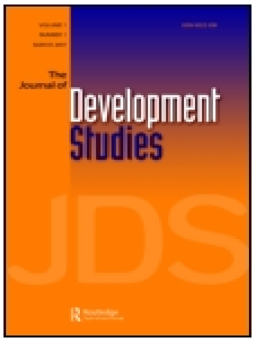

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Cash Transfer Programme, Productive Activities and Labour Supply: Evidence from a Randomised Experiment in Kenya

SOLOMON ASFAW*, BENJAMIN DAVIS*, JOSH DEWBRE*,
SUDHANSHU HANDA** & PAUL WINTERS†
*Agricultural Development Economics Division (ESA), Food and Agricultural Organization of the United Nations (FAO), Rome, Italy, **Department of Public Policy, University of North Carolina, Chapel Hill, NC, USA, †Department of Economics, American University, Washington, DC, USA

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ABSTRACT *This paper reports the analysis of the impact of Kenya's Cash Transfer for Orphans and Vulnerable Children Programme on the household decisions on productive activities using data from a randomised experimental design. Results show that the programme had a positive and significant impact on food consumption coming from home production, accumulation of productive assets, especially on the ownership of small livestock, and on formation of nonfarm enterprise, especially for females. The programme has provided more flexibility to families in terms of labour allocation decisions, particularly for those who are geographically isolated. The programme was also found to reduce child labour, an important objective of the programme. However, we find very little impact of the programme on direct indicators of crop production.*

1. Introduction

Over the past 15 years, a growing number of African governments have launched safety net programmes to provide assistance to the elderly and children, as well as households that are ultra-poor, labour-constrained, and/or caring for orphan and vulnerable children. Cash transfer programmes in African countries have tended to be unconditional (where regular and predictable transfers of money are given directly to beneficiary households without conditions or labour requirements) rather than conditional (more common in Latin America), which require recipients to meet certain conditions, such as using basic health services or sending their children to school. Most of these programmes seek to reduce poverty and vulnerability by improving food consumption, nutritional and health status, and school attendance.

The Kenya Cash Transfer Programme for Orphans and Vulnerable Children (CT-OVC) is the government's flagship social protection programme, reaching over 150,000 households across the country as of December 2012, with the ultimate goal of providing coverage to 300,000 households. A flat monthly transfer of Ksh1500 (approximately USD21; increased in the 2011/2012 budget from Ksh1500 to Ksh2000) is given to those households who are ultra-poor and contain OVC (Kenya CT-OVC Evaluation Team, 2012). OVC are defined as household residents up to 17 years old with at least

Correspondence Address: Solomon Asfaw, Agricultural Development Economics Division, Food and Agricultural Organization of the United Nations, Viale delle Terme di Caracalla, Rome 00153, Italy. Email: solomon.asfaw@fao.org
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one deceased parent, or a parent who is chronically ill, or whose main caregiver is chronically ill. The value of the transfer represented an average of 14 per cent of the expenditures of the beneficiary households in 2011. Given the fixed transfer amount regardless of household size, in per capita terms the transfer is larger for smaller-sized households. Due to inflation, the real value of the transfer declined by 40 per cent between 2007 and 2009, and by an additional 15 per cent between 2009 and 2011. The Government of Kenya began implementing the CT-OVC as a pilot in 2004. After a three-year demonstration period, the programme was formally approved by the Cabinet, integrated into the national budget, and began expanding rapidly in 2007. Further details on the programme and the targeting procedure can be found in Handa et al. (2012).

Although the primary goal of the programme is to build human capital and improve the care of OVC, there are good reasons to believe that cash transfer programmes, and the CT-OVC programme in particular, can have impacts on household decision making, including labour supply, accumulation of productive assets, and productive activities. Most beneficiaries of cash transfer programmes in sub-Saharan Africa live in rural areas, depend on subsistence agriculture, and live in places where markets for financial services (such as credit and insurance), labour, goods, and inputs are lacking or do not function well. Cash transfers often represent a significant share of household income, and when provided in a regular and predicable fashion may help households overcome the obstacles that block their access to credit or cash.

There is robust evidence from numerous countries (especially Latin America and, increasingly, sub-Saharan Africa) that cash transfers have leveraged sizeable gains in access to health and education services, as measured by increases in school enrolment (particularly for girls) and use of health services (particularly preventative health and health monitoring for children and pregnant women) (for example Barrientos & DeJong, 2004; Davis, Gaarder, Handa, & Yablonski, 2012; Fiszbein & Schady, 2009). However, there is relatively limited empirical evidence on the productive impact of cash transfer programmes, particularly in the African context. Todd, Winters, and Hertz (2010) and Gertler, Martinez, and Rubio-Codina (2012) find that the Mexican Programa Nacional de Educacion, Salud y Alimentacion (PROGRESA) programme led to increased land use, livestock ownership, crop production, and agricultural expenditures, and a greater likelihood of operating a microenterprise. Soares, Ribas, and Hirata (2010) find from their analysis of a conditional cash transfer (CCT) programme in Paraguay that beneficiary households invested 45–50 per cent more in agricultural production and that the programme also increased the probability that households would acquire livestock by 6 per cent. Martinez (2004) found that the Bono Solidario (BONOSOL) pension programme in Bolivia had a positive impact on animal ownership, expenditures on farm inputs, and crop output, although the specific choice of investment differed according to the gender of the beneficiary.

In contrast, Maluccio (2010) found that the Red de Proteccion Social (RPS) programme in Nicaragua had muted impacts on the acquisition of farm implements and no impact on livestock or land ownership. The results in Nicaragua may stem from the implementation of the RPS pilot, in particular the low levels of transfers (as share of total income) combined with a stronger programme emphasis and pressure on how the transfers should be spent (Davis, Carletto, & Winters, 2010).

On the other hand, CCTs in Latin America have been shown to have little impact on work incentives and adult labour supply. Studies of Bolsa Familia in Brazil (Foguel & Paes de Barrios, 2010; Ribas & Soares, 2011; Teixeira, 2010), PROGRESA in Mexico (Alzúa et al., 2010; Parker & Skoufias, 2000; Skoufias & di Maro, 2008), the RPS in Nicaragua (Alzúa, Cruces, and Ripani (2010); Maluccio, 2010; Maluccio & Flores, 2005), the Bono de Desarrollo Humano (BDH) programme in Ecuador (Edmonds & Schady, 2008), and Programa De Asignación Familiar (PRAF) in Honduras (Alzúa et al., 2010; Galiani & McEwan, 2012), using a variety of approaches, have not found significant impact on participation in wage employment by adults, female or male, or reallocation between agricultural and non-agricultural sectors. There is some evidence, however, that CCTs have modestly reduced time spent working, for males in Nicaragua (Maluccio & Flores, 2005) and females in Brazil (Teixeira, 2010), and substitution between wage and domestic home work in Brazil (Ribas & Soares, 2011). Handa, Davis, Stampini, and Winters (2010) also find that agricultural households benefiting from PROGRESA were less likely to comply with conditionality due to time conflicts with agricultural work on their own farms. Finally, a number of programmes have been found to lead to reduced child labour (see the review in Fiszbein & Schady, 2009).

With respect to sub-Saharan Africa (SSA), Covarrubias, Davis, and Winters (2012) and Boone, Covarrubias, Davis, and Winters (2013) found that the Malawi Social Cash Transfer (SCT) programme led to increased investment in agricultural assets, including crop implements and livestock, and increased satisfaction of household consumption by own production. Gilligan, Hoddinott, and Taffesse (2009) found that Ethiopian households with access to both the Productive Safety Net Programme (PSNP) and complementary packages of agricultural support were more likely to be food secure, to borrow for productive purposes, use improved agricultural technologies, and operate their own nonfarm business activities. In a later study, Berhane, Hoddinott, Kumar, and Taffesse (2011) found that the PSNP led to a significant improvement in food security status for those that had participated in the programme for five years versus those who only received one year of benefits. Moreover, those households that participated in PNSP as well as the complementary programmes had significantly higher grain production and fertiliser use. However, beneficiaries did not experience faster asset growth (livestock, land, or farm implements) as a result of the programmes (Gilligan & Hoddinott, 2007; Gilligan et al., 2009).

Early evidence from cash transfers in SSA shows a mixed picture in terms of labour supply. Gilligan et al. (2009) found that households in Ethiopia with access to both the PSNP and a complementary package of agricultural support showed no indication of disincentive effects on labour supply, while Ardington, Case, and Hosegood (2009) find that the South African Old Age Pension (OAP) had a positive effect on adult labour supply, arguing that the OAP relieved financial and child care constraints. On the other hand, Covarrubias et al. (2012) found that the Malawi cash transfer programme led to a shift from agricultural wage labour and child work off farm to increased labour allocation in on farm activities by both adults and children.

Building on the existing literature, we analyse the productive impact of the Kenya CT-OVC programme on the accumulation of productive assets, food consumption by source, resource allocation among productive activities, and changes in the labour supply of household members. The impact evaluation strategy was based on a randomised cluster longitudinal design, and the framework for empirical analysis is based on a comparison of programme beneficiaries with a group of non-beneficiaries serving as controls, all interviewed before the programme began and again four years later.

The rest of the paper is organised as follows. Section 2 provides a conceptual framework on the link between cash transfers, productivity activities, and labour supply. Survey design and data collection methods are discussed in Section 3. The fourth section presents the analytical methods, with emphasis on empirical models and hypothesised relationships. The main analytical results are presented and discussed in Section 5, followed by the conclusions in Section 6.

2. Cash Transfer and Productive Activities: Conceptual Framework

The concept of cash transfer programmes leading to economic and productive impacts is built around the hypothesis that the provision of regular and predictable cash transfers to very poor households in the context of missing or malfunctioning markets has the potential to generate economic and productive impacts at the household level and stimulate the local economy through the networks that link individuals, households, businesses, and institutions.

To understand the influence of transfers on agricultural production, we start by considering how agricultural households make decisions. A common approach toward investigating household decision making in these contexts is to employ an agricultural household model in which households are both utility-maximising consumers of agricultural goods and profit-maximising producers of those goods, and potentially face market constraints (Singh, Squire, & Strauss, 1986). In this model, when markets function perfectly, production and consumption decisions can be viewed as 'separable': profit maximisation and utility maximisation are solved recursively. First, the agricultural household maximises profit from agricultural production based on standard economic theory. Second, given that profit, they seek to maximise utility. All prices are determined exogenously through market mechanisms and households are price takers. If markets are perfect, spending and investment in agriculture are optimal, and the effect of the transfer should only be on consumption.

In contrast to the assumptions underlying this model, agricultural households in developing countries often face significant barriers in multiple markets. For example, high transaction costs in staple markets can often make self-sufficiency the optimal choice (Key, Sadoulet, & de Janvry, 2000). Labour transaction costs, such as monitoring worker effort, can prevent households from hiring labour and encourage them to use family labour, making family and hired labour imperfect substitutes. Poor households often face difficulties in accessing credit due to lack of assets to use as collateral, or credit rationing that might occur due to factors such as adverse selection, asymmetric information, or government policies (Feder, Lau, Lin, & Luo, 1990). Liquidity and credit constraints are two of the main factors limiting poor agricultural households from investing optimally (Fenwick & Lyne, 1999; Lopez & Romano, 2000; Rosenzweig & Wolpin, 1993; Winter-Nelson & Temu, 2005). Without access to adequate credit markets or insurance, agricultural households may adopt low-risk, low-return strategies, either in production or the diversification of income sources. Agricultural households will often sell more than the optimal amount of labour off farm in order to provide a variety of sources of income.

When faced with multiple market failures, agricultural households may then make decisions to ensure that they have enough food to eat, but not necessarily that which would be the most profitable. For example, to minimise the risk of high prices for staple foods they may produce more of these foods to ensure food security, even if they could make more money from a cash crop. In the face of such constraints, the production and consumption decisions of agricultural households can be viewed as 'non-separable', in the sense that they are jointly determined (Singh et al., 1986).

If household production and consumption decisions are non-separable, cash transfers may be able to help overcome several of these constraints. First, if correctly implemented, transfers provide a guaranteed steady source of income at regular (for example monthly or bimonthly) intervals. This assurance, especially for agricultural households that are less likely to have regular sources of income, might allow households to adopt riskier strategies with a higher rate of return. This guaranteed flow of income can help make up for failures in the insurance market. Secondly, the cash can be used for productive investment by providing liquidity. This liquidity can help farmers move closer to the optimal level of inputs when credit markets have failed. Such investments can be complemented by household labour and lead to increased agricultural production by the household.

Alternative theoretical models can also help to understand the potential impact of a cash transfer programme on labour supply decisions. Becker's Time and Household Production theory (1965) suggests that time allocation decisions involve a trade-off between time devoted to domestic activities, such as domestic production or leisure, which generate utility, and time devoted to paid labour, which yields income. An increase in household income unrelated to work enhances the value of time dedicated to housework activities, relative to the time dedicated to paid work. Cash transfer programmes can potentially create negative incentives for time allocated to paid work – that is, the income effect discussed by Parker and Skoufias (2000) – while at the same time providing incentives for housework activities which promote wellbeing. This impact may vary by gender: given cultural norms and the constraints of caring for children, income effects may lead women to withdraw from the labour market while men increase their leisure. On the other hand, a substitution effect might also occur when there is an increase in adult labour supply in order to compensate for a reduction in child labour in response to a conditionality related to school attendance, which is the case for most CCTs. Further, meeting conditions, for example health clinic requirements, may conflict with time spent working, and this may well vary by gender (Kabeer, 2009). While the Kenya CT-OVC is unconditional, the programme does involve social messaging (that is, the money is suggested to be used on children, health, and improved nutrition).

The specific hypotheses we wish to test in this paper are the following. Does the Kenya CT-OVC: lead to an increase in investment in agricultural and non-agricultural productive assets and activities; increase food consumption obtained from own production; result in a shift in adult labour towards own agricultural and non-agricultural activities and away from casual labour; result in heterogeneous impact by gender; and reduce the time children spend at work?

3. Programme Evaluation Design and Data

3.1 Programme Targeting and Data Type

Prior to programme expansion of the CT-OVC in 2007, UNICEF designed a social experiment to track the impact of the programme on a range of household welfare indicators, including child health and schooling, and economic productivity. The evaluation was contracted to a private consulting firm, Oxford Policy Management (OPM), and entailed a cluster randomised longitudinal design, with a baseline household survey (and related community survey) conducted in mid-2007 and a 24-month follow up in 2009.

The design of the impact evaluation followed the programme's targeting process, which involved three stages. In stage one, seven districts were chosen for inclusion into the programme, based on overall poverty levels and the prevalence of HIV/AIDS (directly related to OVC). The ethical rationale for the design was that the programme could not expand to all eligible locations at the same time, so locations which would enter the programme later in the expansion cycle were used as control sites to measure impact. Thus in the second stage, within each of seven districts that were scheduled to be included in this expansion phase, four locations were identified as eligible, two of which were subsequently randomised out of the initial expansion phase and served as control locations (Figure 1). Targeting of households was carried out in the intervention locations according to standard programme operation guidelines in the third stage. Each location formed a committee of citizens charged with identifying potentially eligible households based on criteria of ultra-poverty and containing at least one OVC as defined above. The list of eligible households was sent to the programme's central office (located within the Ministry of Gender, Children, and Social Development), which then administered a detailed socioeconomic questionnaire to confirm eligibility. The final number of households that entered the programme in each district depended on funding to that district, but

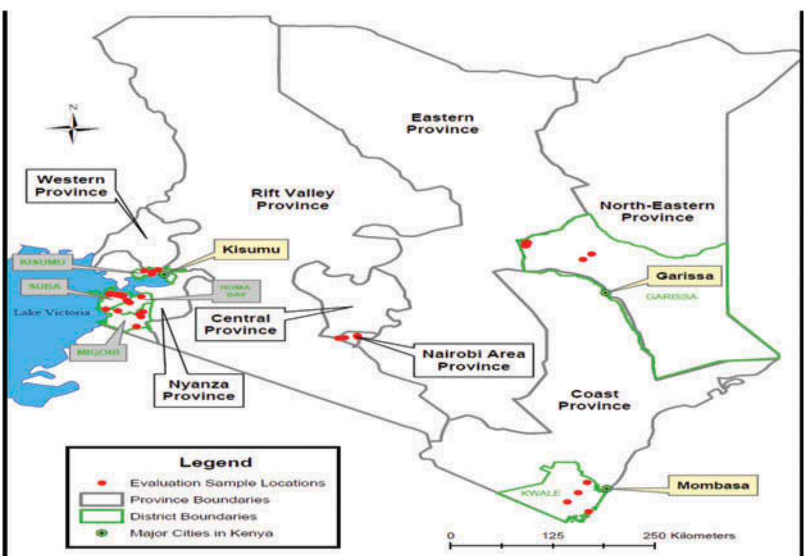

Figure 1. Map of the evaluation sites.

approximately 20 per cent of the poorest households in each location were enrolled in the programme. The criterion for ultimate inclusion was based on age: child-headed households received highest priority, followed by age of head of household (with oldest getting priority). Since the programme was not scheduled to be implemented during this phase in the control locations, programme targeting was 'simulated' in order to identify a sample of households that were comparable to those identified as eligible in treatment locations. The simulation meant that the first stage of targeting was replicated in control locations but not the second stage, since a final eligibility list was not required. Households in both the treatment and control arms were surveyed prior to being told that they were selected into the programme. The targeting performance of the programme is reported in Handa et al. (2012). A second follow up study of the evaluation sample (this time under the leadership of the University of North Carolina) was conducted four years after baseline, between May and July 2011. Both the baseline and first follow up surveys had collected only limited data on production activities and labour supply; thus, in order to measure the economic impacts of CT intervention at the individual and household level, additional data were collected in the 2011 follow up. First, to measure the investment impacts of the programme, data were collected on livestock, agricultural asset, non-agricultural asset, and durable goods ownership. Respondents also provided information on land ownership and acquisition. Crop level information obtained included harvest, sales, own consumption, and in kind gifts, as well as by-products obtained, sold, and consumed. A livestock production module captured animal stocks and revenues from sales of live and slaughtered animals, as well as animal by-products. Additional detailed information on changes in the labour allocation of household members to off farm and on farm activities was also collected. The survey also included a small module on non-agricultural business operated by the household.

For this paper, we rely on data collected at baseline (2007) and the second round follow up in 2011. Not having data on some variables for the 2007 survey means that for many of the outcome variables of interest we have only one data point (no baseline). This limits our ability to control for time-invariant unobservables in the impact estimation for some of the outcome variables with no baseline information.

3.2 Characteristics of Evaluation Sample, Attrition, and Balance

The original OPM evaluation sample includes four groups of households: treatment and control households, and non-eligible OVC households in intervention and control localities. The latter two groups were included in the baseline survey in order to assess the targeting effectiveness of the programme, but these households were not surveyed in the 2009 or 2011 rounds.

Table 1 reports the sample sizes for each survey round for eligible intervention and control households only. Approximately one-third of the sample is control households and the sample size at the 2007 baseline is 2294. Attrition was fairly substantial between 2007 and 2009 at 18 per cent, but was reduced considerably to only 5 per cent in the 2011 round. All three rounds of field work were conducted by Research Solutions Africa, a private research firm based in

Table 1. Sample sizes by wave (eligible households only)

Treatment	Control	Total
	Round 1 2007	
1542	755	2294
	Round 2 2009	
1311 + 15 (new)	571 + 13 (new)	1910
	Round 3 2011	
1280	531	1811

Nairobi; the field work report for the 2011 survey is provided by Otienoh (2011). A number of variables are used in the analysis in order to set the context and establish the validity of the counterfactual for assessing impact. Two sets of variables are used: those linked to programme eligibility criteria and general variables that provide information on basic characteristics of the household and adults in the household. Table 2 shows baseline summary statistics for these variables. Statistical tests of difference are performed, comparing baseline control and treatment groups, to determine if the experimental procedure used to create the treatment and control groups created a valid counterfactual and, if not, to help determine what characteristics are of concern. Table 2 indicates that the first stage targeting (based on OVC and poverty) was accurate in control households. Both treatment and control households are comparable across poverty indicators. However, there are significant differences in baseline characteristics across the treatment and control groups for a number of variables related to household demographic structure and individual characteristics: treatment households have heads who are about nine years older than control households (due to the priority ranking of the programme), are more likely to be male, and have less education. Control households have more prime-age adults (age greater than 18) in the household relative to treatment households. These differences are not surprising given the simulation of targeting in control locations and the small number of communities (only 28 locations) included in the treatment and control groups. With a sufficiently large number of communities, the expectation would be that treatment and control groups would, on average, prioritise different types of poor in similar ways. With a relatively small number of communities, however, differences emerge even with randomisation. Of course, these differences suggest a need to make adjustments to data to ensure unbiased estimates of impact, and these adjustments are discussed in the Methods section.

We have also looked at selected characteristics at baseline for households from each of the three survey rounds for treatment and control households. This helps us understand the degree of non-random attrition as well as the comparability of households in the two arms. Results show that the differences observed between the different arms are essentially the same across households in each of the three waves of the study. In other words, there is no significant change in the composition of households across the two arms over time, which supports the idea that attrition is random and not systematic across the survey rounds. For more details on the sample and a discussion of attrition, see Handa et al. (2012).

3.3 Summary Statistics

Table 3 presents a summary of ownership of productive assets and participation in productive activities. A large majority of beneficiaries in the evaluation sample are agricultural producers: over 80 per cent of beneficiaries grow crops, and three-quarters have livestock. Agriculture households in the sample, as would be expected, have modest levels of assets: around 2.6 acres of agricultural land (Table 3), an assortment of animals, and low levels of education. Agricultural producers also own a variety of tools and implements. Only 16 per cent of households used credit in 2011, and of these, less than half used credit for investment in productive activities. Of those who did not use credit, the vast majority felt they had no means to repay loans. Approximately one-third of households had some small business activity in 2011. Both male- and female-headed households reported that own savings were the principal first source of capital for their nonfarm enterprise, followed by gifts, loans, and sales of assets. Nevertheless, the CT-OVC transfer was reported as the most important second source of capital for female-headed households (over 30%) and second most important for male-headed households (just under 20%). Averaged over beneficiary households, the percentage rises to almost 50 per cent, indicating that the transfer is perceived as a factor in investment in nonfarm enterprises. The importance of agriculture is also seen in the allocation of household labour supply (Table 4). Over half of all adults work on their own farm, with a somewhat higher percentage of women (59% versus 52%). A quarter of all adults work for wages (31% men

Table 2. Summary of baseline characteristics, 2007 (household and individual level)

	Total (N = 1783)	Treatment (N = 1265)	Control (N = 518)	Difference
Household characteristics				
Age of the head (years)	55.97	58.53	49.73	8.81***
Female headed household (1=yes)	0.64	0.65	0.60	0.06**
Household size	5.62	5.55	5.79	0.23*
Total non-active labour force in household	3.19	3.17	3.24	0.06
Elderly headed household (1=yes)	0.42	0.48	0.27	0.20***
Education of household head (years)	3.37	2.99	4.30	1.30***
Education of the spouse (years)	1.25	1.10	1.63	0.53***
Dependency ratio	1.49	1.49	1.50	0.01
Sex ratio	1.24	1.25	1.22	0.03
Number of household members				
Under 11 years	2.04	1.97	2.20	0.23***
12–17 years	1.31	1.31	1.32	0.1
18–34 years	1.02	0.97	1.15	0.18***
35–49 years	0.37	0.33	0.48	0.16***
50–64 years	0.50	0.57	0.35	0.21***
Over 65 years	0.36	0.39	0.25	0.14***
Head was sick (1=yes)	0.02	0.01	0.04	0.03***
Number of OVC in the household	2.47	2.50	2.38	0.13
Poverty indicators				
Number of adult member with over 8 years of education	0.63	0.62	0.66	0.04
Drinking water from unprotected sources (1=yes)	0.63	0.61	0.70	0.09***
Agriculture is the main source of income (1=yes)	0.43	0.44	0.39	0.05*
Main source of income is salaried employment (1=yes)	0.04	0.03	0.06	0.03***
Main source of income is casual labour (1=yes)	0.57	0.56	0.58	0.02
Main source of income is self-employment (1=yes)	0.32	0.32	0.30	0.02
Main source of income is transfers (1=yes)	0.07	0.07	0.05	0.02
Household asset				
Own bicycle (1=yes)	0.17	0.15	0.21	0.05***
Proportion of household who owns blankets	0.86	0.86	0.86	0.00
Proportion of household who owns mosquito nets	0.62	0.59	0.69	0.11***
Total cultivable land owned by household (acres)	1.95	1.70	2.56	0.85***
Proportion of livestock owner	0.76	0.75	0.79	3.21***
Monthly consumption per capita (Ksh)	1285.98	1298.09	1256.40	41.69
Community level indicators				
Access to road to the village (1=yes)	0.76	0.77	0.72	0.05**
Distance to local market (1=far)	0.23	0.21	0.27	0.07***
Share of household who can make telephone calls (1=high)	0.12	0.11	0.15	0.04**
Individual characteristics	(N = 7191)	(N = 5114)	(N = 2077)	
Age of the individual (years)	27.23	27.91	25.56	2.35***
Gender of the individual (1=female)	0.52	0.52	0.52	0.00
Marital status (1=married)	0.2	0.19	0.23	0.04***
Marital status (1=single)	0.62	0.62	0.61	0.01
Education of the individual (years)	2.52	2.42	2.75	0.33**
Individual is disabled (1=yes)	0.04	0.05	0.03	0.02***
Unemployed	0.63	0.64	0.62	0.02**
In wage labour	0.01	0.01	0.01	0.00
In causal work	0.09	0.09	0.07	0.02**
In off farm work	0.03	0.03	0.04	0.01

Notes: Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. Note also that the number of observations are different for household versus individual level variables.

Table 3. Descriptive summary of productive asset and activities (2011), household level

	All	HH size<5	HH size>4	Female head	Male head
Owns non-farm enterprise (1=yes)	0.35	0.31	0.37	0.34	0.37
Share of households that operate land	0.80	0.83	0.79	0.79	0.82
For those that operate, land size in acres	2.67	2.20	2.96	2.52	2.90
Share of households that own land	0.76	0.82	0.72	0.75	0.76
For those that own, size in acres	2.58	2.15	2.86	2.45	2.79
Owns livestock (1=yes)	0.75	0.75	0.76	0.73	0.78
Access to credit (1=yes)	0.16	0.20	0.14	0.16	0.17
Share of households that own agricultural assets	0.97	0.97	0.97	0.97	0.97
N	1783	698	1085	1137	646

Table 4. Descriptive summary of labour participation and intensity (2011), individual level

	All (18+)	Female (18+)	Male (18+)	Children (10–15)	Female (10–15)	Male (10–15)
Labour participation						
Works in casual wage labour (1=yes)	0.26	0.23	0.31	0.01	0.01	0.02
Works in agriculture wage labour (1=yes)	0.09	0.09	0.08	0.01	0.01	0.01
Works in non-agriculture wage labour (1=yes)	0.18	0.14	0.23	0.00	0.00	0.01
Works in own agriculture (1=yes)	0.56	0.59	0.52	0.42	0.39	0.45
Labour intensity						
Days per year in wage labour (man-days)	38.21	29.60	50.07	0.76	0.25	1.21
Days per year in agricultural wage (man-days)	10.28	9.79	10.97	0.65	0.19	1.04
Days per year in non-agricultural wage (man-days)	27.93	19.81	39.10	0.12	0.06	0.17
Days per month in own agriculture (man-days)	6.78	7.29	6.07	1.61	1.26	1.91
N	3965	2297	1668	2133	995	1138

and 23% women); almost all of this work is casual and approximately two-thirds are non-agricultural.

4. Methods

4.1 Empirical Approach

In this paper we seek to answer the question 'How would cash transfer beneficiaries have fared in absence of the programme?' As it is impossible to observe a household both participating in the programme and not participating, the goal is to compare participants with non-participants who are as similar as possible except for the fact that they are not beneficiaries. Creating a valid counterfactual is crucial to producing reliable estimates of programme effects. By comparing outcomes between these two groups, the average impacts of the cash transfer programme can be estimated. Although on average the targeting emphasis of the treatment and control communities may have differed, the random assignment of eligible communities into treatment and control groups suggests similarities between the groups; that is, the groups are not radically different and tend to be poor with limited assets. These imply a need to adjust the baseline data to create a more reasonable counterfactual.

Towards this end, we use two approaches: a difference-in-difference estimator and a single difference approach combined with inverse probability weighting. When baseline data are not available, as is the case for some of our outcome variables (that is, those that are observed only after the implementation of programme), a single difference method can be applied; when panel data are available with pre- and post-intervention information, which is the case with some of our outcome variables, we use a difference-in-difference approach. Since baseline differences between treatment and control are primarily linked to observable demographic characteristics, for both approaches an emphasis is placed on these variables in ensuring an adequate estimate of impact.

For all variables with adequate baseline data, a difference-in-difference, or double difference (DD), estimator can be specified as follows:

$$\begin{aligned} ATT &= E[(\tau_t - \tau_{t-1})|D = 1] = E[(Y(1)_t - Y(0)_t) - (Y(1)_{t-1} - Y(0)_{t-1})|D = 1], \\ &= E(Y(1)_t - Y(1)_{t-1})|D = 1) - E(Y(0)_t - Y(0)_t|D = 1) \end{aligned}, \tag{1}$$

where $t-1$ and t represent time periods before and after the introduction of the cash transfer programme and the binary indicator D refers to programme assignment at the baseline. The panel nature of the data provides the option of using a before/after comparison of control and treatment because it compares the difference between control and treatment as well as before and after.

By taking the difference in outcomes for the treatment group before and after receiving the cash transfer, and subtracting the difference in outcomes for the control group before and after the cash transfer was disbursed, DD is able to control for pre-treatment differences between the two groups, and, in particular, the time invariant unobservable factors that cannot be accounted for otherwise (Woodridge, 2002). The key assumption is that differences between treated and control households remain constant throughout the duration of the project. If prior outcomes incorporate transitory shocks that differ for treatment and comparison households, DD estimation interprets such shocks as representing a stable difference, and estimates will contain a transitory component that does not represent the true programme effect.

When differences between treatment and control groups at the baseline exist, the DD estimator with conditioning variables has the advantage of minimising the standard errors, as long as the effects are unrelated to the treatment and are constant over time (Wooldridge, 2002). Control variables are most easily introduced by turning to a regression framework that is convenient for the DD, combining DD with propensity score matching, or combining DD with inverse probability weighting (DD-IPW). Equation (2) presents the regression equivalent of DD with covariates and/or IPW:

$$Y_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 R_t + \beta_3 (R_t * D_{it}) + \sum \beta_i X_i + \mu_{it}, \tag{2}$$

where Y_{it} is the outcome indicator of interest, D_{it} is a dummy equal to one if household i received the treatment, R_t is a time dummy equal to zero for the baseline and one for the follow up round, $R_t * D_{it}$ is the interaction between the intervention and time dummies, and μ_{it} is an error term. To control for household and community characteristics that may influence the outcome of interest beyond the treatment effect alone, we add in X_i, a vector of household and community characteristics, to control for observable differences across households at the baseline that could have an effect on Y_{it}. These factors are not only those for which some differences may be observed across treatment and control at the baseline, but also ones which could have some explanatory role in the estimation of Y_{it}. As for coefficients, β_0 is a constant term, β_1 controls for the time invariant differences between the treatment and control, β_2 represents the effect of going from the baseline to the follow up period, and β_3 is the double difference estimator, which captures the treatment effect.

We employed a single difference combined with IPW (SD-IPW) approach when baseline data were not available. It is important to point out that unlike the DD, the SD-IPW estimation procedure is not robust against time-invariant unobservables; therefore results from the SD should be interpreted with these caveats in mind. The regression equivalent of SD-IPW can be expressed as follows:

$$Y_i = \beta_0 + \beta_1 D + \sum \varphi_i Z_i + \gamma_i (D * Z_i) + \mu_i. \tag{3}$$

We use the method of inverse probability weighting by specifying a propensity score model. Inverse probability weighting derives weights from the propensity score, where these are defined by the inverse of the propensity score if the subject receives treatment and the inverse of one minus the propensity score if the subject receives the control. Propensity score is defined as the probability of receiving treatment given the measured covariates ($\hat{P}(Z) = \Pr(D = 1|Z)$, where Z is a vector of control variables). In the case of DD-IPW or SD-IPW, control observations are assigned weights equal to the inverse of their propensity score, that is $w = \frac{\hat{P}(Z)}{(1-\hat{P}(Z))}$, and treatment observations receive a weight equal to one. Applying these weights[1] to control households effectively reweights the distribution of observable characteristics included in $\hat{P}(Z)$ to be like that of the treatment group. Said differently, control observations that are dissimilar to the treatment group will have a $\hat{P}(Z)$ near zero and a weight near zero; conversely, control observations similar to the treatment group will receive a higher weight. One advantage of the weighting approach is that it is considered to be 'doubly robust': if either the propensity model or the outcome equation is correctly specified the estimator will be consistent. Therefore, for this paper, following Rubin (1977), as suggested by Hirano and Imbens (2001), we combine the IPW estimator with the regression adjustment in the analysis of individual and household level outcomes as presented above.

Any method that uses the propensity score requires that all relevant confounders are included in the model and that this model is specified correctly to validate the conditional exchangeability assumption. As with all observational studies, inference is only valid under the strong assumption of there being no unmeasured confounders. This is crucial in allowing the causal interpretation placed on the parameters but is, unfortunately, untestable. Ensuring that a region of common support exists is necessary in the weighting approach in order to avoid observations with extremely large weights, which can yield estimates with high variance and undue influence on results (Imbens & Wooldridge, 2009). For both DD-IPW and SD-IPW, we calculate clustered standard errors at the community level (location level, which is also unit of randomisation for this study) for household level outcomes, and we cluster the standard errors at the household level for individual level outcomes. In the subsequent section we will discuss in detail the estimation procedure of the propensity scores and the overall results of the common support and balance.

4.2 Estimation of Propensity Scores

We estimate three sets of propensity scores: for household level outcomes we estimate propensity score at the household level, while for individual level outcomes we generate propensity score at the individual level, overall, and by gender. Alternatively, we could have estimated household level weights and then disaggregated the analysis at the individual level. However, given the importance of individual level variables in the labour allocation decision, and the existence of at least some limited information at baseline on individual labour market participation, we decided to use propensity scores generated at the individual level.

The baseline data provide a rich set of variables to help identify programme participation. In the baseline survey implemented in 2007, the criteria used to target programme beneficiaries are documented. This enables us to identify the targeting component of the participation decision by including the specific eligibility criteria as control variables in the participation regression, which is estimated using a logit model (Online Appendix Tables 1 and 2). At the household level the set of observable variables includes household characteristics such as age, gender, education of the household head, household size, dependency ratio, sex ratio, number of OVC in the household, poverty indicators such as income sources and access to drinking water, household assets such as ownership of bicycles, blankets, mosquito nets, land and livestock holding, consumption expenditure, community level indicators such as access to roads, distance to daily market, access to telephone, and finally district fixed effects. Individuals' characteristics at baseline were used in addition to the above variables when estimating the participation equation for individuals. Specifically, these included participation and type of labour activity, age, education, marital status, and health.

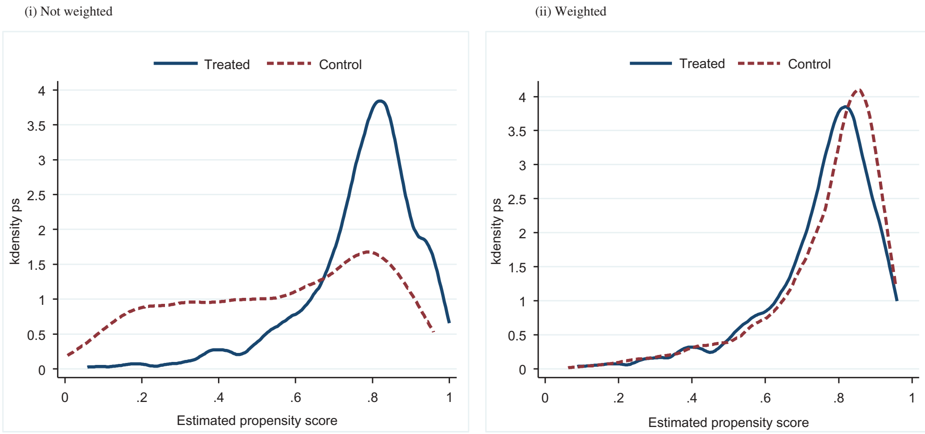

Figure 2. Kernel density of the propensity score for the treated and control groups, household level weighting.

Evidence on the result of reweighting can be seen in Figure 2, which shows the distribution of the estimated propensity scores. As shown in Figure 2 on the left side, the unweighted distribution of the propensity score for the control groups is more negatively skewed to the right. However, on the right side, with weighting the distribution of the propensity score of the control groups is similar to the distribution of the treatment group. A similar picture is seen in Figure 3 for the distribution of propensity score generated at individual level. Given that the analysis does not condition on all covariates but on the propensity score, there is a need to check if the weighting procedure is able to balance the distribution of the variables used in the construction of the propensity score. After some experimentation we have settled on a preferred specification of the participation model, for which we cannot reject the null of mean equality of baseline characteristics between (reweighted) treatment and control households. Also reported in Online Appendix Tables 3a and 3b are weighted means of the baseline characteristics, where the weights are constructed from estimated propensity scores. Testing for differences in these weighted means across the treatment and control groups reveals no significant differences. The fact that the weights can balance the beeline characteristics across the two groups provides motivation for their use and, as a result, results presented in this paper for both SD and DD rely solely on the weighted regressions. Following Imbens and Wooldridge (2009), we use IPW by combining the propensity score with regression analysis rather than PSM. Just over 4 per cent of observations are outside of common support in the household level IPW, while the original and (post-IPW) final number of observations for the individual level analysis (including by gender) can be found in Online Appendix Table 4.

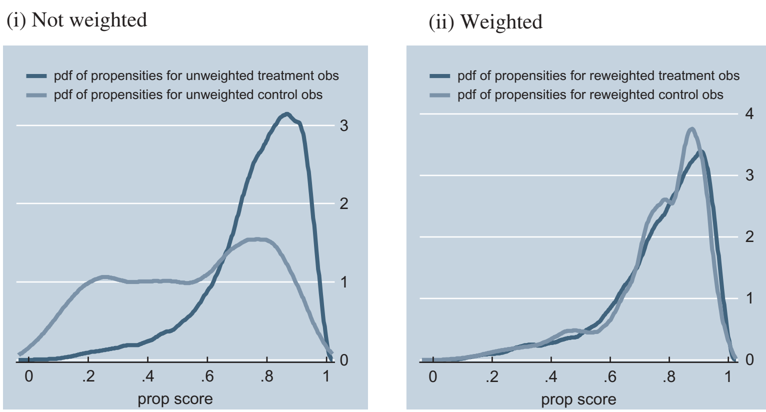

Figure 3. Kernel density of the propensity score for the treated and control groups, individual level weighting.

4.3 Heterogeneity of Programme Impacts

The average treatment effect of participation in the CT-OVC may mask differential impacts of the programme on subgroups of households, for example among female- and male-headed households. We use two approaches to determine the existence of these differential effects. For all household level equations, we divide the sample of households into female- and male-headed households and by household size. Since the transfer is a fixed amount per household regardless of household size, the per capita transfer amount is larger for smaller households, and we would expect the impact of the programme to be different for households with a smaller number of members compared to a household with a larger number of members. For the labour allocation equations at the individual level, we divide the sample into males and females and perform separate analyses on each group. For these individual level equations we interact treatment (in separate equations) with individual age and chronic illness status, as well as with household distance to market, adult household members, and regional dummies.

5. Results

In this section we discuss our findings for the average treatment effects of the Kenya CT-OVC programme over four broad groups of outcome variables: food consumption, productive assets, non-agricultural business activities, and labour supply. When the baseline information is available for a given outcome variable, we employ a DD-IPW estimator in a multivariate framework. Otherwise, we use the SD-IPW estimator as described above.

5.1 Impact on Food Consumption

One of the most consistent findings regarding the impact of cash transfer programmes is their contribution to reducing hunger and food insecurity. Often the most immediate impact of cash transfer programmes for the very poor relates to basic consumption needs, particularly nutrition and food security, through a direct increase in purchasing power (Devereux & Coll-Black, 2007). Table 5

Table 5. Impact on consumption of food groups in proportion, DD-IPW estimator (2007–2011)

	All	HH size <5	HH size 5 & above	Female head	Male head
Cereals (1=yes)	−0.004	−0.010	0.001	−0.005	−0.000
	(0.54)	(0.63)	(0.63)	(0.52)	(0.20)
Legumes (1=yes)	0.004	0.109	−0.069	0.067	−0.117
	(0.04)	(1.48)	(0.64)	(0.65)	(1.25)
Dairy and eggs (1=yes)	0.123	0.297	−0.001	0.163	0.045
	(2.52)**	(5.03)***	(0.02)	(3.08)***	(0.63)
Meat and fish (1=yes)	0.053	0.135	−0.007	0.072	0.015
	(1.22)	(2.96)***	(0.12)	(1.83)*	(0.22)
Vegetables (1=yes)	−0.022	−0.043	−0.007	−0.033	−0.003
	(0.69)	(0.73)	(0.17)	(0.79)	(0.06)
Fruit (1=yes)	0.043	0.104	−0.000	0.047	0.036
	(1.08)	(1.80)*	(0.02)	(0.98)	(0.93)
Cooking oil (1=yes)	0.021	0.023	0.019	−0.004	0.069
	(0.77)	(0.50)	(0.53)	(0.11)	(4.80)***
Other food (1=yes)	−0.009	−0.009	−0.009	−0.007	−0.012
	(0.66)	(0.46)	(0.50)	(0.41)	(1.04)
N	1783	698	1085	1137	646

Notes: Robust standard errors are clustered at community level. Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. T-statistics in parentheses.

presents the average difference between the control and treated groups in components of food consumption expenditure.[2] Results from the DD estimator with IPW show a positive and significant impact on consumption of animal products such as dairy and eggs, meat and fish, and cooking oil and in consumption of fruits across household size and gender line. The results show no significant impact on consumption expenditure of cereals and legumes. The average treatment effect for food spending on dairy and eggs is 0.123, which is equivalent to a 12.3 percentage point increase as a result of the programme.

As expected, the results of the disaggregated analysis show considerable variation in the impact of the programme across gender and household size. The analysis shows no effect of the programme on spending on most of the food consumption categories for households with larger numbers of members, but shows large, positive, and significant effects on three of the outcomes (dairy and eggs, meat and fish, and fruit) for households with smaller numbers of members. The programme tends to have larger and positive impact on female-headed compared to male-headed households. For instance, the programme results in a statistically significant 16 percentage point increase in consumption of animal products for female-headed households, but only a 4.5 percentage point increase for male-headed households. The one exception in which the impact is positive and significant for male-headed households is in the consumption of cooking oil.

Information was collected on the primary source of specific types of food consumption, with own production, purchases, and gifts as the possible sources. We have used proportion of food consumption from own production as an indirect proxy to measure the linkages between diet diversity and food security (see Todd et al., 2010). Table 6 shows the DD with IPW results of the programme impact on the proportion of food consumption that comes from own production. The treated households appear to consume more animal products, as well as other foods, from their own production compared to control households. The estimated treatment effect for change in dairy and egg consumption from own production is about 13 percentage points, and the impact on other types of foods is about 4 percentage points. For most of the outcomes, the differential impact again appears to be bigger for households with smaller sizes and for female-headed households. The average treatment effect for the share of consumption from home produced dairy and eggs is 20 percentage points for smaller households and 15 percentage points for female-headed households.

Table 6. Impact on proportion of food consumption from own production, DD-IPW estimator (2007–2011)

	All	HH size <5	HH size 5 & above	Female head	Male head
Cereals	0.06	0.13	0.01	0.05	0.08
	(1.10)	(1.72)*	(0.18)	(0.73)	(0.93)
Legumes	−0.001	0.02	−0.02	0.04	−0.08
	(0.02)	(0.32)	(0.44)	(0.72)	(1.66)
Dairy and eggs	0.13	0.20	0.09	0.15	0.11
	(3.09)***	(3.40)***	(1.66)	(3.03)***	(1.32)
Meat and fish	0.04	0.11	−0.003	0.03	0.07
	(0.89)	(3.64)***	(0.05)	(1.01)	(0.62)
Vegetables	0.004	−0.006	0.02	−0.05	0.10
	(0.06)	(0.09)	(0.25)	(0.72)	(1.12)
Fruit	0.04	0.09	0.01	0.06	0.003
	(1.02)	(1.93)*	(0.12)	(1.31)	(0.07)
Cooking oil	0.003	0.01	−0.003	0.003	0.002
	(0.46)	(0.97)	(1.02)	(0.42)	(0.39)
Other foods	0.04	0.04	0.04	0.04	0.05
	(4.20)***	(2.92)***	(3.38)***	(3.60)***	(2.52)**
N	1706	680	1026	1087	619

Notes: Robust standard errors are clustered at community level. Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. T-statistics in parentheses.

5.2 Investment in Productive Assets, Input Use, and Nonfarm Activities

We look at investment in two types of productive assets: livestock ownership and agricultural implements. We also look at dimensions of the productive process to ascertain whether households have increased spending in agricultural activities. These include crop production, input use, and credit use. Table 7 presents the impact of the CT-OVC on ownership of livestock assets estimated using the DD estimator with IPW. We used two indicators to measure the impact on livestock assets: the proportion of households owning each type of livestock and the total quantity owned (aggregated using tropical livestock unit or TLU). The results show a positive and significant impact only on the ownership of small livestock such as sheep and goats, for both smaller and female-household households. For smaller households, the estimated average treatment effect of 0.154 is equivalent to a 15.4 percentage point increase in ownership of small livestock compared to control households, while female-household households receiving the transfer experienced a 6 percentage point increase in ownership of small livestock. Overall no impact is found on the number of livestock owned by households; however, for smaller households, the total number of livestock (aggregated in TLU) increased by 0.7 compared to control households. Given the relatively small amount of the transfer, the lack of impact on cattle is not surprising; however, we would have expected some kind of positive impact on poultry ownership.[3] Overall, as can be seen in Table 8, we find very little impact of the programme on direct indicators of crop production. This includes no impact over the share of households growing crops (and specifically improved maize) or the share of crop producing households using different inputs (seeds, pesticides, and organic and inorganic fertiliser). In fact, we find some small but significant negative impacts on the use of pesticides by large households and by female-headed households. Similarly, we find no impact on input expenditures, with the exception of a negative impact on seed expenditure. It is, however, important to point out that these results are based on an SD-IPW estimation procedure which is not robust against time-invariant unobservables, therefore it should be interpreted with these caveats in mind. Why are the results for the Kenya CT-OVC modest compared to those of other programmes, such as the Malawi SCT (Boone et al., 2013; Covarrubias et al., 2012)? Three possible reasons emerge. First, the Kenya transfer was about half the size of the Malawi transfer at the time of their respective impact evaluations. Second, the value of the transfer was severely eroded over the period of the impact evaluation. Third, the Malawi SCT programme was also a pilot only implemented in one district (Mchinji) which is a relatively homogenous and vibrant agricultural economy, while the Kenya SCT is implemented in four regions over seven districts which are heterogeneous both in terms of geography and economic activities.

As reported in Table 3, approximately one-third of households had some small business activity in 2011. Households reported that own savings were the principal first source of capital for their nonfarm

Table 7. Impact on livestock ownership, DD-IPW estimator (2007–2011)

	All	HH size <5	HH size 5 & above	Female head	Male head
Proportion of household owning					
large livestock (cattle, donkey, and so forth)	0.038	0.033	0.041	0.051	0.010
(1=yes)	(0.91)	(0.58)	(0.88)	(1.06)	(0.21)
Small livestock (sheep, goat, and so forth)	0.054	0.154	−0.022	0.06	0.043
(1=yes)	(1.65)	(2.85)***	(0.48)	(1.74)*	(0.74)
Poultry (1=yes)	−0.001	0.053	−0.038	0.005	−0.013
	(0.02)	(0.84)	(0.58)	(0.12)	(0.13)
Total quantity owned (measured in TLU)	0.593	0.671	0.500	0.570	0.660
	(0.62)	(1.72)*	(0.34)	(1.16)	(0.31)
N	1706	680	1026	1087	619

Notes: Robust standard errors are clustered at community level. Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. T-statistics in parentheses.

Table 8. Impact on crop production, SD-IPW estimator (2011)

	All	HH size <5	HH size 5 & above	Female head	Male head
Proportion of households:					
Growing crops	−0.024	−0. 036	−0.008	−0.016	−0.054
	(−0.44)	(−1.16)	(−0.13)	−(0.31)	(−0.96)
Improved maize	−0.009	0.018	−0.013	0.003	−0.028
	(−0.45)	(0.83)	(−0.43)	(0.10)	(−0.99)
Using seed	−0.015	−0.005	−0.011	0.001	−0.067
	(−0.25)	(−0.09)	(−0.17)	(0.04)	(−1.07)
Using pesticide	−0.031	−0.021	−0.035*	−0.053*	0.008
	(−1.65)	(−0.80)	(−1.74)	(−1.95)	(0.35)
Using organic fertiliser	−0.005	0.038	−0.036	0.015	−0.039
	(−0.11)	(0.67)	(−0.71)	(0.31)	(−0.63)
Using inorganic fertiliser	−0.028	0.014	−0.048	−0.007	−0.079
	(−0.45)	(0.20)	(−0.81)	(−0.12)	(−1.05)
Expenditure (Ksh) per acre on:					
Seeds	−104.8**	−76.59	−110.4**	−95.94	−157.1**
	(−2.19)	(−1.28)	(−2.25)	(−1.58)	(−2.35)
Pesticide	7.428	−9.393	16.37	−5.635	27.51
	(1.03)	(−1.20)	(1.61)	(−0.78)	(1.28)
Organic fertiliser	10.69	21.13	15.17	3.357	29.07
	(0.61)	(0.88)	(0.66)	(.015)	(1.02)
Inorganic fertiliser	−72.45	−14.10	−107.1	−81.15	−68.99
	(−1.16)	(−0.22)	(−1.38)	(−1.32)	(−0.86)
N	1706	680	1026	1087	619

Notes: Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. T-statistics in parentheses.

enterprise, while the CT-OVC transfer was reported as the most important second source of capital for female-headed households. This perception is confirmed in the econometric analysis, at least for women (Table 9): we find that the CT-OVC transfer is associated with a 7 percentage point increase in household participation in a nonfarm enterprise for female-headed households, and an 11 percentage point decrease for male-headed households (though statistically significant only at the 10% level). These findings are consistent with some other findings in the literature. For instance, in Latin America, the Mexican PROGRESA programme increases the probability of operating a nonfarm microenterprise (Gertler et al., 2012; Todd et al., 2010). In South Africa, pension beneficiaries started or strengthened their own microenterprises (Du Toit & Neves, 2006). Lichand (2010) also finds that Brazil's Bolsa Familia (CCT) programme was positively associated with entrepreneurial investments.

Table 9. Impact on household participation in nonfarm enterprises and access to credit, SD-IPW estimator (2011)

	All	HH size <5	HH size 5 & above	Female head	Male head
Household participation in nonfarm enterprise (1=yes)	0.016	0.019	0.001	0.072**	−0.112*
	(0.47)	(0.53)	(0.04)	(2.09)	(−1.94)
Received loan (1=yes)	0.007	−0.006	0.015	0.031	−0.044
	(0.31)	(−0.18)	(0.57)	(1.31)	(−1.13)
Sought credit (1=yes)	0.010	0.007	0.010	0.036	−0.046
	(0.44)	(.20)	(0.39)	(1.18)	(−1.10)
N	1706	680	1026	1087	619

Notes: Robust standard errors are clustered at community level. Statistical significance at the 99 per cent (***), 95 per cent (**), and 90 per cent (*) confidence levels. T-statistics in parentheses.

5.3 Impact on Household Labour Allocation

As is common in the labour literature, we model labour supply as an individual decision, though we include a series of household and context variables as this decision takes place within the decision making process of the household and within a given economic context. We look at the two main types of labour supply: wage labour supply[4] and labour used on own farm. For both types, we look at both the decision to participate and then, conditional on participation, the intensity of participation. Note that since almost all wage employment in this sample is casual, whether agricultural or non-agricultural, we make no distinction between casual and permanent labour. For both wage and own farm labour, we look at all individuals as well as disaggregated by gender, and we make a distinction between adults (older than 18 years in 2011) and children (between 10 and 15 years of age, inclusive). We further look at heterogeneity of impact by running four different specifications by interacting programme participation with different explanatory variables. In the first specification, no interaction variable is introduced, while in the consecutive three specifications we have interacted programme participation with the family's distance to local market, individual age, and physical health (chronic illness) for adults.

An important element missing from the analysis is the impact related to time devoted to housework activities, as receipt of the programme may permit substitution between casual wage activities and pressing housework, including care of children (one of the objectives of the programme). Unfortunately data were not collected on adult time use, and thus we leave this question for future research.

5.3.1 Adult labour allocation. Table 10 reports the estimation results of the programme impact on adult wage labour supply. Overall, in terms of the propensity to participate in wage labour, we find no significant impact of the CT-OVC programme. For all individuals, but for women in particular, however, we find a positive and large impact (13 percentage points) of the programme for those who live farther from the local markets (more isolated). The programme thus appears to facilitate labour market participation for those who face higher transaction costs, in terms of distance to local market.

From the separate male equation, for all types of wage labour, we do find a negative and significant impact on participation. However, this negative impact decreases with increasing age, eventually becoming positive (Figure 4)[5]; indeed, for most relevant ages the impact on male participation on non-agricultural wage labour is positive. Thus from this same figure, the positive impact of the programme on males is much stronger for non-agricultural wage labour, while the negative impact is more relevant for agricultural wage labour, though even here the impact of the programme becomes less negative and eventually positive with increasing age. In terms of the participation of females in non-agricultural wage labour, the trend is similar, though more muted. In terms of agricultural wage labour, however, the pattern is reversed: the programme has a positive impact on younger women, and this decreases with age, eventually becoming negative.

We also looked at the intensity of wage labour participation (days worked per year). Overall, the programme appears to have a negative impact on labour intensity (Table 10): participation in the CT-OVC programme is associated with a reduction in 20 days per year of all types of wage labour. No significant impact is found for the separate male and female estimations; however, in the male equation for all types of wage labour and for non-agricultural wage labour, the interaction variable between gender of the head and treatment is significant. So the negative impact on labour supply among males is mostly concentrated among the male-headed households. Among females, the heterogeneity impact of the programme by gender of the head is not significant in any of the equations.[6] The underlying story in regard to wage labour supply is that the CT-OVC programme, overall, tends to affect negatively the labour supply. Although the impact on the propensity to participate in wage labour is insignificant. However, the negative impact of the programme on labour supply is more pronounced in adult male individuals compared to females. Table 11 reports the estimation results of the programme impact on adult labour supply on own farm activities. A major

Table 10. Impact on wage labour supply by adults (age >18), SD-IPW estimator (2011)

	All adults			Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Wage labour participation									
Treatment	−0.026	−0.053*	−0.138	0.017	−0.009	−0.007	−0.091*	−0.108*	−0.527**
Treatment * distance to local market		0.129**			0.132*			0.072	
Treatment * age			0.005			0.002			0.021*
Treatment * age squared			−0.000			−0.000			−0.000
District fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	3,643	3, 643	3, 643	1,743	1,743	1,743	1,276	1,276	1,276
Adjusted R2	0.098	0.101	0. 098	0.117	0.119	0.116	0.12	0.12	0.126
F-test of joint significance		2.17*	16.20***		2.51*	7.83***		1.77	12.13***
Days worked per year									
Treatment	−20.41**	−22.162*	39.603	−13.912	−17.357	58.556	−18.582	−27.71	46.016
Treatment * distance to local market		26.047			19.903			46.944	
Treatment * age			−2.539			−3.377			−3.017
Treatment * age squared			0.024			0.035			0.024
District fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	1,028	1,028	1,028	457	457	457	420	420	420
Adjusted R2	0.059	0.079	0.078	0.064	0.063	0.061	0.09	0.092	0.088
F-test of joint significance		1.7	3.31***		0.60	0.52		1.46	1.55

Notes: The sample excludes Garissa district. Control variables used in the regression include individual level indicators (gender, age, education, health), household level proxies (gender, age, education, household size, dependency ratio, education), community level indictors (distance to market, access to road), and district level fixed effect. ***, **, * denote statistical significance at the 1, 5, and 10 per cent levels, respectively. Robust standard errors clustered at the household level.

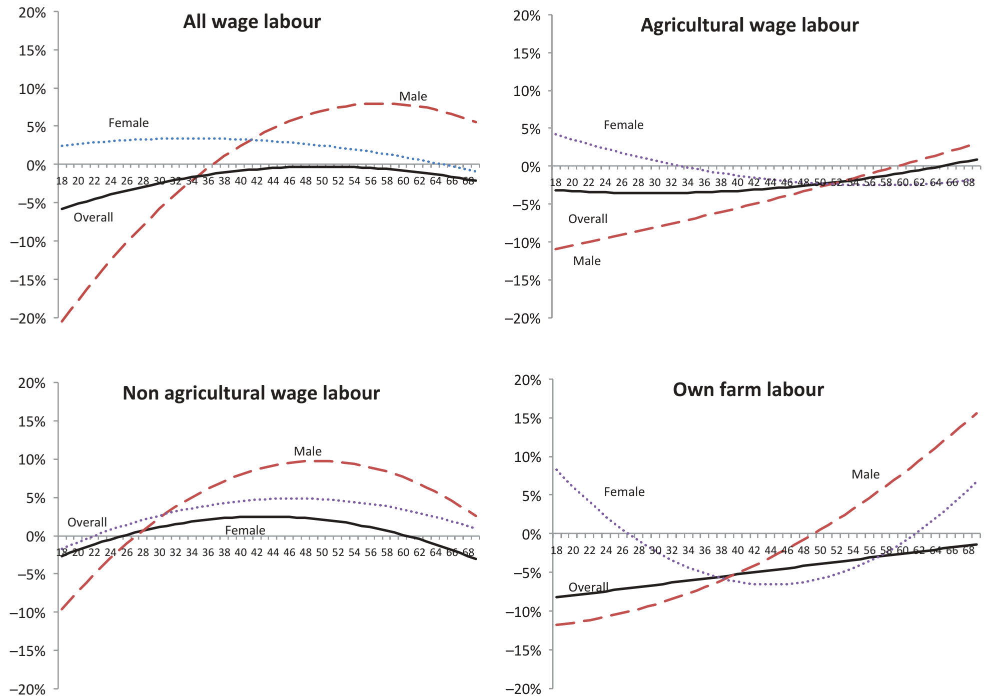

Figure 4. Impact of the programme on labour supply (participation) by age and sex of adult individuals, 2011.

hypothesis we would like to test with this analysis is to see if there is some sort of substitution between wage labour supply and labour used for own farm as a result of the programme. Unfortunately the results do not provide a conclusive narrative. Overall, the programme does not have a significant impact on the decision to participate and labour supply on own farm. Also looking at the disaggregated analysis by gender and age, a similar story (initially negative, increasingly positive with age) is found for men in terms of their participation in own farm labour (Figure 4). Again, a similar trend is found for female participation in own farm labour: with older women, the programme impact eventually becomes positive. However, for both males and females participation in the programme leads to increasing intensity of own farm labour with increasing age.[7] Overall, these findings of ours are not unique, given the fact that the evidence so far shows mixed impacts on adult labour allocation as reported in the introduction section. Again it is important to point out that these results are based on an SD-IPW estimation procedure which is not robust against time-invariant unobservables, therefore it should be interpreted with these caveats in mind.

5.3.2 Children labour allocation. Table 12 reports the impact of the programme on children participation in own farm labour. A significant percentage of children work on the family farm (42%), particularly boys (45%). We find that the programme results in a significant (12%) reduction in child labour on farm (Table 12).[8] This impact appears to be concentrated among boys, as no significant impact is found for girls. When the interaction term with distance to local markets is added, the results vary by gender. While we find that in the equation for all children the child labour reducing impact of the programme increases with increased isolation, with similar results for girls (though not statistically significant), for boys the impact of the programme is muted (by approximately 5 percentage points) by increased geographic isolation. Parallel results also show that there is a meaningful overall school enrolment impact at the primary and secondary level (age 12–18). While we can't necessarily attribute the decrease in child labour to an increase in school attendance, the two seem to go in the right direction. Our findings are consistent with overwhelming evidence that shows that several social

Table 11. Impact on participation in own farm labour by adults (age >18), SD-IPW estimator (2011)

	All adults			Female			Male		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Participation in own farm labour									
Treatment	−0.047	−0.063*	−0.107	0.007	−0.021	0.356*	−0.055	−0.043	−0.115
Treatment * distance to market		0.077			0.143*			−0.052	
Treatment * age			0.001			−0.019**			−0.002
Treatment * age squared			−0.000			0.000**			−0.000
District fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	3,643	3,643	3,643	1,743	1,743	1,743	1,276	1,276	1,276
Adjusted R2	0.243	0.243	0.243	0.340	0.342	0.342	0.222	0.222	0.230
F-test of joint significance		1.55	4.58***		2.01	9.23***		0.70	2.31**
Days worked per month									
Treatment	−0.042	0.058	−6.521	0.406	0.671	−12.198***	−0.622	−1.012	−0.233
Treatment * distance to market		−0.491			−1.481			1.886	
Treatment * age			0.330			0.503**			−0.081
Treatment * age squared			−0.003			−0.004*			0.002
District fixed effect	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	2,184	2,184	2,184	1,084	1,084	1,084	671	671	671
Adjusted R2	0.133	0.133	0.136	0.235	0.235	0.247	0.223	0.223	0.224
F-test of joint significance		0.42**	5.75***		1.86	7.25***		0.18	5.00***

Notes: The sample excludes Garissa district. Control variables used in the regression include individual level indicators (gender, age, education, health), household level proxies (gender, age, education, household size, dependency ratio, education), community level indictors (distance to market, access to road), and district level fixed effect. ***, **, * denote statistical significance at the 1, 5, and 10 per cent levels, respectively. Robust standard errors clustered at the household level.

Table 12. Impact on participation in own farm labour by children (10–15 years), SD-IPW estimator (2011)

	All		Boys		Girls	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	−0.124***	−0.120***	−0.120**	−0.131**	−0.072	−0.056
Treatment * distance to market		−0.119		0.048		−0.085
District fixed effect	YES	YES	YES	YES	YES	YES
Number of observations	1,909	1,909	998	998	901	901
Adjusted R2	0.139	0.138	0.142	0.141	0.109	0.109
F-test of joint significance		4.28***		3.13**		1.14

Notes: The sample excludes Garissa district. Control variables used in the regression include individual level indicators (gender, age, education, health), household level proxies (gender, age, education, household size, dependency ratio, education), community level indictors (distance to market, access to road), and district level fixed effect. ***, **, * denote statistical significance at the 1, 5, and 10 per cent levels, respectively. Robust standard errors clustered at the household level.

protection programmes reduce child labour supply. In Latin America two major reviews find that most CCTs significantly lower child labour participation (Fiszbein & Schady, 2009). In South Africa, children residing in pension eligible households reduce their hours of work by 33 per cent (Edmond, 2006). In Malawi, the social cash transfer scheme decreases off farm child labour but increases child labour on the family farm (Covarrubias et al., 2012).

6. Conclusions

This paper used data collected from a four-year randomised experimental design impact evaluation (2007 and 2011) to analyse the productive impact of the Kenya CT-OVC, including food consumption, accumulation of productive assets, and labour allocation. Kenya's CT-OVC is a national child protection programme that provides a flat monthly transfer of Ksh1500 to ultra-poor families with orphans and vulnerable children aged 17 years and younger. Although the programme is designed to encourage the care of OVC and human capital development, we find that this programme also has an impact on the productive activities of beneficiaries, who are primarily agricultural producers but also diversified into casual wage labour and nonfarm enterprises.

Three main conclusions can be drawn from the results of this study. First, we find robust evidence of a positive impact of the programme on consumption. Taking advantage of comparable baseline information, we find that treated households consumed significantly more cereals, animal products (meat and dairy), and other foods out of own production compared to control households. This is particularly true for both smaller sized and female-headed households. This indirect evidence is worth highlighting because the under-reporting of consumption is much less likely than under-reporting or measurement error in income generating activities such as agricultural and non-agricultural businesses.

Second, the programme has a significant impact on the accumulation of productive assets, particularly on certain subgroups within the evaluation sample. Large and significant effects on the share of households owning small animals are found for smaller households and female-headed households. We also find that the CT-OVC transfer is associated with a 7 percentage point increase in household participation in a nonfarm enterprise for female-headed households.

The final piece of evidence comes from labour allocation. The programme has a variety of impacts on labour supply, varying by gender and by type of labour. Overall, when grouping all types of labour and for all adults, we find no significant impact of the programme on participation in wage labour. For all individuals, however, and particularly for women, the programme facilitates labour force participation for those living farther from local markets. In addition, the programme is associated with a generally positive impact on participation in non-agricultural wage labour (particularly for males) compared to a generally negative impact on participation in agricultural wage. In both cases, however, the probability of participation increases with the age of programme beneficiaries. On the other hand, the programme appears to have a negative impact on wage labour intensity. Nevertheless, for both males and females, participation in the programme leads to increasing intensity of own farm labour with increasing age. Unlike other studies, which found a substitution between casual wage labour and own farm labour, this is not a pattern observed in our findings. At the same time, the programme leads to a significant reduction in child labour on farm, particularly for boys.

Overall, the study has provided evidence, direct and indirect, that the CT-OVC programme influences the livelihood strategies of the poor, which is also differentiated across gender and household size. It seems clear that the programme has helped families increase food consumption and productive assets, as well as provide more flexibility to families in terms of labour allocation, particularly for those individuals who are geographically isolated and children, an important objective of the programme. From impact evaluation point of view, while we are somewhat constrained by incomplete data at base line, forcing us to rely on non-experimental measures for some indicators, together they point to the importance of considering impacts on household decision making on productive activities in the design and implementation of the programme.

The key finding from the overall analysis is that the positive productive impact of the programme, either in terms of consumption or productive asset, or even to some degree in labour allocation, is more modest compared to other social cash transfer programmes, like the Malawi SCT programme. It is, however, important to point out that in a separate analysis, the CT-OVC programme significantly increases secondary school enrolment and helps households meet transport costs and the cost of school supplies (The Kenya CT-OVC Evaluation Team, 2012). The programme also significantly increases food expenditures and decreases spending on alcohol and tobacco (The Kenya CT-OVC Evaluation Team, 2012). The programme has increased the real household consumption levels of recipient households substantially, by some KSh274 per adult equivalent. The benefit of increased consumption is concentrated in smaller households, since the value of the transfer (per capita) is diluted in larger households, reinforcing the case for indexing the payments in some way to household size. Taylor et al. (2012) simulated the local economy impact and revealed a minimal inflationary impact and real production value added multipliers of Ksh1.58 per shilling transferred, which suggests that the programme may have led to spillovers. Hence, the results discussed in the paper are underestimates of the actual impact of the programme. Therefore, it is important to frame our findings within the overall programme impact evaluation, which goes beyond productive and economic activities and which in most of the human capital indicators shows that the programme has a robust positive impact. We would have liked also to analyse heterogeneous effects for households that are credit constrained and households that are not credit constrained, however we do not have sufficient data to analyse credit constraints in more detail. Thus future research should focus on heterogeneous effects for credit constrained and non-credit constrained households (Blattman, Fiala, & Martinez, 2013).

Finally, studies have shown the programme to be cost effective. Ward, Hurrell, and Visram (2010) reported that in the three financial years from July 2006 to June 2009, the CT-OVC programme spent some USD9.96 million in the seven pilot districts. The total expenditure per annum per household supported during 2007–2009 was about USD474, including the transfer and other transaction costs. Around half of the total cost reached the beneficiary in the form of the cash transfer, at a time when the government was investing considerable sums in setting up the programme, reaching 15,000 households. At the current scale of the programme, the unit cost of the programme is most likely much reduced, but data are not available to provide exact figures. Expanding the programme to cover the poorest 25 per cent of OVCs in Kenya at this unit cost was estimated to imply a total programme cost of around KSh8.7 billion per annum. This represented around 0.3 per cent of total GDP or about 1 per cent of government expenditure, which suggests that it ought to be financially sustainable (Ward et al., 2010).

We believe that these results are relevant for other unconditional cash transfer programmes in SSA. First, the results reported here are based on a rigorous and credible research design and thus can be taken as causal impacts of the programme. The only caveats for our analysis are related to the absence of baseline data for some outcome variables, which in turn required the use of an SD estimator instead of a DD estimation strategy. Second, the institutional, market, and economic context in Kenya is similar to other SSA countries currently initiating such programmes. Finally, the design features of the CT-OVC are also typical of other programmes in the region, which include unconditional transfers, community involvement in beneficiary selection, and targeting based on vulnerability and poverty rather than just poverty.

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Notes

1. Note that propensity weights are also multiplied by survey sampling weights.
2. For each outcome variable we estimated an unweighted comparison, DD-IPW without controls and DD-IPW with controls, reporting only the latter in the included tables. The results are broadly consistent across all three estimates. Full results are available upon request.
3. We also looked at the purchase of different kinds of animals using IPW with controls; no significant impacts were found, with the exception of a positive impact (but of tiny magnitude) on sheep purchases for male-headed households. Results are available upon request.
4. We also conducted analysis separately for agricultural wage labour and non-agricultural wage labour. For each of these types of wage labour, we look at both the decision to participate in wage labour and then, conditional on participation, the intensity of participation. Some of the results reported in Figure 4 are partly based on this disaggregated analysis. Detailed results are presented in the Online Appendix.
5. Some of the results reported in Figure 4 are partly based on this disaggregated analysis undertaken for agricultural and non-agricultural wage labour. Figure 4 is plotted based on results from the third specification. Detailed estimation results are presented in the Online Appendix.
6. Although results are not reported in this paper, we have also examined whether the programme impact is heterogeneous along a few dimensions, including adult household size, gender of the head, and also with regional dummies. The results seems to suggest a differentiated impact across region: treated individuals in the central province participate more in wage labour compared to individuals in the coastal areas, and the same appears to be true for intensity of participation. Looking at the differentiated impact across the size of households, we have not found differentiated impact in terms of the participation decision, though individuals in treated households with more adult household members tend to participate less intensively. Results of these interactions are not reported in this paper; however, the full results are available from the authors upon request.
7. We have also looked at the heterogeneous impact on own farm labour across different regions and the results show the same pattern as wage labour. Treated individuals in the central and western province tend to participate more in own farm labour vis-à-vis treated individuals in the coastal province. However, there seems to be no differentiated impact by adult household members in terms of participation in own farm labour. Contrary to the wage labour, however, we find a significant reduction of male labour use for own farm in female-headed households. Again, full results are available upon request.
8. Although results are not reported, we find no impact of the CT-OVC programme on wage labour participation by children, which is not surprising given that less than 2 per cent of children aged 10–15 worked in wage labour.

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