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Expropriation, compensation and transitions to new livelihoods: Evidence from an expropriation in Ethiopia

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Abstract

Government intervention in land transactions is common in developing countries, especially where land markets function poorly. This is the case in Ethiopia, where expropriation of farmland from small-scale farmers has been used by all levels of government as a tool for providing new land for industrial investors, commercial agriculture and expanding cities. This paper evaluates the impact of such a policy on a group of small-scale farmers whose land has been taken to make room for a large factory. Baseline data was collected in the year before expropriation and a follow up survey was conducted 8 months after households lost their land and received payment. On average, household lose 70% of their land and receive compensation payments that are about 5 times the value of annual consumption expenditure.

I find that households in the treatment group increase their consumption, start more businesses and participate more in non-farm activities than households that do not lose farmland. These households also reallocate their livestock portfolios away from oxen and towards small ruminants and cattle, reflecting a shift away from growing crops. However, all of these changes are relatively minor compared to the increase in savings: with the exception of a few households, most of the compensation payment is left in the bank.

Keywords: Land expropriation, Ethiopia, agricultural investment

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1 Introduction

Government intervention in land transactions is common in developing countries, especially where land markets function poorly and land is held in small, fragmented plots. Expropriation and compulsory purchase of farmland from small-scale farmers are important economic policy tools that enable governments to consolidate agricultural land and provide space for industry and urban expansion.[1] China, for example, has relied heavily on expropriation to meet the demand for land for industry, infrastructure and urban expansion (Ding, 2007). These policies are not without controversy. Across Africa, Asia, and Latin America, land for large-scale commercial farms is often acquired through expropriation (Cotula et al., 2009) and this has been a cause for concern amongst many NGOs and advocacy groups[2]. In West Bengal, the compulsory acquisition of farmland for a Tata factory lead to political unrest and violence (Banerjee et al., 2007; Ghatak et al., 2012). Without major changes to land markets, expropriation will continue to play an important part in the process of industrialization and development.

Expropriating farmland deprives rural small-holders of one their most important income-generating assets and forces them to find new livelihoods. Governments recognize this, and often provide households with compensation, which in some cases takes the form of a lump-sum payment. But are these lump-sum payments sufficient to compensate households for the land that is taken? A natural way to assess this is to determine whether a household's permanent wealth has changed as a result of the intervention. Evaluating this requires some understanding of how households adjust their asset and activity portfolio after losing land. It also requires an understanding of what households do with large lump-sum payments; households may use lump-sum payments for productive investments such as livestock or a new business or may look for paid wage employment, choosing to save or consume their payment instead. Changes to permanent wealth may also be reflected in household consumption, with increasing consumption an indication of increased wealth. However, previous liquidity constraints and behavioural biases may render changes in consumption a poor measure of changes in permanent wealth.

Beyond the analysis of the Singur case in West Bengal in Ghatak et al. (2012) and Banerjee et al. (2007), very little is known about what happens to households that lose their land or the way in which they find new income generating activities. In this paper I explore these questions in detail using an impact evaluation of an expropriation and compensation program that occurred in Ethiopia. I evaluate the extent to which households use financial compensation payments for productive investments, the change in their income-generating activities and the change in levels of consumption following expropriation. I focus specifically on evaluating the effect of the program on a number of key household outcomes, including consumption, asset ownership, livestock holdings, savings and labour market participation.

I use data from a survey of rural households in Ethiopia that had their land expropriated to build a factory. Expropriation of land from small-scale farmers is commonly used by

[1] Work by Adamopoulos and Restuccia (2014) highlights the effect of inefficient land market allocation on cross-country productivity differences.

[2] Oxfam recently launched a campaign calling for a moratorium on land grabs in part because of the consequences for households displaced by investors (Geary, 2012).

the Ethiopian government to provide land for rapidly growing cities and industrial investment projects. Surveyed households received a lump-sum compensation payment for their land, which was intended to help them transition to new income generating activities. On average, these households lost 70% of their farmland and received compensation payments worth 5,200 USD (the equivalent of 4.7 times total annual consumption expenditure and 9 times the value of livestock). A baseline survey was conducted one year prior to expropriation, but following the announcement of the project, and a follow-up survey was conducted eight months afterwards. A group of households that did not lose land were selected from within the same administrative area to serve as a comparison group. The timing of the data collection and the inclusion of a comparison group permit me to evaluate the way in which the program affects households' asset and activity portfolios, their consumption and their ability to cope with the challenge of finding new income generating activities. I find that, on average, the households that lose their land increase their consumption, start more businesses and increase their livestock assets. However, with the exception of a few households that make large lumpy investments, the increase in investment in productive assets is dwarfed by massive increases in cash savings. Households also shift assets away from agriculture uses and spend more time in non-farm work, although the change is not large.

The paper proceeds with a brief review of the literature on expropriation and compensation, and the literature on how rural households use cash transfers. Section 2 discusses the policy context and the intervention in more detail. Section 3 discusses the data, empirical strategy and identifying assumptions required to estimate the treatment effect. Finally, section 4 presents results, robustness checks and a discussion.

1.1 Related literature

Land expropriation and cash payments are inextricably linked components of the policy intervention. There is a large literature on both expropriation and cash payments individually, but very little that studies their effect together. The exception to this is Ghatak et al. (2012), who study the aftermath of a land expropriation in India, where the government in Singur, West Bengal acquired farmland from households to build a car factory. In this setting, compensated households experienced slower income growth in the 5 years following expropriation and a majority of households reported spending their payment on house improvements and savings in the bank, rather than investing in new businesses. Households that relied heavily on agriculture for their livelihoods - owner-cultivators and agricultural wage workers - were adversely affected by the policy and to a greater extent than households headed by non-agricultural wage workers.

The large body of research on land expropriation tends to focus on the effect of expropriation risk on ex ante investment incentives and on the impact of improving tenure security in countries where the risk of expropriation is high, rather than on evaluating what happens to households that lose their land. Typically, households that anticipate expropriation adjust their land-based investment, avoiding investments that are immovable or where the value cannot be verified (Ali et al., 2011; Deininger and Jin, 2006; Fenske, 2011; Jacoby et al., 2002). In some cases, households respond in the opposite way, investing in immovable assets precisely to reduce the risk of expropriation (Besley, 1995). Ghatak and Mookherjee (2013) explicitly model land expropriation in a setting where

farmland can be expropriated by a landlord or local government and sold on to an industrialist, showing that the size of compensation payment, even if it is not linked to land quality or verifiable investments, affects ex ante investment incentives for farmers.[3] In contrast, this paper illustrates the ex post consequences of expropriation and gives some suggestive evidence about the adequacy of the compensation in the Ethiopian setting.

Cash compensation payments are often provided to help households that lose land make the transition from farming to non-farm livelihoods; the adequacy of compensation depends in part on what households can do with cash transfers. There is a large literature that evaluates how households and small enterprises deal with cash transfers, which finds that, amongst many things, cash payments can assist unemployed youth in transitioning toward trades and formal businesses (Blattman et al., 2013), increase returns for owners of micro-enterprises (de Mel et al., 2008; Fafchamps et al., 2014) and increase consumption, durable assets and investment (Gertler et al., 2012; Haushofer and Shapiro, 2013). These papers fit into a broader context that suggests that rates of return on investment in developing countries are very high (Banerjee et al., 2005). However, for all the benefits that accrue to households from cash transfers, many of these papers also find heterogeneity in the effect of cash payments on investment and household businesses.[4] These papers generally suggest that cash payments can be effectively used by households in developing countries, but the parallels with the intervention studied here should not be taken too far. First, in the literature on cash transfers, the cash transfer is typically the only policy intervention, whereas in my context households lose their land as well. Second, the magnitude of the transfers in these papers is much smaller. Out of the papers discussed, Haushofer and Shapiro (2013) analyzed the effects of the largest cash payment, which was 1,300 USD. This amount is lower than the payment received by 85% of the treated households in my sample. Although cash transfers can be effectively absorbed at a small scale, there is no reason to think that households receiving very large cash payments will be able to use the money effectively.

2 Policy context, timeline and description of the intervention

2.1 Land ownership, expropriation and compensation in Ethiopia

The Federal government owns all rural land in Ethiopia and can expropriate land from anyone if it is deemed in the national interest. Small farmers have user rights over their land, which entitle them to lease out land for short periods of time and to give land to their children. However, individuals do not have the right to sell land, which means

[3] Ghatak and Mookherjee (2013) argue that households should be over-compensated, in the sense that they should receive a payment that is greater than what the household receives from farming. They argue that households should be given a greater share of the economic surplus that is generated by transforming agricultural land into industry. In a setting like Ethiopia, where there is no established price for farmland, one might think of this value as the expected net change in household income resulting from expropriation.

[4] For example, Fafchamps et al. (2014) and de Mel et al. (2008) find that cash transfers do not yield positive returns for female micro-entrepreneurs. de Mel et al. (2008) also find that returns vary widely with the owner's entrepreneurial ability.

that land markets in rural areas are very thin (Ali et al., 2011; Deininger and Jin, 2006). Expropriation of land is therefore the most common way that land is transferred from small-scale farmers to industrial uses. Federal laws on expropriation entitle households to compensation if their land is expropriated. Households can be compensated with equivalent land in another part of the area where they live, or, if there is no land, financial compensation. Officially, households should be paid 10 times the market value of what can be produced on their land. In practice, this figure is impossible to calculate for an individual plot so administrators calculate a common price per square metre for the whole project area instead. For the project evaluated in this paper the compensation price reflects whether the plot is used for grazing, growing rain-fed crops for one season only (Meher land), or growing crops for two seasons (irrigated land). Households are also compensated for any trees or improvements that are on the expropriated plots and for their house. Households that lose their homestead are provided with a plot of land and money to rebuild their house.

2.2 Survey area, investment project and timeline

The survey was conducted in a rural administrative area next to the town of Kombolcha, Ethiopia. Kombolcha is a town of 60,000 people that has recently been designated as a target for industrial investment by the Federal Government of Ethiopia. Kombolcha is known for being a major transport hub as it lies on one of the roads the goes from Addis Ababa to Djibouti, and for some existing industry, including a textile factory, a brewery and a steel plant. In recent years, rural land around the town has been expropriated to make space for a new airport and for large industrial projects. The area of land where the survey was conducted was allocated to an Indian textile firm in 2009 as part of an initial investment agreement, however the land was never transferred to these investors.[5] In early 2012, the land concession was transferred to a major Ethiopian company that plans to build a steel factory and in January 2013 land was expropriated. The survey area itself is close to the town of Kombolcha and is well connected by a main road that runs through the area. The closest parts of the survey area border the town, whereas the farthest parts are approximately two hours from the town centre by foot. Given the proximity, most households are well connected to economic activity in the town: most households purchase and sell their produce at the main market, many individuals look for casual labour in town and high-school students attend school in Kombolcha.

The area of land for the investment project covers approximately 340 hectares out of a total land area of 1100 hectares from the survey area and expropriation affected 626 out of 1100 households living in the area. The land was chosen primarily because it is a large contiguous piece of flat land that is well connected to the road. A map of the survey area in figure 1 shows the project area outlined in red with the road to Kombolcha marked in blue. In addition to the project area, this map shows the location of households, with treated households indicated with red markers and control households indicated with green. Many of the households that lose land do not live inside the project boundary, but own at least one plot inside the project boundary. The western edge of Kombolcha town borders the right hand side edge of the map.

[5]Further details about the baseline survey can be found in a companion paper by Harris (2014) (other chapter) that studies the effects of anticipating expropriation on agricultural investment decisions.

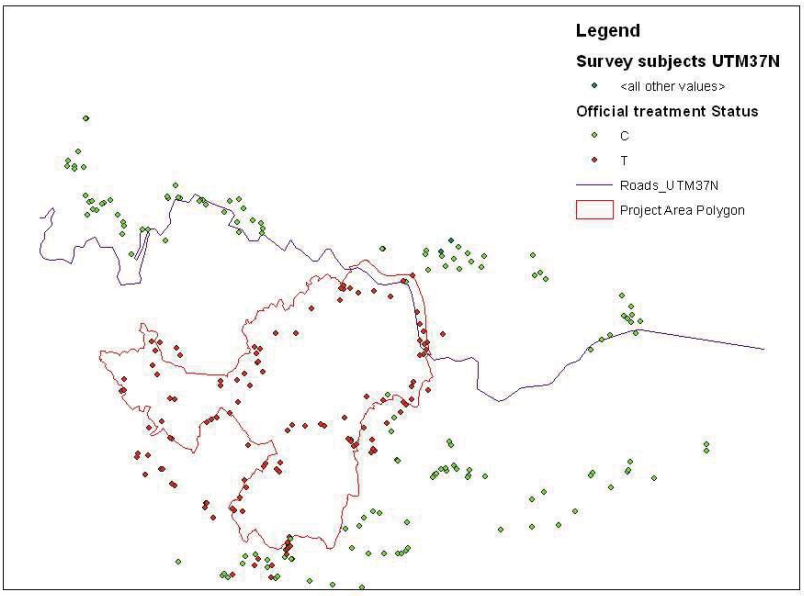

Figure 1: Map of survey area showing HH location - treatment (red), control (green) at baseline

Table 1 on the following page summarizes the available administrative data on expropriation and compensation, and breaks down the total household compensation payment for farmland by category.[6] In total, 626 households received compensation for two projects that were happening in the survey area.[7] Households lost 288.3 ha of Meher[8] farmland, 21.6 ha of irrigation land and 25.5 ha of grazing land for which they were paid 14.7 Birr ($0.80), 30.9 Birr ($1.70) and 5.1 Birr ($0.28) per square meter, respectively. Land prices were calculated using 5-year averages of local agricultural yields and market prices for a number of key crops grown on each type of land. Prior to expropriation, local officials conducted a cadastral survey to establish how much land each household owned and to classify each plot as Meher land, irrigated land or grazing land. Basing payment on the land type means that total compensation payments will not correspond one-to-one to the quantity of land a household loses since the type of land affects the unit price of land. Furthermore, households were compensated for any trees on the plot, so payments may vary across plots of the same type. Despite this variation, the quantity of Meher land lost is the most important determinant of compensation payments. Table 1 shows that 96% of treated households received some compensation for Meher land and that, on average, this accounts for 84% of household's compensation.

[6]The administrative data does not include information on compensation for lost homesteads.

[7]Land was taken from the centre of the survey area for a steel factory. This area is indicated in red on the map. Land was also taken on the edge of town to make room for a new landfill and to expand urban housing. This occurred at the same time as the expropriation for the factory and so I treat them as the same intervention.

[8]Meher farmland is rain-fed agricultural land used only during the main growing season.

Table 1: Breakdown of administrative compensation payment data by category

		Mean payment (Birr)	Mean share of total payment	Share of HH receiving any payment
Category of land:	Meher (one season)	68,010	84%	96%
	Irrigation	10,695	8%	19%
	Grazing	2,086	3%	33%
	Trees*	7,275	6%	44%
	Total payment	86,375	-	-
		Mean area taken (ha)	Total area taken (ha)	
Category of land:	Meher (one season)	0.46	288.3	
	Irrigation	0.035	21.6	
	Grazing	0.041	25.5	

Note: Data on compensation paid for trees is only available for one of the two projects, which comprises 418 out of 626 affected households. At the time of data collection 1 USD was equal to approximately 19.2 Ethiopian Birr.

The timing of the data collection relative to the timing of the process of expropriation is a critical part of the identification strategy used in this paper. Although baseline data was collected prior to expropriation, households in the survey area were aware that their land had been identified by a potential investor. Investors identified the land in the project area in early 2009 and in June 2009 the government conducted a cadastral survey of the project area to calculate compensation payments for expropriated households. The city government told households that their land would be taken following the main harvest in November, but this did not occur and in the subsequent years the investment timeline was revised and expropriation delayed. In early 2011 the government once again announced that land would be taken in December and once again expropriation was postponed. During September 2011 we conducted the baseline survey. Following further delays, the government transferred the land concession to another investor in January 2012. The land was ultimately expropriated following the main harvest in December 2012 and the follow up survey was conducted in October 2013.

2.3 Description of the intervention

Households in the treatment group are formally defined as those that report having had any of their land expropriated between rounds.[9] But what does it mean for households to be in the treatment group? Fundamentally, the intervention has two related components: 1) households lose their farmland and 2) they receive a cash payment that is a function of how much land was taken. Land holdings are fractured and distributed widely across the survey area, so there are many households that lose some, but not all of their land. In addition there is a high degree of uncertainty about how the policy is enacted: households were unsure of when and whether their land would be taken and often have little knowledge of the process of calculating compensation.

[9]Specifically, households were asked: "Did you lose any land as part of the expropriations in this kebele in the last two years?" Although this is a subjective measure of expropriation, it accords fairly well with official records. Appendix A validates these measures using official government records.

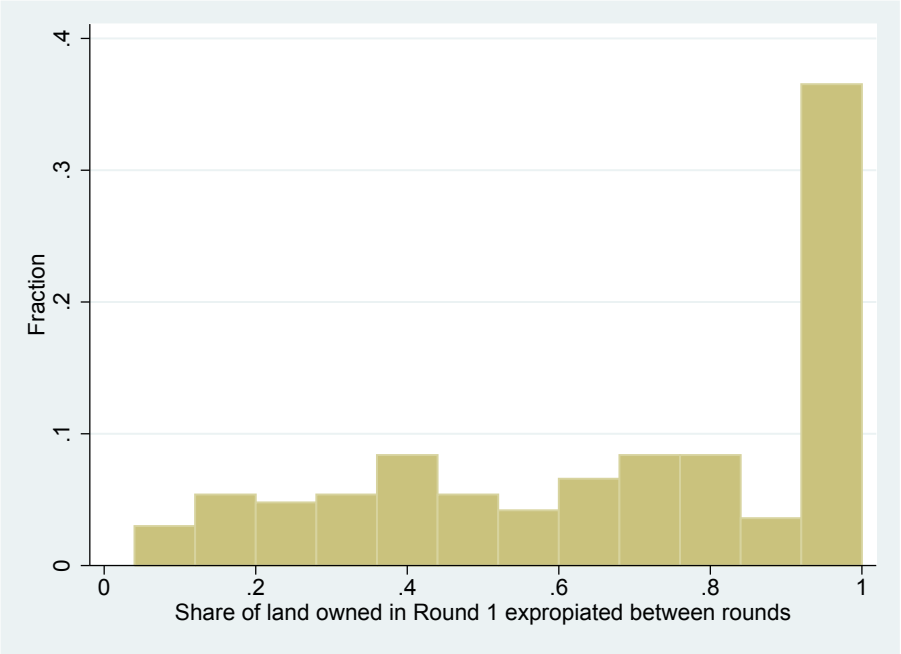

Figure 2: Distribution of share of land expropriated from treated households

Figure 2 plots the distribution of land lost by the treated group calculated as a the share of land owned in round 1 that was expropriated by round 2.[10] Treated households lost, on average, 68% (median 75%) of their initial land holdings and approximately 35% of households in the treated group lost all of their land between rounds. The distribution of compensation payments also varies greatly across the sample of treated households. Figure 3 shows the distribution of reported compensation payments in Birr and indicates the level of median total annual consumption expenditure as a benchmark. The median reported compensation payment was 85,500 Birr (4500 USD) and the average payment was approximately 100,000 Birr (5,200 USD). These payments are very large; on average, compensation payments are 4.7 times higher than total annual household consumption expenditure and for some households as much as 10 times higher. Compared to household assets, compensation payments are also very large: the median household received a payment 8.8 times the value of their livestock and 40 times the value of their non-productive assets. This policy intervention represents a major change in life circumstances for treated households, although the portion of land lost and the size of compensation varies across households.

There is uncertainty along a number of dimensions with this policy, both with respect to how the policy was implemented and whether a household would be affected. Half of the households in the treatment group lodged complaints about the measurement of their land and/or the total payment they received, suggesting that they expected different payments. Households also reported receiving their payments at very different times (this may be a function of recall). On average, households received their payment 2 months after they lost their land, with about 10% of treated households facing a delay of more

[10]Information about the treatment status of a particular plot comes from recall data that was collected about every plot that households listed during the baseline survey. Details about this data can be found in a companion paper by Harris (2014) (other chapter).

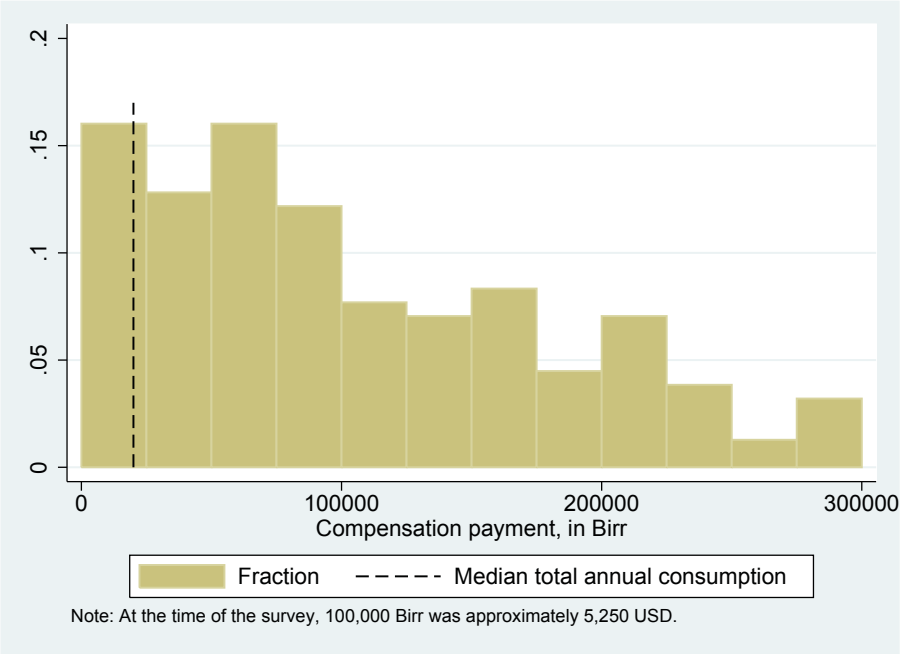

Figure 3: Distribution of compensation payments

than 5 months. Households have had their compensation payments on average for 8 months, with months since payment ranging from 0 to 16 months. The land was only taken 9 months before the survey, so reports of longer durations may relate to other expropriation programs that happened in the area. In rare cases there are households that are still waiting for payment.

Data on expectations of expropriation collected during the baseline survey are sometimes at odds with a household's realized treatment status, suggesting that households faced a high degree of uncertainty about whether they would actually lose land. This is perhaps due to a long history of delays in the implementation of the land expropriation program, and also a lack of communication and information between officials and households.[11] Panel 1 of table 2 shows the discrepancy between household's expectations and realized outcomes; the shares are equivalent to 70% of households in the sample being correct in their assessment of their treatment status.[12] Local officials also had incomplete information about which households would lose their land. Panel 2 of table 2 shows the treatment status of a household reported by the local officials in round 1 compared to the realized outcome: in this case, 72% of households were correctly identified as treatment or control.[13]

[11]The fact that a number of households were ultimately incorrect about their treatment status could be a very interesting source of variation that would allow one to separate the effect of expected and actual expropriation. Unfortunately, sample sizes are too small to exploit this variation.

[12]Those households that predicted that they would not lose land within 1 year were ultimately proved right as the land expropriation was delayed by one year following the baseline survey.

[13]The final size of the project was reduced from the initial proposed size between rounds, which may explain why households thought they would lose land, but found themselves in the control group. Some households also live near the town of Kombolcha, where land was taken to expand the city at the same time as land was taken for the factory; this ambiguity may explain some of the confusion behind the answers given by local officials and households.

Table 2: Baseline expectations of treatment status compared to realized status

			Share of HHs that actually lost land:
(1)	Do you expect to lose land within 1 year (baseline)?	No (n=169)	37%
		Yes (n=127)	80%
(2)	Local official's assessment of HH treatment status (baseline):	Control (n=164)	34%
		Treatment (n=130)	82%

The nature of the policy intervention differs greatly depending on how much land a household loses. For some households the policy intervention is very disruptive: they lose a major income-generating asset and are given a massive cash payment instead. Land is the most important asset for many households in this area; it provides a steady source of food for the household and can be sharecropped out by older households once they are too old to farm the land themselves. As compensation, households receive cash payments that are probably larger than any amount of money that households have held at one time. For households that lose less land and receive smaller payments, the intervention is much less disruptive and may have very different effects.

3 Data description, empirical strategy and identification

The baseline survey was conducted in September 2011. We planned to survey 300 households drawn from 19 sub-villages in one Kebele (the smallest administrative unit in Ethiopia) in which the expropriation was to occur. The sample was restricted to households living in the Kebele at the time of the survey. Together with local officials we identified treated and control households from the Kebele administrator's household list. 15 households were randomly sampled from each of 16 sub-villages where the treatment status was common across the village. In two villages which contained a mix of treatment and control households we randomly sampled 30 households. One village of the 19 was excluded from the sample because their land had been taken in previous years. During the analysis of the baseline data it became clear that the official's assessment of the household's treatment status did not coincide with the household's own assessment. At the end-line this discrepancy was confirmed: the treatment status was correctly identified by officials for 72% of the sample. There are three main reasons for this: 1) the size of the factory project area was reduced between rounds, 2) an additional area of land was expropriated to expand the town and 3) any random errors on the part of local officials who did not know exactly which households would lose land.

The end-line survey was conducted in October 2013 and every effort was made to follow households that had moved away and to interview the same respondent as in round 1. Where the household head had died, we interviewed the new household head, if that individual had been part of the household in the previous round. If the household had divided, we interviewed those people remaining in the main home. Out of 299 households interviewed during the baseline survey, 1 household refused to be interviewed and 2 respondents were too old to complete the survey on their own, so others completed

partial information on their behalf. Most households still lived in the same place as they had in round 1, except for a small number of households had moved to the nearby towns of Komobolcha (approximately 3km from the centre of the Kebele) or Dessie (approximately 17km from the centre of the Kebele) and one household had moved to the far west of Ethiopia. Out of 298 surveys, 82% were conducted with the same respondent as in round 1 and 95% reported having the same household head, thus attrition is not a major problem.

3.1 Conceptual framework

How might expropriation and compensation affect household behaviour? In this analysis, I think of households as having a portfolio of activities chosen with a view to mitigate risk and accumulate assets for future consumption or investment. Income generating strategies employed by the household depend on inherent characteristics of the household, such as business skills or education, household endowments and on the asset portfolio owned by the household. The policy intervention disrupts this balance, essentially forcing households to liquidate their land assets, which had previously been impossible to do. In response to this change, households rebalance their asset portfolios, which now contain a large cash component and choose a new portfolio of income generating activities to replace the flow of agricultural income. As before, households adjust their portfolio to generate income, mitigate risk and accumulate assets. With less land and with large cash reserves, one would expect households to adjust asset portfolios away from agricultural production and towards investment in new businesses, livestock and other assets that yield a return that exceeds what is paid in interest by the bank. One would also expect households to supply labour that is no longer used for agricultural to local labour markets or household businesses.

The degree to which households can react in these ways to expropriation may be complicated by a number of factors including: 1) the slow speed of adjustment to new asset or activity portfolios, and 2) exogenous constraints such as physical limits to livestock herd size or rationing of low-skilled jobs that may limit employment opportunities. The combined adjustment of asset and activity portfolios contribute to a new permanent income for household's which, in turn, affects their consumption decisions. In this sense, changes in consumption due to expropriation could be attributed to changes in permanent wealth. I use this stylized framework to interpret the results of the impact evaluation and ultimately try to say something about the adequacy of compensation payments.

3.2 Empirical strategy

I estimate the average treatment effect of losing land and receiving compensation on a number of key outcomes, including, household consumption, savings, asset holdings and off-farm work using the following first difference regression specification:

$$\Delta y_{it} = \rho T_i + x'_{iB}\beta + \Delta\epsilon_{it} \tag{1}$$

where subscript i denotes households and subscript t denotes the time period, taking a value of $t = B$ at baseline and $t = E$ at end-line. Δy_{it} is the change in the outcome

of interest for households i, T_i is an indicator for whether the household lost any land to expropriation, and x_{iB} is a set of household controls measured at baseline. The first difference specification eliminates the effect of any fixed household characteristics such as household productivity or risk preference, but does not control for differential trends across various types of households. For this reason I include control variables that enter the regression as differential time trends, based on baseline household characteristics. These characteristics are mostly fixed at baseline and include household size and household head's age, gender, marital status and literacy. I also include the quantity of land owned by the household at baseline, to control for the likelihood that a household will lose any land at all. The object of interest in this regression is ρ, which captures the difference in the outcome of interest that can be attributed to losing some land and receiving a cash compensation payment.

The basic specification simply reflects the average change in the outcome of interest due to losing any land for the investment project. However, as section 2 illustrates, the intervention varies greatly across households: some households lose more land than others and as a result receive a larger compensation payment. I test how the size of the compensation payment (and implicitly the loss of land) affects the change in the outcomes of interest by splitting the treatment group into two, where one group is those that receive payments above the median payment and the other is those that receive payments below. I estimate the treatment effect for these groups using the following first difference regression specification:

$$\Delta y_{it} = \rho^A T_i^A + \rho^B T_i^B + x'_{iB}\beta + \Delta\epsilon_{it} \tag{2}$$

where T_i^A is an indicator for households that receive payments above the median payment and T_i^B is an indicator for households that receive payment below the median.

The key outcomes of interest are chosen to reflect elements of the conceptual framework above. They include the most important income generating activities, assets for households and a measure of consumption. I estimate the effect of expropriation on household consumption, non-farm labour supply, asset holdings - specifically, livestock assets, agricultural assets and other assets - and savings. Land holdings are excluded from the outcome variables since it is directly affected by the intervention.

3.3 Identification

The average treatment effect can be identified if the household's treatment status is uncorrelated with characteristics of the household at baseline. Differencing eliminates any omitted variables that are fixed across time, but there may be time-varying characteristics that can bias estimates. Furthermore, a household's treatment status will not be random, given the population of households that the sample is drawn from. Treatment status is defined by losing at least some land, which means that a household's treatment status is necessarily related to the quantity of land that they initially own. This implies that households that own no land at all must be in the comparison group[14] and, all else equal, households with more land have a higher likelihood that at least one of their plots will

[14]Households without farmland could lose their house and would then be included in the treatment group. I abstract from this given the small number of treated households that lose their house.

be contained within the project boundary. To account for this, I include baseline land holdings as a control variable in all regression specifications.

However, there are a number of reasons to think that a household's treatment status (conditional on controlling for baseline land holdings) is uncorrelated with omitted variables and that I have a suitable comparison group. First, the sample is drawn from a small 3km by 3km area, so treated households have access to the same markets, schools, health facilities and political institutions as the control group. Second, although the baseline data was collected after the announcement of the project, land law in Ethiopia prevents households from selling their farmland and moving away. This means that households cannot select out of treatment and factors such as human capital, asset holdings and livestock will be predetermined with respect to treatment. Table 3 shows the statistical balance between treatment and control for the included control variables and the outcomes of interest. It is possible that households will adjust some behaviour in anticipation of expropriation, for example by borrowing money against an anticipated cash windfall. (Anticipation effects are explored in more detail in a companion paper by Harris (2014)). Indeed, the third panel of table 3 shows that 60% of households in the treatment group expected their land to be taken within one year of the baseline survey. However, if ex ante behaviour moves in the same direction as behaviour following expropriation, the average treatment effect will be biased downward.[15] Despite this possibility, households actually seem to be quite limited in the short term changes they can make - credit access is limited, so households are not able to borrow in anticipation and labour may have to be kept on the farm while households still own the land.

Another threat to identification is that households may manipulate the political process to ensure that their land is or is not included in the project area. However, households' plots tend to be scattered across the project area and so for the majority of households any political manipulation is only likely to affect the magnitude of compensation or the amount of land taken rather than a household's binary treatment status. Finally, we might worry that the project area was selected by the investors because of the characteristics of the households living in it. This is unlikely, since the investors are more concerned with finding a large, flat, contiguous piece of land than targeting particular types of individuals or acquiring land from the most fertile part of the project area. Households across the survey area hold flat land, but their holdings are fractured and small relative to the overall size of the project area, so it would not benefit the investors to target specific households nor would we expect households holding land in the project area to be systematically different from households in other parts of the survey area that were not selected into the project area.

This empirical specification does not account for any spillover effects from treated households to households in the control groups. Treated households receive large cash payments for their land and it is possible that this could lead to improved credit access, informal insurance and local labour hiring conditions for comparison households. Although these may not be first order considerations, they could lead to systematically underestimating the treatment effect (Angelucci and Giorgi, 2009). Similarly, control households are not isolated from the benefits (or costs) that come from building a factory in their neighbour-

[15]For example, if households wanted to ease into new off-farm activities, they may choose to do this in anticipation of expropriation. The treatment effect estimate would then understate the true effect of expropriation on occupation choice.

Table 3: Statistical balance between treatment and control households

		Control (n=133)	Treatment (n=164)	t-stat of difference (T-C)
Controls	Household size	4.74	5.18	1.97**
	Female head, {1,0}	0.26	0.18	1.63
	Head age	50.5	50.0	0.42
	Head married, {1,0}	0.71	0.79	-1.56
	Head sep/div/wid, {1,0}	0.27	0.18	1.79*
	Land owned (ha)	1.18	1.29	1.32
Outcomes	Total consumption (Birr)	22,429	24,198	0.97
	Total savings (Birr)	3,411	1,481	-1.98**
	Non-farm work or business, {1,0}	0.48	0.52	0.63
	Agricultural asset value (Birr)	360	391	0.89
	Non-agricultural asset value (Birr)	1,769	2,188	0.94
	Livestock value (Birr)	10,356	11,430	0.93
Other	Expect expropriation w/in 1 year, {1,0}	0.20	0.62	8.26***
	Expect expropriation w/in 5 years, {1,0}	0.36	0.74	6.91***
	Trust land committee, {1,0}	0.90	0.77	3.06***

Notes: t-statistics for the difference in means are calculated assuming unequal variance. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1.

hood and will benefit from any local externalities, such as job creation resulting from the new factory. In this way, control households do not provide an exact counterfactual for losing land and receiving financial compensation. Rather, the control group tells us what the treated households might have done if their neighbours land was taken away rather than their own. Given that large projects such as this factory will often provide different benefits (or costs) for the households that lose their land and for those that remain behind, this comparison can tell us much about how households respond to land expropriation programs.

3.4 Inference

Sample selection was stratified at the sub-village level and, as such, I adjust the standard errors on my treatment effect estimates to account for village-level clustering. However, the sample only contains 16 clusters, which can lead to over-rejection of the null hypothesis. Cameron et al. (2008) simulate data with a clustered error structure and show that with 15 clusters an ad hoc adjustment to the t-distribution can adequately correct for the over-rejection of the null hypothesis due to a small number of clusters. They recommend using a T distribution with $(G-k)$ degrees of freedom, where G is the number of clusters and k is the number of included regressors that do not vary within clusters. Throughout the paper, I calculate p-values using this adjustment, and report statistical significance accordingly.

Furthermore, I am estimating the average treatment effect for a number of key outcome variables. In order to account for running multiple hypothesis tests, I present Bonferroni adjusted p-values alongside the normal p-values. These p-values are almost certainly too conservative since they assume that each outcome, for each household is independently drawn. Considering that many outcomes within categories are correlated I make an ad

hoc adjustment to allow for this correlation following Aker et al. (2011). Both adjusted p-values are reported using the following transformation:

$$p_{adj} = 1 - (1 - p_{unadj}(k))^{g(.k)} \tag{3}$$
$$g(.k) = M^{1-r(.k)}$$

where M is the number of outcomes, k, being estimated, $p_{unadj}(k)$ is the unadjusted p-value for outcome k and $r(.k)$ is the average correlation between the $(M-1)$ other outcomes. The Bonferoni adjustment is the limiting case of this transformation where $r(.k) = 0$. The adjusted p-values are reported alongside the the regression results in the main results table below.

4 Results

4.1 Key indicators

Regression results are presented for each of the key outcome indicators in table 4.[16] Full tables showing regression results for a wider sub-set of outcomes related to each of the key outcomes are in the appendix. I examine each of the indicators in more detail below, but the most striking result, at the outset, is that the most of the money received by households is kept as savings in the bank. Although some households have increased their non-farm assets and started new businesses, this average increase is dwarfed in magnitude by the average effect on household savings. Furthermore, most of the treatment effect on non-farm assets is driven by 9 treated households purchasing expensive motorcycle taxis. There is suggestive evidence that households have increased the value of livestock holdings and their participation in off-farm activities, but these effects are not statistically significant. Even adjusting for running multiple hypothesis tests, the trend is clear: beyond a small effect on consumption, most of the compensation payments are left as savings in the bank.

The following section examines the effect of expropriation on consumption, savings, assets and labour markets in more detail, analyzing a subset of indicators related to and making up the key indicators, and breaking down treatment by the size of payment, to explore the heterogeneity in how households respond to expropriation.

4.1.1 Consumption

Total nominal consumption expenditure increased by 6,300 Birr more for households that had land expropriated, an increase that is statistically significant at the 90% level. Measured in round 1 prices, this effect is 20% of the average baseline level of expenditure. What components of the consumption index drive this change? Table 6 presents regression results using the main empirical specification, where each row corresponds to a regression explaining a component of the total consumption measure. Model 1 refers to the main specification outlined in equation 1 and model 2 refers to the specification that

[16] Table 9 in the appendix estimates the treatment effect on each of the key indicators without household demographic controls and without controlling for initial land holdings. The treatment effect estimates are similar to the main results across all specifications.

Table 4: Treatment effect estimates for key outcomes

	(1) Mean of DV at baseline	(2) Treatment effect	(3) N	(4) Unadjusted p-value	(5) Partial adjust-ment	(6) Bonferoni adjust-ment
Total consumption (Birr)	23,225	6,285*	293	0.0643	0.270	0.329
		(3,148)				
Total savings (Birr)	2,199	58,305***	288	0.000	0.000	0.000
		(5,781)				
Participates in off-farm activity, {1,0}	0.502	0.0765	295	0.195	0.642	0.728
		(0.0564)				
Value of agricultural assets (Birr)	376.8	-69.47	295	0.464	0.948	0.976
		(92.37)				
Value of non-agricultural assets (Birr)	1,872	5,404*	295	0.0842	0.341	0.410
		(2,921)				
Value of livestock (Birr)	10,954	2,348	295	0.132	0.489	0.572
		(1,474)				

Notes: Each row corresponds to the first differenced regression in equation 1 explaining the outcome variable specified. All financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. I report only the treatment effect of losing land, but control for differential trends based on household size, head characteristics and baseline land holdings. Standard errors reported in column (2) are clustered at the sub-village level and there are 16 clusters. t-statistics are compared to a T distribution with $(G-1)$ degrees of freedom and statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1. These critical values do not account for multiple hypothesis tests. Column (3) reports the number of observations, which varies depending on whether there is missing data. Columns (4) to (6) calculate p-values with increasingly strict adjustments for multiple hypothesis tests: column (5) reports p-values for a single hypothesis test, column (7) adjusts for the number of hypothesis tests, but allows for correlated outcomes and column (6) implements a full Bonferoni adjustment. The adjustments are explained in equation 3.

splits the treatment group into households that received high and low payments as outlined in equation 2. First, households in the treatment group shifted their consumption expenditure away from own food production towards food consumed or purchased outside of the household. At baseline, households spent 17,600 Birr annually on food items consumed at home, of which 10,400 Birr was spent on food items purchased outside of the household and 6,600 Birr was spent on food produced by the household. Households that lost land increased their consumption of purchased food items by 5,500 Birr relative to the control group and decreased their consumption of home produced goods by 1,500 Birr. The increase in consumption of purchased food is significant at the 90% level and represents a 35% increase relative to baseline levels. The decrease in consumption of home produced goods represents a 20% decrease on baseline levels but is not statistically significant. This pattern doesn't change when the treatment group is split into households that receive payments above and below the median compensation payment. In addition to purchasing more food for home consumption, treated households more than doubled their consumption of food prepared outside of the household, with households that received larger payments increasing their outside food consumption by more than those that received lower payments.

The change in consumption is not driven entirely by changes in food consumption. Although the survey does not collect data on a very many non-food items, treated households increase their spending on clothing and shoes by 1,600 Birr, which represents a 60% increase compared to average baseline spending and is statistically significant at the 90% level. Households receiving larger payments also increased their spending on clothing and shoes by more than those receiving lower payments. This may be explained by the fact that households in the treatment group now having access to cash and are able to afford clothes that they couldn't buy before. Finally, it does not appear that households are squandering their cash payments on alcohol or chat (a popular drug in the area); there is no change in chat or alcohol consumption for households that lost their land nor is there an any change for households that received larger payments.[17] This suggests that at least in this respect, households are not behaving irresponsibly with their payments.

Why might we observe this pattern? One reason to increase consumption in response to receiving compensation is that the household's permanent income has increased. Given that households also lose an unmeasured stream of income from their farmland, it is impossible to test whether this is the case. Another explanation for the increased consumption is that the survey was conducted during the lean season, just before the main harvest; treated households receive a liquid asset that can be used to smooth consumption across seasons, whereas households in the comparison group do not.[18] This could explain the relative increase in food consumed at home from purchased sources. Finally, there may be a behavioral explanation: when a household holds a large sum of cash, it is easy to rationalize spending a small amount to supplement household consumption. The change in consumption expenditure observed in the treatment group is large relative to baseline

[17]This finding is in line with Blattman et al. (2013), Haushofer and Shapiro (2013) and a number of other studies of cash transfers that find that households that receive cash windfalls do not increase their spending on alcohol, tobacco and drugs.

[18]Note also that the treatment effect for home consumption of purchased goods is similar across households that receive large and small payment, despite the fact that households that receive large payments are more likely to lose all of their land. This suggests that these households want to meet a certain level of consumption, which comparison households are unable to reach.

average consumption, however the magnitude of change is relatively small compared to the total payments received. In interpreting these results it is also important to keep in mind the timing of the survey: the survey was conducted within one year expropriation and households were permitted to harvest their land before it was taken from them, which means that treated households may still have had stores remaining.

4.1.2 Savings

The biggest effect of the intervention in terms of magnitude is the increase in savings held by households that lost land. Initial savings at baseline were low: 65% of households did not have any savings and 30% had less than 10,000 Birr. These proportions are reflected in the level of savings held by the control group at end-line. In contrast, treated households increased their savings, on average, by 58,000 Birr, a change which is strongly statistically significant. These results are reported in table 8. Within the treatment group there is a close relationship between the level of savings at end-line and the amount of compensation households received. Figure 4 plots a local polynomial regression of the ratio of end-line savings to total compensation payment against the size of the compensation payment.[19] There is a clear non-linear relationship between compensation payments and end-line savings, with the average savings to compensation ratio increasing below payments of 50,000 Birr, after which households hold, on average, 60% of their compensation as savings. About 15% of households report having no money held in savings, which suggests that they have already spent their compensation.[20] Most treated households with no savings received smaller payments in the first place, with a median payment size of 30,000 Birr compared to a median payment of 85,000 in the treatment group as a whole.

This result is so striking because 8 months after receiving compensation most households keep a majority of their compensation payment in an asset that has a negative real interest rate rather than investing in a new income generating activity.[21] Compensation was paid directly into savings accounts at a commercial bank so, in some ways, the amount saved in the bank represents what remains of the lump-sum cash transfer. Households may actively choose to leave their payments in a savings account because they offer a safe, liquid asset. However, saving is costly since annual interest rates on these accounts tend to be below inflation: households reported 0% to 5% annual interest on their savings accounts, but food prices increased by 30% between survey rounds. Why might households choose to keep the money in savings rather than investing in a new business or expanding an existing one? One possibility is that the real return on starting or scaling up a non-farm business is negative and that households prefer to keep their compensation in savings because of a lack of any other option. Most households know how to farm, but may lack the necessary experience or skills to operate a new business at a larger scale. Another

[19] Households with savings greater than compensation are excluded from the plot, but given the small size of initial savings this does not amount to many households nor does it change the interpretation of this graph.

[20] It is also possible that these households are reluctant to disclose how much money they hold in savings.

[21] Haushofer and Shapiro (2013) present findings on the largest unconditional cash transfer program, by size of payment. In their sample from poor rural Kenya, households that receive 404 USD increase their savings by 10 USD while households that receive 1,500 USD increase their savings by 20 USD. Their follow up surveys were run between 1 and 14 months after the treatment.

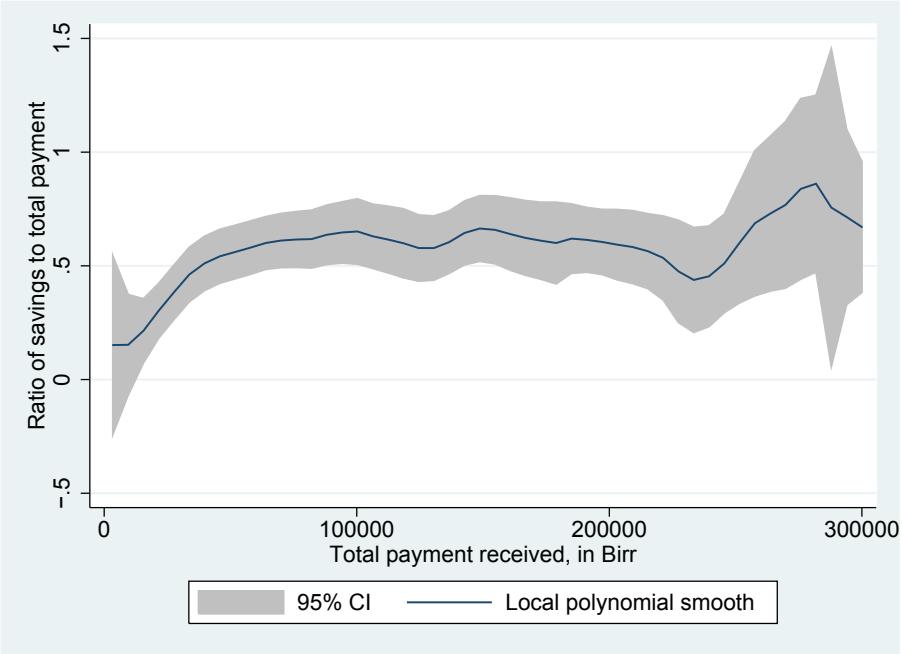

Figure 4: Local polynomial smooth of savings to compensation ratio plotted against total payment

possibility is that households are biding their time before making an investment decision because they are waiting for a good opportunity to arise, they may want to learn from what other households do or they may be waiting for construction jobs at the factory. Finally households may simply choose to consume out of their consumption while they make a transition to the local non-farm labour market or migrate elsewhere for work. I return to these questions in the extension sections and try to test some of these possibilities.

4.1.3 Other assets: livestock and other assets

Losing land and receiving compensation can affect the asset mix held by households in a number of ways. Where treated households are liquidity constrained, a cash payment enables households to make lumpy purchases(Fafchamps and Pender, 1997; Rosenzweig and Wolpin, 1993). Likewise, if households lose enough land, they may choose to draw down the value of assets that are directly used in agricultural production. Many of the non-productive assets asked about in the survey could be classed as durable consumption goods and households may increase their investment in these goods as well.[22] Table 7 breaks down the relative change in key asset indicators for households in the treatment group. These assets fall into three broad categories: productive agricultural assets, non-productive assets and livestock holdings. Many relevant assets are missing from the list due to constraints on the size of the survey, but the analysis of their change gives some insight into how households reallocate their asset portfolio following expropriation.

Table 4 on page 15 shows that treated households increase the total value of their livestock

[22] Haushofer and Shapiro (2013), in their evaluation of a large unconditional cash transfer program, find that poor households in rural Kenya increase their consumption of durable goods and especially metal roofs.

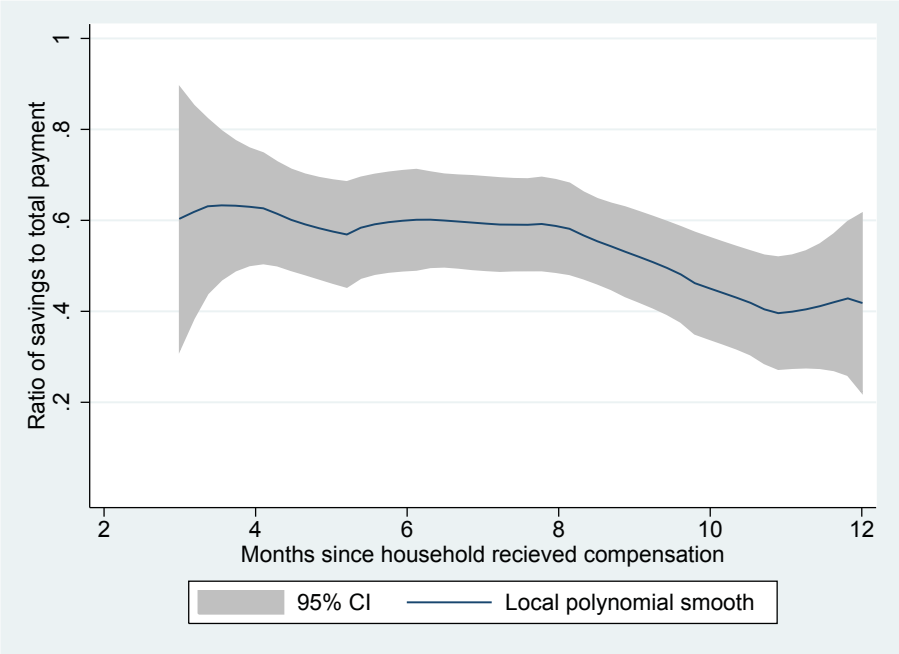

Figure 5: Local polynomial smooth of the savings to compensation ratio over months since payment

holdings by 2,400 Birr more than the control group, however this effect is not statistically significant above the 90% level. There is also no difference in the size of the treatment effect when the treatment group is divided according to the size of payments. However, a more nuanced picture emerges when the value of livestock holdings is broken down by the type of animal. These results are reported in panel 3 of table 7. Relative to the control group, treated households increase the value of their holdings of sheep and goats by 1,300 Birr and cattle by 1,100 Birr, while reducing the value of their oxen by 1,300 Birr. The positive effect on sheep and goats and the negative effect on oxen is statistically significant at the 99% and 90% levels respectively. This pattern is even more pronounced when the treatment indicator is split by the size of payment: households that receive payments above the median reduce their holdings of oxen by 2,600 Birr, while increasing the value of their holdings of sheep and goats by 1,500 Birr. The reduction in the value of oxen is statistically significant at the 95% level.[23] There is no change in the value of oxen holdings for households that receive payments below the median payment, but they do increase their holdings of sheep and goats. This pattern is consistent with households that receive large payments losing more land, and therefore having less need of oxen. To test this, figure 6 plots the change in oxen against the area of land that is expropriated. Households that lose more land reduce their head of oxen by more. In contrast to oxen, cattle, sheep and goats represent both a store of real value and a business opportunity for households that lose their farmland, so it is unsurprising to see that treated households have increased their investment in this type of livestock. However, the change in the value of sheep, goats and cattle does not increase dramatically with the size of household's compensation payment, which suggests that herd size may be constrained by other factors such as a

[23]These general patterns persist when I use the number of animals instead of their reported value as the outcome variable.

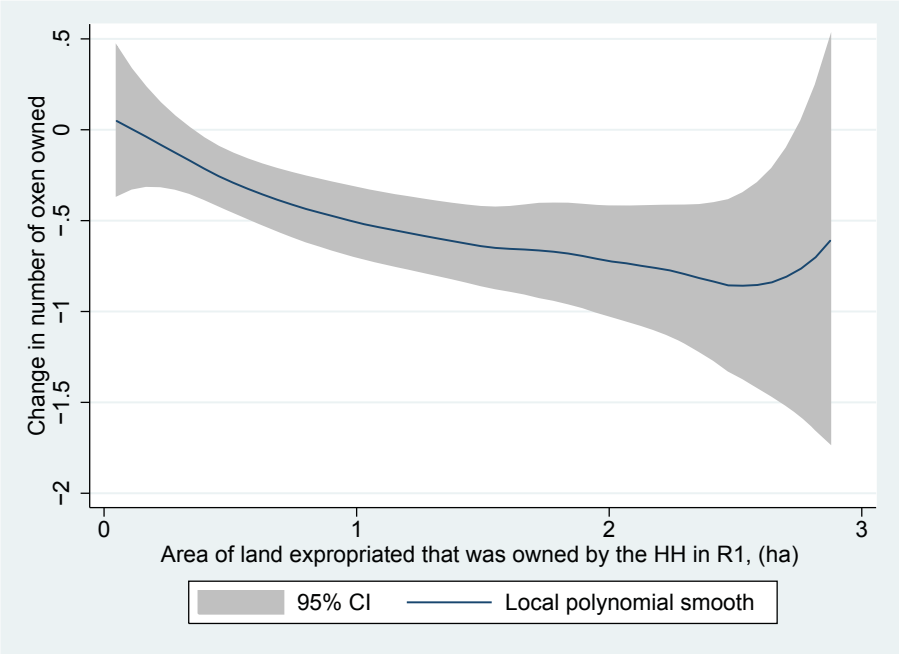

Figure 6: Local polynomial smooth of the change in the number of oxen over the total area of land lost

lack of grazing land, pens or household labour.

Panels 1 and 2 in table 7 show the estimated treatment effect of losing land on productive agricultural assets and set of non-productive assets held by households. Both asset value measures are constructed using self-reported estimates of the cost of purchasing a specific set of items. Productive assets include ploughs, hoes, irrigation pumps, tools and axes and guns, while the set of non-productive assets include furniture (beds, table, sofa, chair), stoves, cellphones, radios, TVs, transport (cars, motorcycles, carts) and jewelry. The treatment effect on productive agricultural assets is small and not statistically different from zero nor is there any difference between treated households that receive large payments and those that receive less. This zero result is somewhat surprising, since one might expect households that retain land and receive some compensation to invest in agricultural production, while those that are forced out of agriculture altogether would liquidate their agricultural assets. To some extent, such a pattern is visible in figure 7 where the change in productive agricultural asset values are plotted against the total land area lost, however this plot excludes 10 households that increased the value of their agricultural assets by purchasing irrigation pumps.[24] However, there is also no reason why households would use compensation payments to increase their agricultural assets if they already had the productive assets they need.

Panel 2 in table 7 reports the treatment effect for a subset of non-productive assets and durable goods. Losing land and receiving compensation increases the value of non-productive assets held by the household by 5,400 Birr, an increase that is statistically

[24]These 10 households increased the value of their productive assets by an average of 5,800 Birr, which is 17 times the mean value of baseline productive assets and 3 times the largest value from round 1. Three of these households are in the control group and seven are from the treatment group, so this might be an example of spillovers from treatment.

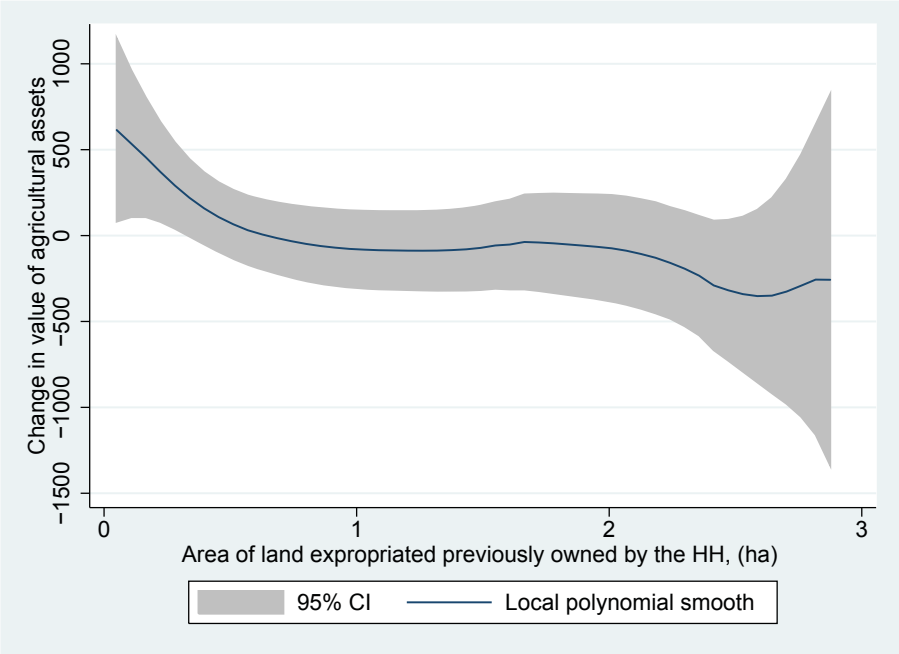

Figure 7: Local polynomial smooth of the change in productive assets and the total area of land lost

significant at the 90% level. This large, positive effect is almost entirely driven by the treatment effect on transport assets, which itself is due to 9 households that purchased Bajaj motorcycle taxis. These households reportedly spent between 50,000 Birr and 231,000 Birr on motorcycle taxis between rounds, while no control households purchased any transport asset. This is the primary example of households making lumpy purchases with their compensation payment.

The average treatment effect on the other assets measured is much smaller in magnitude than the effect on transport assets: treated households increase their cellphone ownership by 280 Birr and reduce the value of jewelry by 530 Birr, effects which are statistically significant at the 95% and 90% level respectively. There is no statistical difference in the change in the value of furniture or televisions owned by the treated and control households. The pattern remains the same even if the treatment indicator is split by payment size, except for the treatment effect on televisions and radios, which is positive and significant for households that receive large payments. The set of assets that make up the non-productive asset indicator is limited, so we might not be measuring other types of investment, however most of the money held by treated households is still in the bank, suggesting that no other large purchases have been made. Overall, this evidence suggests that treated households use their compensation payment to increase their purchases of durable assets, but the size of the effect is not large. The negative effect on jewelry would be consistent with households choosing to substitute jewelry for bank accounts as their primary saving mechanism or with households drawing down assets prior to expropriation (but after baseline) in anticipation of a cash windfall.

4.1.4 Off-farm labour, businesses and income shares

Table 8 evaluates the treatment effect for a variety of indicators that reflect off-farm labour market participation and participation in household businesses. These indicators measure whether a household has any members of the household working for wages in the non-agricultural sector or working for a non-agricultural household business or both. Households also reported the number of weeks each member of the household spent doing non-farm work. The average treatment effect for households that lost land was positive for each of these measures, but not significant at the 90% level. However, if the treatment group is split into those who received payments above the median and those who receive payments below, there are positive and statistically significant effects of losing land on labour market participation for those households that received the bigger payments. These households were 22% more likely to participate in the non-farm labour market and/or a household business unrelated to farming compared to a baseline participation rate of 50%. These households also increased person-weeks worked by 9 weeks over the course of the year, were 18% more likely to participate in wage labour and 15% more likely to participate in a household business. In contrast, households that received smaller payments were no more likely to have increased their participation in non-farm activities than control households. This heterogeneity in response by the size of payment suggests that those households that lost larger amounts of land were being forced to adapt their income generating strategies rather than choosing to work more. Households in the low payment group retain farmland, which may explain why they have chosen not to increase their off-farm participation relative to the control group.[25] This suggests that high payment households are working in business or for wages because their labour is no longer needed on the farm and these jobs provide the household with important cash income.

Losing land and receiving compensation also affects a household's source of cash income. Panel 3 of Table 8 shows the treatment effect for cash income shares. Households that lose land derive a relatively smaller share of their cash income from selling crops and increase the share of cash income that comes from the sale of livestock, and from household business. At baseline, the average household acquired 50% of their cash income from the sale of crops, 13% from the sale of livestock and 8% from household businesses. Treated households receive 11% less cash income from crops, 8% more from livestock sales and 6% more from household business, effects which are significant at the 90% level. There is no statistically significant treatment effect on the share of cash income that comes from non-agricultural wages. This pattern suggests that households in the treatment group are adjusting their cash income portfolios as a result of losing land, but that the important source of non-farm income comes from household businesses rather than wage work. It is important in interpreting these results to emphasize that these are shares of cash income and not absolute levels.[26] It is impossible to say anything about what is driving the portfolio readjustment: a shift away from crop income could occur either because of a drop in crop incomes that is not matched by a proportionate drop in other income sources

[25] Although, note that the size of payment and the amount of land lost are closely correlated, so the effect is not separately identifiable from receiving a large payment. The driving force may actually be the large payments received by households. For example, large payments could enable households to make large fixed investments that are required for starting a business.

[26] In the survey, households were asked to allocated 20 tokens representing their yearly cash income across a number of categories of income sources.

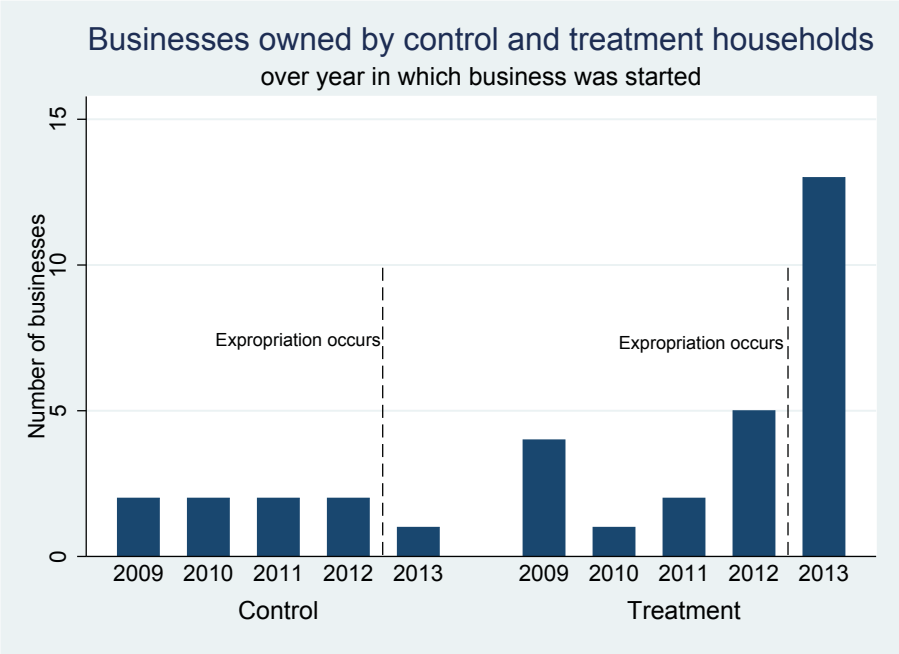

Figure 8: Distribution of year in which household business was started

or an increase in income from other sources that is not proportionate to an increase in crop income. Thus, this pattern is both consistent with households reducing their crop income because they have less land and using compensation payments to increase income from other categories.

Households in the treatment group increased their share of cash income from non-farm businesses and increased their labour participation in non-farm businesses. However, the survey only contains basic information on household businesses collected in the end-line survey, which makes it difficult to formally measure how much households invested directly into these business following the intervention. (No detailed information on household enterprises was collected at baseline.) Figure 8 shows the year in which household businesses were started relative to the year of expropriation. At end-line, 23% of all households owned a non-farm business. Of these businesses, 18 were started in the year of or year following expropriation by treated households and 2 by control households. Amongst the remaining businesses started prior to this time, 22 were owned by control households and 27 by treated households - these numbers are roughly 16% of the total number of households in each group. Although this is evidence is not subject to empirical testing, it strongly suggests that some households that lost their land have responded by starting new businesses. Table 5 on the following page breaks down the businesses by type; most of the businesses, with the exception of those households that have purchased motorcycle taxis, have entered the trading business. These businesses have limits to how much can be invested, and indeed the savings rates of households in the treated group with businesses are not significantly different from those in the treated group without businesses.

Table 5: Breakdown of businesses owned by treated households

Business activity started in year of expropriation	Treated HH (n=164)
Grain trade	2
Livestock trade	1
Other trade	9
Shop/kiosk/retail	2
Transport/cart/bajaj	6
Handicraft	1
Sub-total	**21**
Business established before 2012	**24**
No business reported	**119**

4.2 Robustness

Data on the intervention is somewhat messy and one might worry that the treatment effect estimates are biased by this mis-measurement. Table 10 presents treatment effect estimates for various measures of treatment on the key indicators using the main specification outlined in equation 1. In some cases, households report receiving payments more than 12 months prior to the date of the end-line survey, which should not be possible since expropriation occurred only 8 months before the end-line survey. There is also some inconsistency within household responses. An alternate measure of treatment is derived from the plot roster collected at end-line: households were reminded about the plots that they had listed in the baseline survey and were asked which, if any had been expropriated. Out of 295 households, 22 provided inconsistent answers across these measures. Table 10 presents treatment effect estimates on the key indicators using various measures of treatment using the main specification outlined in equation 1. Column (2) uses the measure of treatment derived from the plot roster. The results are very similar when this alternate measure is used. Some households also lose their house in addition to losing land and may respond very differently than households that only lose land. Households that lose their homestead are given money to rebuild their home and a new plot of land within the kebele. Column (3) and (4) run the main specification while including a dummy variable for whether the household lost their house in addition to their land. The treatment effect estimates are similar to the main results for households that do not lose their homestead, but households that do lose their house are more likely to divest their productive agricultural assets and less likely to increase the value of their livestock holdings relative to households that only lose land.

The effect of expropriation on some of the outcomes discussed above depends on whether households receive large or small payments. This is intimately related to how much land households lose. Thus, in addition to receiving very different payments, these groups also lose different shares of their initial land holdings. Figure 9 shows the distribution of the share of land holdings lost by whether households receive large or small payments. Households that receive large payments are much more likely to lose all of their land whereas those who receive payments below the median are not. Splitting the treatment group by median payment effectively estimates a non-linear effect of the size of compensation on outcomes. Columns (7) and (8) of table 10 present alternate specifications of the split treatment variable, running each regression on the total payment size and the log of total payment (giving control households a payment of 1). Both sets of regressions provide

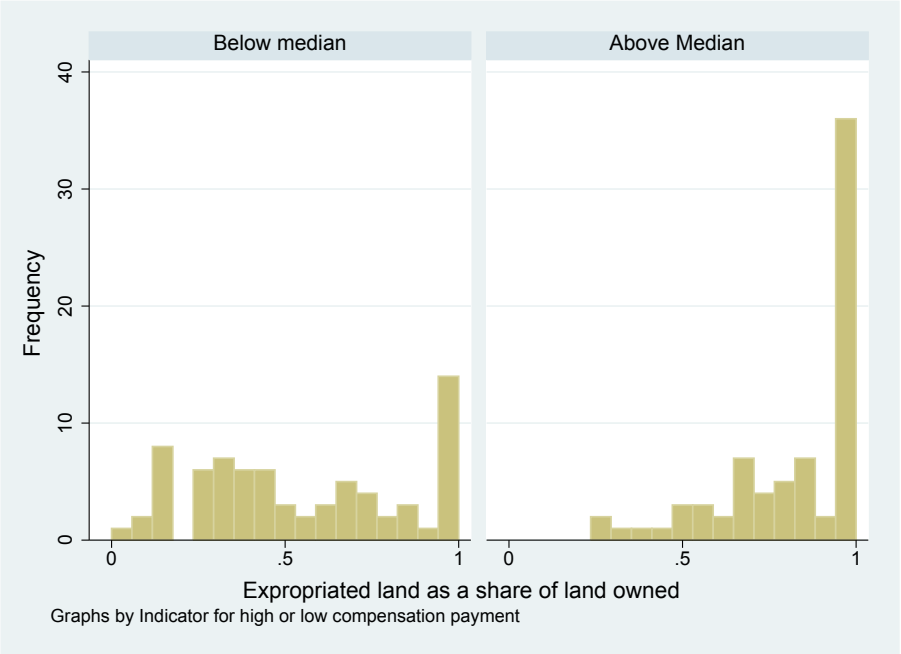

Figure 9: Distribution of share of land lost by large and small payment groups

estimates that have a similar magnitude and support the estimated coefficients on the indicators for high and low payments.

The final set of robustness checks run the main specification on a set of restricted samples. These results are reported in table 11. The first set of regressions in columns (2) to (4) run the main specification on a sub-set of households living close to the boundary of the project area. The first regression is run on a sub-sample of households living within 500m of the boundary, followed by those living within 1000m and finally by those within 2500m. Restricting the sample to those households living near to the project boundary limits the influence of unobservable omitted variables that vary by geography. These might include things like better access to markets or unobserved soil quality. We may also worry that households have been incorrectly identified as treatment or comparison, have been misclassified in some systematic way. This might be the case if households that were identified by local officials as being in the treatment group at baseline had undue political influence and were able to ensure that their land wasn't taken (or comparison households that ensured that their land was taken). Columns (5) to (7) run the main specification on a sub-sample of households for which treatment is consistent across measures. Column (5) restricts the treatment sample to households that report losing their land within the last year, which eliminates any households that lost land in previous expropriations. Column (6) drops any households whose self-reported treatment status was different from what the local official reported prior to the baseline survey. Column (7) restricts the sample to those households whose self-reported treatment status is consistent with whether they report losing any land in the plot recall section described above. The coefficient estimates are broadly similar across these different regressions.

4.3 Discussion

Expropriating farmland forces households to find new income generating activities and compensation payments provide a liquid asset that can be invested, consumed or saved. In the 8 months following expropriation, most households have done relatively little with their compensation payment, having chosen to save most of it in the bank where it's real value is eroded by high inflation. If this trend continues, policy makers should worry. First, it suggests that most households are not using their lump-sum payments as seed capital for new businesses. Second, inflation in Ethiopia is high and, if it continues, will erode the real value of saved compensation. Between survey rounds the price of the household's food basket increased on average by 30%, yet nominal interest rates on savings accounts range from 0% to 5% annually.[27]

Evidence on the effect of expropriation and compensation on livestock assets and agricultural assets suggest that households do react to expropriation in ways that might be suggested by the conceptual framework, but the magnitude of their response is dwarfed by the amount of money left in the bank. Treated households do make adjustments to their asset portfolios, reducing their holding of agricultural assets and increasing their livestock holdings, and shift labour into off-farm income generating activities. Treated households also start more new businesses following expropriation, despite only investing small sums of money in these businesses. Where the data permits, exceptions to this trend have been identified: for example 9 households used their compensation payments to make very large capital expenditures in buying motorcycle taxis. But this group represents a small fraction of treated households and most observed changes in investment are relatively small compared to the size of the household's compensation payment. These findings are consistent with the conceptual framework, but suggest that households face a lack of high-return investment opportunities.

What then explains the high level of savings? Households may already have a diversified asset and activity portfolio and are saving their compensation payment for a 'rainy day'. This behaviour may also be rational if households see future opportunities for work at the factory; if households can find regular employment working in the construction of the factory, they may not need to risk their compensation payment in a new investment project, especially when they don't have the requisite business skills or experience. On the other hand, the household's choice to save their money in the bank may indicate that returns to other activities are lower than the negative real return from keeping the money in the bank. The patterns observed in the first 8 months might be the beginning of a worrying trend: households will continue to slowly consume out of their compensation payment until it is gone, without using the money towards any productive purpose. This would make households worse off as a result of the policy.

Assessing the adequacy of compensation requires us to consider whether the changes that are observed in income generating activities and the investment in productive assets pro-

[27] Most of the respondents are Muslim and many reported that they did not receive interest on religious grounds. The website for the Commercial Bank of Ethiopia currently advertises annual interest rates of 5% on savings accounts. Although I have no official information on interest rates from the banks in Kombolcha town, 25% of households that had bank accounts reported annual interest rates in the 0% - 5% range. 75% of households that had savings in a commercial bank did not know what interest rate (if any) they were being paid.

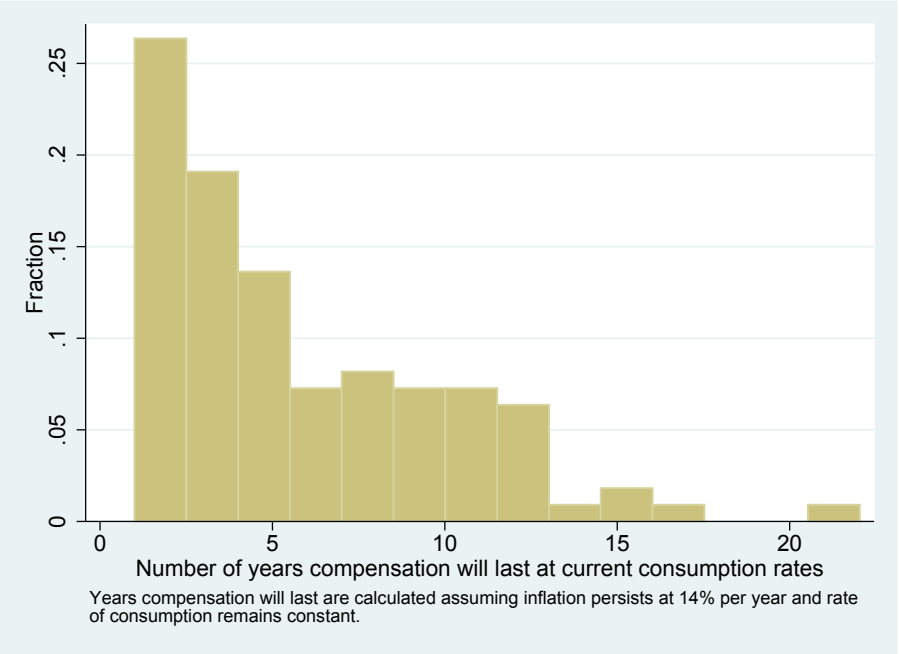

Figure 10: Year in which households will exhaust compensation payment given current rates of consumption

vide households with a level of permanent wealth that is equivalent to what they had before. Treated households increase their consumption expenditure following expropriation along a number of dimensions, increasing their consumption of purchased food, clothing and shoes and durable goods such as cellphones. This finding is consistent with an increase in permanent income, but may just as easily reflect seasonal liquidity constraints faced by agricultural households during the lean season.

Another way of assessing the adequacy of compensation payments is to consider whether the changes to asset and income portfolios would provide households with a sufficient level of consumption by the time their compensation payment is exhausted. Households were asked to report how much of their compensation they had spent on food and household expenditure since receiving their payment. I use this data in figure 10 to calculate the year in which households would exhaust their payments if the rate of consumption remained unchanged and price inflation stayed constant at 14%[28]. By this measure, most households will deplete their compensation within 5 years. For compensation to be adequate, the adjustments to asset and income portfolios made by households must be sufficient to allow households to consume at the same level as if they still owned all their land.

5 Conclusions

Households in this area experienced a significant intervention: on average they lost half of their farmland and received the equivalent of 5,200 USD. These households responded by moving into new income-generating activities, investing in new businesses and adjusting

[28]Inflation was calculated using data on the basket of goods included in the survey's consumption module.

their asset portfolios. They also increased their consumption expenditure relative to the comparison group and increased their consumption of durable goods. The magnitude of these effects depends in part on the size of the payment (and the share of land lost): households that lost most of their land also received the largest payments and were more likely to participate in non-farm income generating activities and to sell off oxen. While all of these effects reflect a rational response to losing land and receiving a large compensation payment, by far the biggest and most striking result is that most of the compensation payment is left in the bank. This finding suggests that rates of return, at least in the short term, are very low. While households are able to find a productive use for cash transfers, above a certain value, the additional scope for investing is limited. With the exception of a few households that made very large investments, most households have done very little with their money.

From a normative point of view, households that lose their land should not be made worse off as a result of expropriation and at the very least, should be able to replace the income that they generated with their land. Land in Ethiopia also serves as more than just a productive asset: it serves as insurance and security in old age when it is used for sharecropping. Compensation payments should assist households in making the transition from small-scale agriculture to other income generating activity and yet, in this short time period, it seems that the majority of households are not able to do so.

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A Validation of self-reported treatment using official records

Surveyed households were matched to administrative records for compensation payments using the full name of the household head. However, only 45% of treated households from the survey could be uniquely identified in the administrative data.[29] Although this means that administrative data cannot be used in the analysis, it is possible to use this data to validate the survey questions on the expropriation and compensation process that overlap with the administrative records. In particular, it is possible to check whether households mis-report the compensation payments they receive or the quantity of land taken. Figure 11 compares the household's reported compensation payment with the record held by the government. There are large discrepancies for some households, but for the most part the self-reported value of compensation corresponds closely to the value held in the administrative records. This suggests that the self-reported compensation payment is a good proxy for the official payment and can be used in the analysis. Figure 12 compares the self-reported amount of farmland taken (measured as the sum of Meher and irrigation land) with the official records for land taken. In contrast, it shows that households consistently overstate the amount of land taken relative to the government's records. This likely occurs because households were estimating land lost using local units that are the equivalent of 0.25 hectares and thus will tend to round up. An alternative measure of land taken shows a similar pattern: respondents were shown the plot roster from the baseline survey and asked to identify which of their plots had been taken. Summing over the plot size for treated plots also overstates land taken relative to the official record. Households have a tendency to overstate the size of their plots, although they do not seem to over-report compensation payments. This suggests that any regressions using land size should be interpreted carefully.

[29] There are three main reasons for this. First, many people in this area have the same name and without further information they cannot be distinguished. Second, the administrative data is written using the Ge'ez alphabet, (the Ethiopian script), while the names in the survey are written in the Latin alphabet, which means there will be error in translation. Third, matching was done by hand using a list of names from both surveys, so it is possible that some households were missed.

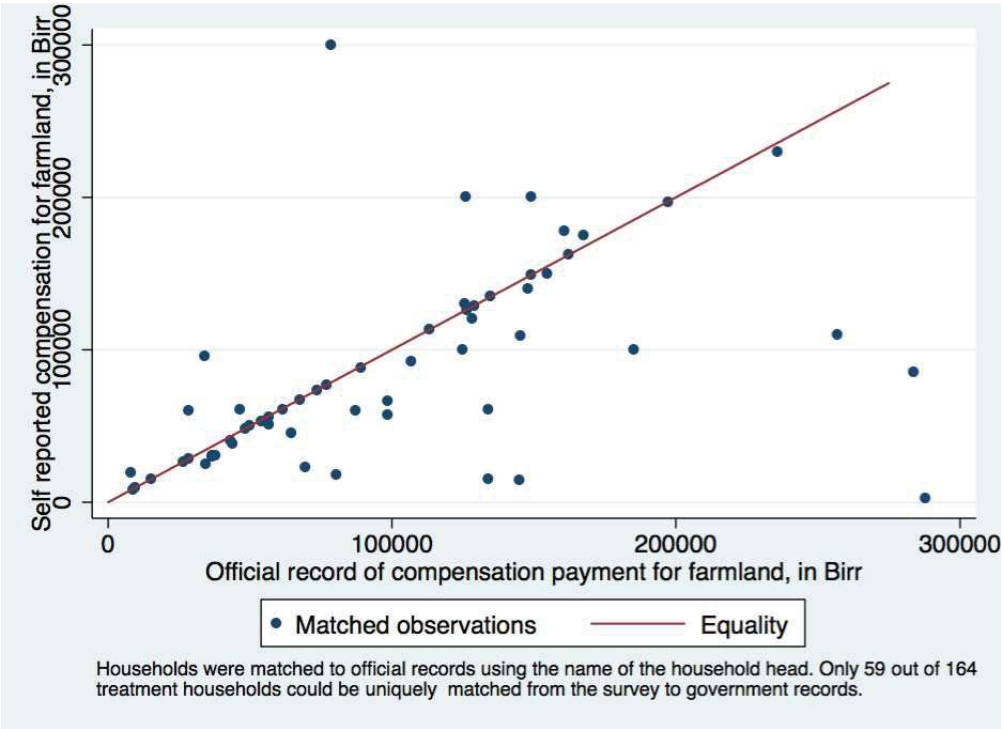

Figure 11: Self-reported compensation compared to government records

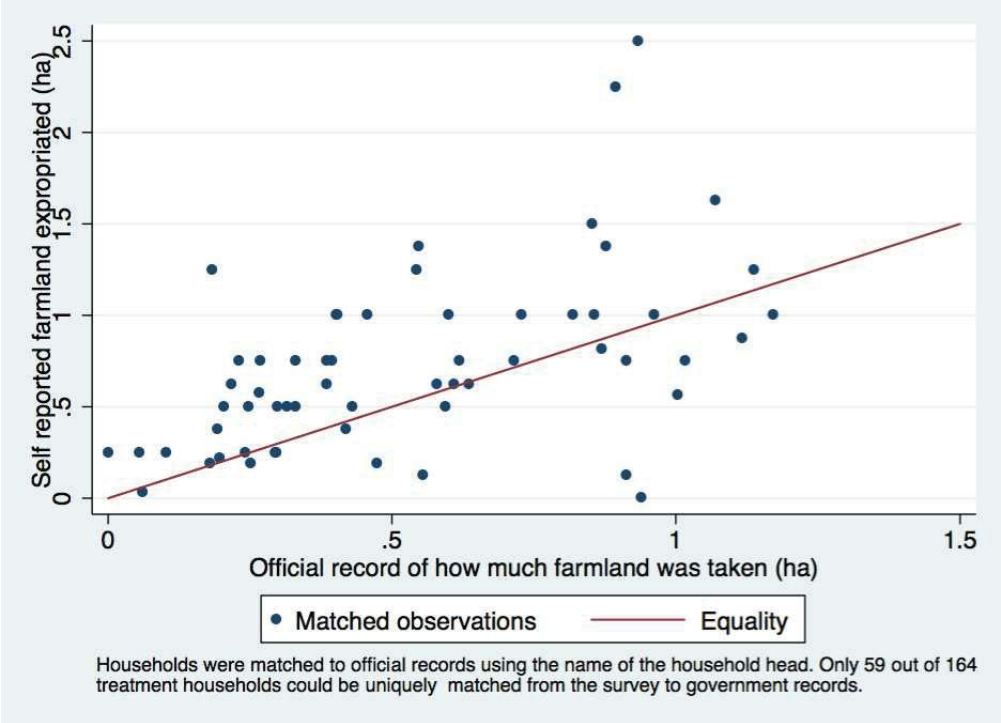

Figure 12: Self-reported farmland taken compared to government records

B Main regression tables

Table 6: Treatment effect estimates: Household consumption indicators

		Model 1	Model 2	
	(1)	(2)	(3)	(4)
Dependent Variable	Mean of DV at Baseline	Treatment indicator {1,0}	Payment above median, {1,0}	Payment below median, {1,0}
Total consumption (Birr)	23,225	6,285*	8,180*	6,438
		(3,148)	(3,896)	(4,270)
Food consumption inside HH (Birr)	17,642	3,370	4,062	3,988
		(2,777)	(3,470)	(3,658)
Food consumption: own production (Birr)	6,580	-1,491	-1,721	-1,365
		(1,135)	(1,129)	(1,499)
Food consumption: purchased (Birr)	10,417	5,470*	5,892	6,452*
		(2,818)	(3,762)	(3,197)
Food consumption: gifts/transfers (Birr)	292.3	-85.11	-165.2	46.92
		(133.0)	(176.4)	(134.1)
Food consumed outside HH (Birr)	656.9	748.8*	1,142**	379.6
		(417.2)	(523.7)	(414.8)
Clothing & Shoes (Birr)	2,649	1,621**	2,554**	1,228
		(590.8)	(966.1)	(704.5)
School expenses, uniforms & textbooks (Birr)	767.8	156.5	188.4	201.2
		(148.8)	(194.7)	(152.8)
Chat expenditure (Birr)	366.5	-160.3	-124.4	-59.79
		(273.7)	(404.0)	(239.1)
Alcohol expenditure (Birr)	12.11	-38.00	6.168	-73.99
		(84.58)	(106.2)	(70.77)
Food consumption, per capita (Birr)	3,857	286.5	414.6	192.6
		(410.0)	(529.1)	(504.0)

Notes: Each row corresponds to a separate outcome variable. All financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. All regressions control for differential trends based on household size, head characteristics and baseline land holdings. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1. These critical values do not account for multiple hypothesis tests, but allow for a small number of clusters. Column (1) reports the mean of the outcome variable at baseline across treatment and control households. Column (2) reports the treatment effect for Model 1, which is the first differenced regression in equation 1. Model 2 splits the treatment group into households that received payments above the median compensation payment and below. Columns (3) and (4) show the coefficient estimates on these dummy variables, using the first differenced regression specification outlined in equation 2 on page 11.

Table 7: Treatment effect estimates: Household assets and livestock

		Model 1	Model 2	
	(1)	(2)	(3)	(4)
Dependent Variable:	Mean of DV at Baseline	Treatment indicator, {1,0}	Payment above median, {1,0}	Payment below median, {1,0}
Value of agricultural assets (Birr)	376.80	-69.47	-202.9	62.81
		(92.37)	(156.7)	(100.6)
Total value of non-agricultural assets (Birr):	1,872	5,404*	11,027*	287.2
		(2,921)	(5,189)	(1,106)
Value of furniture (beds, chairs, sofa, table)	564.20	112.0	44.44	30.85
		(130.7)	(147.5)	(144.6)
Value of cellphones	403.60	276.7**	292.9**	268.6**
		(94.35)	(114.5)	(93.41)
Value of jewelry/gold/watches	574.20	-425.8*	-507.3**	-510.6**
		(202.5)	(213.1)	(226.2)
Value of TV and radio	238.80	127.0	240.3*	53.64
		(77.59)	(126.7)	(95.77)
Value of transport (cart, bajaj, car)	0	5,604*	11,282**	716.3
		(2,928)	(5,135)	(925.5)
Total value of livestock (Birr):	10,954	2,348	2,015	2,846
		(1,474)	(1,330)	(1,936)
Value of oxen	5,656	-1,330*	-2,570**	89.64
		(690.8)	(1,001)	(579.3)
Value of cattle (bulls, cows, calves, heifer)	3,322	1,090*	1,766*	657.1
		(580.7)	(834.8)	(630.4)
Value of sheep and goat	885.10	1,353***	1,504**	821.6*
		(417.7)	(525.0)	(448.3)
Value of transport animals (camel, donkey, horse, mule)	899.40	1,264	1,282*	1,276
		(743.9)	(676.2)	(1,126)
Value of chickens	148.90	49.92	53.96	28.88
		(43.50)	(66.44)	(41.58)
Value of beehives	23.76	-9.675	38.88	-0.704
		(17.22)	(29.22)	(27.65)
Self-reported cost of building house today (Birr)	44,430	1,973	-14,322	13,210
		(7,877)	(11,905)	(8,606)
Sheet roof indicator, {1,0}	0.91	-0.0280	-0.0347*	-0.0190
		(0.0163)	(0.0182)	(0.0175)
Number of sheets on roof	46.51	-0.440	-0.150	2.229
		(2.352)	(2.871)	(2.611)

Notes: Each row corresponds to a separate outcome variable. All financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. All regressions control for differential trends based on household size, head characteristics and baseline land holdings. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1. These critical values do not account for multiple hypothesis tests, but allow for a small number of clusters. Column (1) reports the mean of the outcome variable at baseline across treatment and control households. Column (2) reports the treatment effect for Model 1, which is the first differenced regression in equation 1. Model 2 splits the treatment group into households that received payments above the median compensation payment and below. Columns (3) and (4) show the coefficient estimates on these dummy variables, using the first-differenced regression specification outlined in equation 2 on page 11.

Table 8: Treatment effect estimates: Household savings and income sources

		Model 1	Model 2	
	(1)	(2)	(3)	(4)
Dependent Variable:	Mean of DV at Baseline	Treatment indicator, {1,0}	Payment above median, {1,0}	Payment below median, {1,0}
Total savings	2,199	58,305***	98,412***	26,964***
		(5,781)	(7,639)	(4,582)
HH lent money to others, {1,0}	0.0717	-0.0103	0.0353	-0.0369
		(0.0361)	(0.0348)	(0.0501)
HH borrowed money from others, {1,0}	0.0512	-0.139***	-0.135**	-0.132***
		(0.0386)	(0.0519)	(0.0383)
HH participates in off-farm activity, {1,0}	0.500	0.0765	0.217**	-0.0243
		(0.0564)	(0.0823)	(0.0475)
HH participates in non-farm wage labour, {1,0}	0.292	0.0849	0.181**	-0.0188
		(0.0519)	(0.0771)	(0.0492)
HH participates in own business, {1,0}	0.243	0.0773	0.151*	0.0425
		(0.0681)	(0.0770)	(0.0781)
Total number of person-weeks this year	12.21	3.302	8.919**	-0.630
		(2.870)	(3.850)	(3.231)
Share of yearly cash income from:				
Sale of crops	0.501	-0.110**	-0.144*	-0.136**
		(0.0433)	(0.0762)	(0.0558)
Sale of livestock	0.129	0.0817*	0.100**	0.0798
		(0.0418)	(0.0430)	(0.0628)
Sale of livestock products	0.0253	-0.00295	0.00327	-0.00220
		(0.0107)	(0.0156)	(0.00905)
Agricultural wage work	0.00866	-0.00975	-0.000801	0.00198
		(0.0201)	(0.0184)	(0.0225)
Non-agricultural wage work	0.135	-0.00848	0.00347	-0.0178
		(0.0271)	(0.0344)	(0.0355)
Government & NGO transfers	0.0655	0.00545	-0.00853	0.0187
		(0.0217)	(0.0206)	(0.0271)
Gifts and remittances	0.0464	-0.0228	-0.0424**	-0.0138
		(0.0161)	(0.0160)	(0.0246)
Land rental or sharecropping	0.00313	0.00511	0.00108	0.0109
		(0.0114)	(0.0113)	(0.0165)
Household business	0.0764	0.0605*	0.0904***	0.0474
		(0.0303)	(0.0305)	(0.0370)

Notes: Each row corresponds to a separate outcome variable. All financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. All regressions control for differential trends based on household size, head characteristics and baseline land holdings. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1. These critical values do not account for multiple hypothesis tests, but allow for a small number of clusters. Column (1) reports the mean of the outcome variable at baseline across treatment and control households. Column (2) reports the treatment effect for Model 1, which is the first differenced regression in equation 1. Model 2 splits the treatment group into households that received payments above the median compensation payment and below. Columns (3) and (4) show the coefficient estimates on these dummy variables, using the first differenced regression specification outlined in equation 2 on page 11.

Table 9: Treatment effects: Main outcomes with and without controls

	(1)	(2)	(3)	(4)
	Mean of DV at Baseline	Treatment indicator, {1,0}	Treatment indicator, {1,0}	Treatment indicator, {1,0}
Total consumption (Birr)	23,225	7,103**	6,324*	6,285*
		(3,028)	(3,144)	(3,148)
Total savings (Birr)	2,199	58,958***	59,214***	58,305***
		(5,948)	(6,006)	(5,781)
Participates in off-farm activity, {1,0}	0.502	0.0817	0.0824	0.0765
		(0.0542)	(0.0556)	(0.0564)
Value of agricultural assets (Birr)	376.8	-46.41	-67.08	-69.47
		(80.00)	(92.42)	(92.37)
Value of non-agricultural assets (Birr)	1,872	5,139*	5,343*	5,404*
		(2,721)	(2,895)	(2,921)
Value of livestock (Birr)	10,954	3,049**	2,428	2,348
		(1,356)	(1,446)	(1,474)
Controls included:				
Household demographics		N	Y	Y
Baseline land owned		N	N	Y

Notes: Each row in the first panel corresponds to a separate outcome variable. Column (1) reports the mean of the outcome variable at baseline across treatment and control. Columns (2) - (4) report treatment effect estimates from a regression that explains the differenced outcome variable. Column (2) reports the treatment effect for the regression without any controls. Column (3) includes all household demographic controls that are included in the main model specified in equation 1: household size, head age, gender, marital status and literacy. Column (4) adds the amount of land owned at baseline as a control variable. All controls enter as trend effects. Financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Alternate measures of treatment: Main outcomes

	Model 1	Model 2	Model 3		Model 4		Model 5	Model 6
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Treatment indicator	Plot-based treatment indicator	Treatment indicator	Lose house indicator	Payment above median	Payment below median	Total payment (Birr)	log(payment + 1)
Total consumption (Birr)	6,285*	6,681**	4,576	6,969	8,180*	6,438	0.0312*	606.6**
	(3,148)	(2,990)	(3,276)	(6,448)	(3,896)	(4,270)	(0.0171)	(255.1)
Total savings (Birr)	58,305***	49,176***	49,118***	37,039***	98,412***	26,964***	0.594***	5,975***
	(5,781)	(5,948)	(5,457)	(6,511)	(7,639)	(4,582)	(0.0403)	(578.4)
Participates in off-farm activity, {1,0}	0.0765	0.0412	0.0636	0.0524	0.217**	-0.0243	1.38e-06**	0.00963
	(0.0564)	(0.0560)	(0.0548)	(0.155)	(0.0823)	(0.0475)	(5.05e-07)	(0.00564)
Value of agricultural assets (Birr)	-69.47	-112.6	12.63	-334.2***	-202.9	62.81	-0.00115	-7.951
	(92.37)	(104.6)	(87.92)	(112.8)	(156.7)	(100.6)	(0.000946)	(8.815)
Value of non-agricultural assets (Birr)	5,404*	3,623*	5,369*	140.3	11,027*	287.2	0.0670*	565.8*
	(2,921)	(1,718)	(2,978)	(2,538)	(5,189)	(1,106)	(0.0327)	(310.0)
Value of livestock (Birr)	2,348	1,779	2,718	-1,503	2,015	2,846	0.00747	203.4
	(1,474)	(1,293)	(1,602)	(1,852)	(1,330)	(1,936)	(0.00721)	(123.7)

Notes: Each row in the first panel corresponds to a separate outcome variable. Each model (columns) corresponds to the treatment effect from a regression using the main specification, but with different measures of treatment status. Regressions control for household size, head age, gender, marital status and literacy and land owned at baseline. Column (1) reports the treatment effect from the main specification outlined in equation 1, and is based on the household's self-reported treatment status. Column (2) uses an indicator derived from the plot roster section, in which households were asked about the treatment status of each plot they reported at baseline. Columns (3) and (4) report the coefficients on an indicator for self-reported treatment status and an indicator for whether the household will lose their homestead. Columns (5) and (6) split the self-reported treatment status into an indicator for whether the household receives a payment above and below the median compensation payment. Column (7) uses total compensation payment as a continuous treatment effect, with control households receiving zero. Column (8) uses $log(TotalPay+1)$ instead. All controls enter as trend effects. Financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Treatment effect for restricted samples: Main outcomes

		HH lives within distance of project area			Treatment status correctly identified		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full sample	Within 500m	Within 1000m	Within 2500m	Paid within last year	Paid within last year and official correct	Two measures of treatment consistent
	Treatment indicator	Treatment indicator	Treatment indicator	Treatment indicator	Treatment indicator	Treatment indicator	Treatment indicator
Total consumption (Birr)	6,285*	9,127*	8,231*	6,609*	7,057*	3,991	6,833*
	(3,148)	(4,185)	(3,839)	(3,371)	(3,360)	(4,260)	(3,290)
Total savings (Birr)	58,305***	49,758***	59,126***	56,230***	57,290***	60,039***	58,079***
	(5,781)	(8,227)	(7,872)	(5,698)	(6,031)	(4,533)	(5,813)
Participates in off-farm activity, {1,0}	0.0765	0.0736	0.0657	0.0825	0.0562	0.0205	0.0619
	(0.0564)	(0.0911)	(0.0827)	(0.0554)	(0.0505)	(0.0581)	(0.0603)
Value of agricultural assets (Birr)	-69.47	-227.9	-131.1	-75.28	-109.6	-47.29	-105.0
	(92.37)	(154.3)	(130.8)	(94.16)	(115.3)	(122.5)	(110.9)
Value of non-agricultural assets (Birr)	5,404*	2,709	4,942	5,577*	5,006*	3,193*	4,797*
	(2,921)	(1,944)	(3,112)	(2,995)	(2,453)	(1,774)	(2,441)
Value of livestock (Birr)	2,348	3,354*	3,697***	2,545*	2,349	2,540	2,284
	(1,474)	(1,679)	(1,184)	(1,436)	(1,418)	(1,891)	(1,440)
Sample size (approximate)	295	154	192	290	271	214	271

Notes: Each row in the first panel corresponds to a separate outcome variable. Each column shows the treatment effect estimate from the main regression specification, run on a different sub-sample. Regressions control for household size, head age, gender, marital status and literacy and land owned at baseline. Column (1) reports the treatment effect from the main specification outlined in equation 1. Columns (2) - (4) restrict the sample by the distance between the household's home and the nearest point on the project boundary. Column (5) drops any household that reports receiving compensation more than 12 months prior to the date of the follow-up survey. Column (6) also drops any household whose self-reported treatment status at follow-up contradicts the local official's reported treatment status at baseline. Column (7) restrict the sample to household's whose self-reported treatment status is consistent with whether the household reported losing any plots in the plot recall section of the survey. The actual sample size for each regression is sometimes lower than the approximate sample size indicated because a number of outcome variables are missing data. All controls enter as trend effects. Financial variables are reported in Ethiopian Birr and are top-coded at the 99th percentile to limit the influence of outliers. Standard errors reported in parentheses are clustered at the sub-village level and there are 16 clusters. Statistical significance is denoted by stars on the coefficient estimates using: *** p<0.01, ** p<0.05, * p<0.1.