. Panels A and B plot the distributions for the baseline and endline respectively. All currency values are measured in 2018 USD PPP in annual terms.

B Theoretical Framework

In this section, we introduce a simple static theoretical framework that is consistent with our set of results. Suppose that we have households which are constrained by undefined market frictions with capital K_*, and those that are able to overcome them with capital K^*. This is a simplifying assumption, and our conclusions still hold with a continuous distribution of capital. This will result in a bimodal distribution of capital that we observe in our setting, where we refer to $K_* < K^*$ as the unproductive and productive levels of capital respectively. Based on our results, the term unproductive and productive map to non-upgraded (households with neither cattle nor enterprises) and upgraded respectively. We do not take a stance on the various ways in which we could provide microfoundations for this distribution of capital.

Consider now that there are labour market frictions. We focus on the most simple binding constraint: there is a maximum amount of labour that can be supplied outside of the household, $\overline{H} \geq 0$. There are several possible microfoundations for this type of rationing constraint, and we could arrive at qualitative similiar results with alternative approaches.

Let w denote the market wage. $L^S(w, K)$ is labour supplied by the household, with labour supply increasing in the wage and decreasing in the amount of capital stock owned by the household.[7] $L^D(w, K)$ is labour demanded by the household firm, which is decreasing in the wage and is increasing in capital if there is capital-labour complementarity in the household production function. Our results are consistent with capital-labour complementarities in this setting and so we proceed with this assumption. Our labour supply and demand assumptions are thus:

$$L^S_w(w, K) > 0, \quad L^S_K(w, K) < 0, \quad L^D_w(w, K) < 0, \quad L^D_K(w, K) > 0. \tag{4}$$

$L^O(w, K)$ is labour that the household supplies outside of the household, earning wage w. Given the constraint $\overline{H}$ on the amount of labour that can be supplied outside of the household, this implies that: $L^O(w, K) \leq \overline{H}$. This constraint binds if the desired labour supply exceeds the household labour demand and outside opportunities for a given wage w and capital K. Suppose that this constraint binds for households with the unproductive level of capital K_* because there is a lower marginal product of labour in the household firm, which corresponds to lower labour demand:

$$L_S(w, K_*) > L^D(w, K_*) + \overline{H}. \tag{5}$$

Let w_* denote the households shadow wage when they have capital K_*. For equilibrium, households will maximise their labour supply outside the household equal to $\overline{H}$ and earn a shadow wage below the market wage. This will lower labour supply and increase labour demand until the household labour market clears:

$$L^S(w_*, K_*) = L^D(w_*, K_*) + \overline{H}. \tag{6}$$

As the shadow wage is below the market wage, $w_* < w$, households under-supply total labour, $L^S(w_*, K_*) < L^S(w, K_*)$, and household firms over-demand labour, $L^D(w_*, K_*) > L^D(w, K_*)$. These inefficiencies suppress the household's labour income and lower consump-

[7] These derivatives can be derived by assuming that leisure is a normal good.

tion. This might indeed make it more difficult for households to move towards the productive level of capital, although we do not explicitly model these dynamics.

Cash transfers have the potential to alleviate frictions by enabling households to invest and accumulate capital up to K^*, and in the process, achieve occupational upgrading. This will depend on the size of the cash transfer relative to the gap in capital levels: $\Delta K = K^* - K_*$. In a dynamic extension to the model with additional assumptions on the shape of the production function, if the amount is too low, then gains will be transient and only realised in the short term, with capital levels returning to the unproductive equilibrium level K_*. In our empirical distribution of productive capital, we find that the difference between the two modes is approximately 1,000 USD PPP, just under half of the cash transfer. We take this as suggestive evidence that the cash transfers are sufficiently large as to shift households from the unproductive level of capital to the productive level. The order of magnitudes are appropriate for our setting and consistent with our results on the effects of cash transfers on the distribution of capital.

The effect of this higher level of capital K^* on labour allocations is more nuanced. First, greater capital accumulation lowers the household's labour supply through standard income effects, $L^S(w, K_*) > L^S(w, K^*)$, ceteris paribus. Second, if there is capital-labour complementarity in the household production function, then labour demand will increase, $L^D(w, K_*) < L^D(w, K^*)$, ceteris paribus. Importantly, these comparative statics hold the market wage and other prices fixed. Given that we find no evidence of price and wage effects from the cash transfers, consistent with other research in this setting (Egger et al., 2022), we proceed holding these prices as fixed.

Let w^* denote the shadow wage earned by households in the equilibrium with K^*, the productive level of capital. If the constraint on outside labour still binds, then $w_* < w^* < w$: households earn a higher shadow wage, but labour supply and demand are still inefficient, as per our previous results. However, if the constraint no longer binds, then the shadow wage equals the market wage $w^* = w$ and labour allocations are efficient:

$$L^S(w, K^*) = L^D(w, K^*) + L^O(w, K^*) < L^D(w, K^*) + \overline{H}. \tag{7}$$

The main intuition of this result is that even if cash transfers may have no direct impact on alleviating labour market frictions, there is an indirect benefit to households of increasing the shadow wage from their labour. However, this is only true for households where the labour constraint binds. Moreover, cash transfers may also enable households to make decisions unconstrained by such frictions. Specifically, by increasing the productivity of household firms, binding constraints on the supply of outside labour supply may no longer bind, and allow the household to make optimal labour decisions, and achieve separation between production and consumption decisions.

How can we qualitatively assess the magnitude of such a labour market friction? Our model implies that there is an ambiguous effect of cash transfers on total labour supply: higher capital has an income effect which lowers total labour supply, but a higher shadow wage has a substitution effect which increases total labour supply. Therefore, we can decompose the change in total labour supply into substitution (positive) and income (negative) effects:

$$\Delta L^S = L^S(w^*, K^*) - L^S(w_*, K_*) = \overbrace{L^S(w^*, K^*) - L^S(w_*, K^*)}^{\text{substitution effect (+)}} + \overbrace{L^S(w_*, K^*) - L^S(w_*, K_*)}^{\text{income effect (-)}}. \tag{8}$$

If total labour supply increases, $\Delta L^S > 0$, then the substitution effect must dominate the income effect, implying that the shadow wage must have been significantly below the market

wage, $w_* << w$. Our results show positive total labour supply effects, driven by households with the unproductive capital stock, indicative of a large gap between the shadow and market wages and of the severity with which the constraint was binding for households.

Furthermore, a key implication of our model is that a household's outside labour supply will decrease if the labour market friction is no longer binding: $L^O(w^*, K^*) < \overline{H}$. This has additional implications as well that at the new equilibrium, the household's shadow wage is equal to the market wage and labour allocations are efficient. From our results earlier, we find a negative and statistically significant result on outside labour supply for cash transfer recipients. These results also imply that in response to cash transfers, households with the unproductive capital should have separation between consumption and production decisions. When mapping unproductive households to households with neither cattle nor enterprises, our regressions of labour demand on household demographic composition are consistent with this interpretation.

This model highlights the mechanism through which cash transfers can facilitate occupational upgrading, which in turn enable households to achieve separation, and make efficient production decisions. The household firm is now able to allocate factors to maximise profits, unconstrained by household preferences. Therefore, cash transfers can impact the allocative efficiency of households.