

The Impact of an Unconditional Cash Transfer on Food Security and Nutrition: The Zambia Child Grant Programme

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Abstract The Child Grant Programme is one of the Government of Zambia's largest social protection programmes. The programme provides a monthly cash payment of 60 kwacha (US\$12) to very poor households with children under five years old. A randomised controlled trial of 2,515 households was implemented to investigate the impact of the programme. We find that cash transfers improve household consumption, food consumption, diet diversity and food security. These outcomes lie along the causal pathway linking the cash transfer to children's nutrition. For children under five, we observe positive but not statistically significant impacts of the programme on weight. We find strong and significant heterogeneous impacts on reducing stunting among children who have access to clean water or more educated mothers. The results demonstrate that nutrition can be improved through an integrated and holistic strategy instead of only pursuing targeted programmes in one sector such as health or agriculture.

1 Introduction

A person's life-chances are shaped at a very early age. Early childhood nutrition and nutritional status as early as age two, has been linked to later life outcomes such as cognitive capacity (Paxson and Case 2008), school attainment (Alderman *et al.* 2001) and adult earnings (Strauss and Thomas 1998), and more than half of infant and child mortality is due to underlying malnutrition (WHO 2005). At the aggregate population level, the consequences of early childhood malnutrition can be dire, with one study estimating a potential loss of 3 per cent of GDP in India due to undernutrition (World Bank 2006) alone. With such large stakes, the key question is what policy instruments are available to governments to prevent early childhood malnutrition. This article presents results from one such possible instrument, the Zambia Child Grant Programme (CGP). The CGP started in 2010 and provides small, predictable sums of cash to families with children under age five in the poorest districts in the country. Though the CGP is not exclusively a nutrition programme, it aims to address poverty, food security, access to public services and productivity, all of which are themselves determinants of childhood malnutrition. Because the programme explicitly targets households with young children, it provides an opportunity to assess the impact of a 'structural' approach to preventing or reducing early childhood malnutrition, which, because it addresses the underlying drivers of malnutrition, may be more cost-effective than narrow sector-specific programmes.

The success of cash transfer programmes in improving childhood nutrition has recently been reviewed by Manley, Gitter and Slavchevska (2011). They find that in 17 studies covering 16 cash transfer programmes there is no consistent relationship between programme participation and child nutritional status. They also find that

unconditional programmes seem to do better than conditional programmes, especially when the conditional programmes involve non-health related conditions. Their data sources included two published studies based on African programmes, the Malawi Social Cash Transfer (SCT) Programme (Miller, Tsoka and Reichert 2009) and the South African Old Age Pension (Duflo 2003). Though both these programmes are unconditional, their target group is quite different from the Zambian programme. The South African programme is an old-age pension and so obviously has a very different objective than child nutrition, and so the documented impacts on young children are limited to those that live with a grandparent that is eligible for the pension. In contrast, the Malawi SCT targets 'labour constrained' households who also tend to have much fewer pre-school children than the average poor household in Malawi. In contrast, the Zambian CGP directly targets all households with a child under five in programme areas, and has a clear objective of improving the health and nutritional status of young children.

2 The Child Grant Programme

In 2010, Zambia's Ministry of Community Development, Mother and Child Health (MCDMCH) started the roll-out of the CGP in three districts with the highest rates of child mortality and poverty: Kaputa, located in Northern Province, and Shongombo and Kalabo, both located in Western Province. All three districts are near the Zambian border with either the Democratic Republic of Congo (Kaputa) or Angola (Shongombo and Kalabo). Because Shongombo and Kalabo are cut off from Lusaka by a floodplain that turns into a river in the rainy season, they can be reached only by boat during some months of the year. These districts represent some of the most remote locations in Zambia, making them a challenge for providing social services, and are some of the most

Table 1 Baseline comparisons for households and recipients

Variables	Control		Treatment		Mean difference	p-value
	Mean	N	Mean	N		
Expenditures on food per capita (ZMK)	29.27	1259	30.79	1260	-1.52	0.49
Total household expenditure per capita (ZMK)	39.48	1259	41.38	1260	-1.90	0.47
Severely food insecure (%)	0.90	1246	0.90	1250	0.00	0.97
More than one meal per day (%)	0.78	1255	0.79	1253	-0.01	0.74
Household size	5.63	1259	5.76	1260	-0.12	0.47
Female recipient (%)	0.99	1257	0.99	1255	0.01	0.18
Recipient's highest grade completed (Grades 1–12)	3.79	1253	4.31	1247	-0.52	0.08
Married recipient (%)	0.71	1255	0.74	1251	-0.02	0.58

Source Authors' own.

underprivileged communities in Zambia. The CGP is a categorically targeted programme – any household within the district with a child under five years old is eligible. Recipient households receive 60 kwacha (ZMW) a month (equivalent to US\$12) irrespective of household size, an amount deemed sufficient by the MCDMCH to purchase one meal a day for everyone in the household for one month. The goal of the CGP is to reduce extreme poverty and the intergenerational transfer of poverty through five primary areas: income, education, health, food security and livelihoods. Payments are made every other month through a local paypoint manager, and there are no conditions to receive the money. In the initial phase of the programme, only households with children under age three were enrolled to ensure that every recipient household would receive the transfers for at least two years.

3 Study design

The CGP impact evaluation randomised communities into treatment and control groups to estimate the effects of the programme on recipients. Ninety communities designated by Community Welfare Assistance Committees (CWACs) were randomly selected (out of 300) to be in the study

sample. These 90 CWACs were then randomly assigned to either the treatment condition (45 CWACs) to start the programme in December 2010 or to the control condition (45 CWACs). Randomisation occurred within each of the three study districts. Baseline data was collected in October 2010 prior to households in the treatment arm entering the programme; a 24-month follow-up survey was conducted in October 2012. The timing of the survey rounds occurred during Zambia's lean season, when people have the least amount of food left from the previous harvest and hunger is at its greatest, and also to avoid the rainy season for best accessibility to households. Crops are planted in the rainy season, from December to April, and harvested throughout the rainy season and into May. Food is most scarce towards the end of the hot dry season (October and November) because this is the longest period without a food harvest.

4 Study sample and baseline equivalence

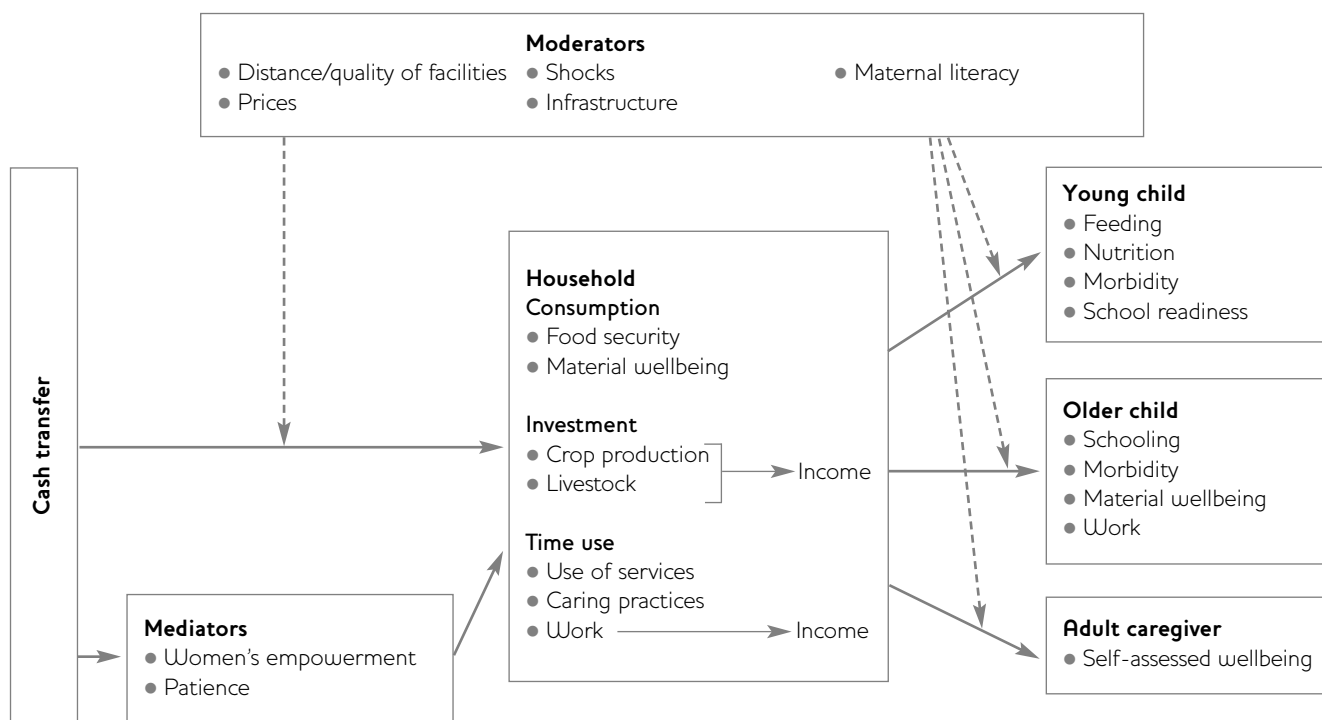
The evaluation study contains a sample of 2,514 households, with 14,565 people, almost all of whom live below the extreme poverty line (95 per cent). Almost one-third (4,793) of the sampled individuals are children under

Table 2 Baseline comparisons for children under five years old

Variables	Control	N (control)	Treatment	N (treatment)	Mean difference	p-value
Children ages 0–5 per household	1.92	1259	1.88	1260	0.04	0.47
Children ages 0–1 per household	0.75	1259	0.77	1260	-0.02	0.30
Children ages 1–2 per household	0.77	1259	0.79	1260	-0.02	0.38
Children ages 2–3 per household	0.69	1259	0.67	1260	0.02	0.54
Children ages 3–4 per household	0.54	1259	0.51	1260	0.03	0.37
Children ages 4–5 per household	0.49	1259	0.44	1260	0.04	0.15
Female (%)	0.50	2113	0.52	2102	-0.02	0.17
Stunted (%)	0.36	1770	0.34	1709	0.02	0.42
Wasted (%)	0.06	1767	0.06	1703	0.00	0.85
Underweight (%)	0.16	1991	0.17	1955	-0.01	0.62

Source Authors' own.

Figure 1 Conceptual framework for impact evaluation of child grant programme



Source Zambia CGP Baseline Report.

age five, with the largest number under one year old (1,427), making the study unique for cash transfer evaluations in Africa – the sample has the largest proportion of children in this age range. This very young study sample is also exciting given the increased recognition of the importance of the first 1,000 days of life for a child’s future development. Among the recipients, 99 per cent are female and among children under five years old, half are female.

Increased nutrition and food security, especially for young children, are two primary goals of the CGP. At baseline, the average household spent 30.10 kwacha (roughly US\$6) per person per month on food, which represents roughly 72 per cent of its total per capita expenditures. Thus, beneficiaries spent most of their money on food. The biggest portion of money spent on food was for cereals at 33 per cent, which includes the staple food, maize, and 49 per cent was spent on carbohydrates as a whole when we also account for roots and tubers. Fruits and vegetables signify the second biggest category, with 22 per cent of overall food spending in this category. Proteins and fats are small relative to carbohydrates, explaining why we see malnourished children in the sample. Many households are food insecure with over 20 per cent only eating one meal per day.

Our comparison of control and treatment groups at baseline finds that randomisation created equivalent groups for the CGP evaluation. Table 1 shows the balance for households and recipient level indicators, while Table 2 shows the balance for children under five nutrition indicators.

Ninety-one per cent of the households from baseline remain in the 24-month follow-up sample. We investigate

attrition at the 24-month follow-up by testing for similarities at baseline between (1) treatment and control groups for all non-missing households (differential attrition) and (2) all households at baseline and the remaining households at the 24-month follow-up (overall attrition). Testing these groups on baseline characteristics can assess whether the benefits of randomisation are preserved at follow-up. Fortunately, we do not find any significant differential attrition at the 24-month follow-up, meaning that we preserve the benefits of randomisation. We find small differences between the study population at baseline and those that remain at the 24-month follow-up; the remaining households are less likely to have experienced a shock, especially flooding or drought at baseline, and they consume a higher proportion of maize over cassava. The remaining sample at 24-month follow-up is likely more similar to populations throughout Zambia because most of the missing households from the study depend on a lake that is drying up for their livelihood, a characteristic less common throughout the country. The study’s generalisability (external validity) likely has increased with the study population at the 24-month follow-up because the remaining sample is more similar to the general rural population in Zambia where the programme might be scaled.

5 Empirical approach and hypotheses

This study reports on the effects of the programme for nutrition outcomes after two years of programme implementation. We estimate programme impacts on individuals and households using a difference-in-differences (DD) statistical model that compares change in outcomes between baseline and follow-up and between treatment and control groups. The DD estimator is the most commonly used estimation technique for impacts of

Table 3 Impact of CGP on per capita total and food expenditure

	Programme impact	Baseline mean	24-month treatment	24-month control
Total	15.18 (5.07)	46.56	6704	48.59
Food	11.60 (4.76)	34.45	50.16	35.85
Cereals	4.54 (3.26)	11.61	15.54	9.95
Tubers	-0.924 (-1.25)	4.96	4.56	4.93
Pulses	1.22 (4.98)	0.94	2.00	0.77
Meats	2.44 (3.08)	6.78	11.43	7.91
Fruits, vegetables	0.49 (0.56)	7.03	8.86	8.89
Dairy	0.76 (3.55)	0.88	1.27	0.48
Baby foods	0.02 (0.78)	0.01	0.03	0.01
Sugars	1.28 (7.80)	0.79	2.61	0.98
Fats, oil, other	1.76 (6.13)	1.45	3.87	1.93
N	4,594			

Note Estimates in column 1 are based difference-in-differences modelling among panel households. Robust t-statistics clustered at the CWAC level are in parentheses. Bold indicates that they are significant at $p < .05$. All estimations control for household size, recipient age, education and marital status, districts, household demographic composition and a vector of cluster-level prices. Source Zambia CGP 24 Month Report.

cash transfer models and has been used, for example, in Mexico's Progreso Programme¹ and Kenya's Cash Transfer for Orphans and Vulnerable Children (Kenya CT-OVC Evaluation Team 2012). We use cluster-robust standard errors to account for the lack of independence across observations due to clustering of households within CWACs.² We also use inverse probability weights to account for the 9 per cent attrition in the follow-up sample (Woolridge 2010).

We briefly sketch out the pathways for the intervention to lead to desired outcomes, including nutrition. The CGP provides an unconditional cash transfer to households with a child under age five. CGP-eligible households are extremely poor, with 95 per cent falling below the national extreme poverty line and having a median household per-capita daily consumption of ZMW1.05, or approximately 20 US cents. Among households at such low levels of consumption, the marginal propensity to consume will be almost 100 per cent; that is, they will spend all of any additional income rather than save it. Thus, we expect the immediate impact of the programme will be to raise spending levels, particularly basic spending needs for food, clothing and shelter, some of which will influence children's health and nutrition. The next step in the causal chain is the effect on children. It is important to recognise that any potential impact of the programme on

children, including their nutritional status, must work through the household by its effect on spending or time allocation decisions (including use of services). The link between the household and children can be moderated by household-level characteristics themselves, such as the mother's education or access to clean water. The impact of the cash transfer may be weaker or stronger depending on these conditions; thus, we analyse heterogeneous treatment effects on children by these moderating conditions. Figure 1 shows the pathways for how the intervention might lead to nutritional impacts, as well as other desired outcomes of the programme. The diagram demonstrates the complexity of evaluating a cash transfer programme due to the myriad of potential pathways and impacts to investigate.

6 Results

We investigate the impact of the CGP on three sets of outcomes related to nutrition: household food consumption, household food security, and anthropometric measures for children under five years old. As discussed in the theoretical framework, we consider food consumption and food security to be first round outcomes because they are directly related to how the beneficiary households choose to spend their cash transfer (i.e. the amount of the transfer spent on food). Children's anthropometry is a second-round outcome because it requires several

Table 4 Impact of CGP on food security

	Programme impact	Baseline	24-month treatment	24-month control
Eats more than one meal a day	0.079 (4.02)	0.78	0.97	0.89
Food security scale	2.498 (4.23)	15.10	9.63	12.36
Is not severely food insecure	0.177 (4.00)	0.10	0.36	0.16
N	4,549	2,249	1,153	1,145

Note Estimates in column 1 use difference-in-differences modelling among panel households. Cluster-robust t-statistics are in parentheses. Bold indicates that they are significant at $p < .05$. All estimations control for household size, recipient age, education and marital status, districts, and a vector of cluster-level prices. All estimates are corrected for attrition bias.

Source Zambia CGP 24 Month Report.

behavioural responses in addition to spending the transfer to induce impacts on these outcomes. We start by presenting the results for the first round effects and then move to second-round effects on children.

Table 3 shows the impacts of the programme on food consumption by category. We find that the CGP increases consumption per capita by 15.18 kwacha per month. Increased consumption is the first step along the causal chain to improved nutritional outcomes, but only if the money is spent on nutrition-related items. The majority of the increased consumption goes to food (ZMW11.60), which is 76 per cent of additional consumption. Within food consumption, the largest share goes to cereals (ZMW4.54), followed by meats, including poultry and fish (ZMW2.44), followed by fats such as cooking oil (ZMW1.76) and then sugars (ZMW1.28). There is a clear shift away from roots and tubers (primarily cassava) and towards protein (dairy, meats), indicating an improvement in diet diversity among CGP recipients.

Table 4 shows the impact of the programme on food security. The CGP improves beneficiaries' food security in addition to their consumption of food. This result means that the programme enables many households to regularly purchase a sufficient amount of food that lifts them out of their severely food insecure status. The programme increases the number of households eating more than one meal a day by eight percentage points and increases the number of households not severely food insecure by 18 percentage points to 97 per cent, nearly all. The control group improved over the two-year period, reflecting the bumper harvests of 2010 and 2011 that affected many people throughout Zambia. However, the programme improved food consumption and food security after accounting for the bumper harvest, bringing greater nutritional gains to poor households with children under five.

The CGP targets households with children under five years old, so we investigate nutritional outcomes such as stunting, wasting, and underweight and their anthropometric measures (height-for-age, weight-for-age and weight-for-height) for those children. Most of these outcomes are second-round effects in that they are not affected directly by the cash transfer but require a series of behavioural responses by the household induced by the

income effect of the cash transfer in order to change. For example, nutritional status is affected by caregiving behaviours, caloric intake and sanitation. For the CGP to affect nutritional status, it must induce a change in feeding practices or the disease environment of the household. Table 5 shows results of the impact of the CGP on the nutritional status of children under five years old. We do not find any nutrition impacts for the full sample of children under five, although we do find programmatic impacts on sub-groups of the population, specifically those with access to clean water or more educated mothers. Although we do not find impacts in the full sample, the point estimates are moving in the right direction. The impact on weight, a shorter term indicator, is larger than for height; for example, the impact on weight-for-age is 0.13 standard deviations with a t -statistic of 1.89, while the impact on weight-for-height is 0.12 ($t = 1.74$), both significant at 10 but not 5 per cent. We also estimated impacts for younger age groups (0–2 and 0–3), but did not find statistically significant effects among these sub-groups.

There are several reasons why we do not observe impacts on child nutrition when looking at the sample for all children under five years old even though food consumption increases. Some possible reasons are that indicators require more time to change, children are not eating sufficiently diverse diets, or external factors such as contaminated water sources that can cause diarrhoea are negatively impacting nutrition and counteracting the positive effects of the programme. Indeed, it may be that children with mothers who are more knowledgeable about nutrition or children with access to clean water benefit more from the programme than other children. The level of schooling among the programme's recipients is low; 28 per cent did not attend school and only 10 per cent attended school past grade eight. Similarly, almost a quarter of the children in the sample (22 per cent) do not have access to clean water from a protected water source (bore hole or well).

We investigate heterogeneous impacts by mother's education and access to clean water since these factors are linked to nutritional outcomes for children. Table 5 shows the results of the heterogeneous impact estimates in columns (5) and (6). We find that the programme decreases stunting and increases children's height-for-age

Table 5 Impacts of the CGP on nutritional status of children 0–60 months old

	Programme impact	Baseline mean	24-month treatment	24-month control	Mother's education interaction ¹	Access to clean water interaction ¹
	(1)	(2)	(3)	(4)	(5)	(6)
Weight-for-age z-score (N=6825)	0.128 (1.89)	-0.902	-0.900	-0.963	0.012 (1.17)	0.149 (1.86)
Weight-for-height z-score (N=6157)	0.118 (1.74)	-0.180	-0.0961	-0.154	0.003 (0.29)	0.003 (0.03)
Height-for-age z-score (N=6155)	0.066 (0.70)	-1.416	-1.445	-1.491	0.028 (2.05)	0.317 (2.26)
Stunting (N=6155)	-0.002 (-0.20)	0.348	0.329	0.359	-0.012 (-2.39)	-0.092 (-2.36)
Wasting (N=6157)	-0.017 (-0.66)	0.061	0.040	0.046	-0.001 (-0.52)	-0.003 (-0.13)
Underweight (N=6825)	-0.026 (-1.48)	0.162	0.159	0.168	-0.003 (-0.95)	-0.029 (-1.21)

Note Nutritional indicators are reported for children 0–60 months. Estimations use difference-in-differences modelling among panel households. Cluster-robust *t*-statistics are in parentheses. Bold indicates that they are significant at $p < .05$. All estimations control for household size, recipient age, education and marital status, districts, and a vector of cluster-level prices and are corrected for attrition bias.

¹ This column shows the coefficient for the interaction between the difference-in-differences programme impact and the indicator at the top of the column. These coefficients measure how the programme impact differs for this group.

Source Authors' own.

for children of more educated mothers and for those that have access to clean water. The programme reduces stunting by nine percentage points for children in the programme who have access to clean water compared to children in the programme without access to clean water, and reduces stunting by 1.2 percentage points for each additional year of education that their mother has. For example, the programme reduces stunting by six percentage points more for children in the programme whose mother has completed five years of school than for children in the programme whose mother has not completed any school. Roughly 28 per cent of the mothers in beneficiary households have zero years of education completed, while 46.5 per cent of mothers in beneficiary households have at least five years of education; thus, on average the programme impact on stunting among children of these more educated mothers is at least six percentage points higher than children in beneficiary households with mothers who have zero years of completed education (an effect size of 35 per cent over the combined baseline proportion).

7 Discussion and conclusion

This study investigates the impact on nutritional outcomes of receiving cash through an SCT. The successfully implemented randomised evaluation design without attrition bias provides strong internal validity to the results and enables us to attribute observed impacts to the programme. We find that cash transfers improve overall household consumption, food consumption, diet diversity and self-reported food security. We also find strong impacts on reducing the incidence of diarrhoea (4.9 percentage points) for children under five years old, but none for other young child health outcomes. These

outcomes all lie along the causal pathway linking the cash transfer to children's nutritional status. In terms of actual nutritional status, we observe positive but not statistically significant impacts of the programme when looking at all children under five years old; the effects on weight are larger than for height, and are significant at 10 per cent, suggesting that impacts will be realised as time passes. Interestingly, we do find strong heterogeneous impacts of the programme on height; the programme leads to a significant improvement in height-for-age and a reduction in stunting among children who have access to clean water or more educated mothers. These effects are quite large. For example, living in a treatment household with access to clean water leads to a nine percentage point reduction in stunting (26 per cent over the combined baseline proportion) compared to children receiving the cash only. Similarly, having a mother with complete primary schooling raises the impact of the cash transfer on stunting by six percentage points versus having a mother in the programme with no education (an effect size of 17 per cent over the baseline proportion). The cash thus appears to be an important complement to these other health inputs in improving child height. They also point towards ways that the programme can be leveraged to maximise impacts on children's nutritional status, for example by providing complementary services and/or information for beneficiaries with low levels of education. Clean water is obviously an important direct input into child nutrition; the results here indicate that the benefits of the cash are even larger when there is access to clean water at the household level.

Beyond implications for complementary services, the results in this article raise some broader issues about social policy

in the country. Zambia has experienced economic growth rates averaging 5–6 per cent annually for the past five years, but this growth has not translated into a corresponding decrease in poverty. While poverty has marginally reduced from 64 per cent in 2006 to 62 per cent in 2010 the absolute numbers of people experiencing poverty have gone up. The results from the CGP give an opportunity for the government to consider repositioning its various social protection programmes to ensure that they deliver or facilitate improved nutritional needs of children. The CGP strives to break the transfer of intergenerational poverty through affecting both protective and productive outcomes including, but not limited to nutrition. Indeed, beyond consumption and food security, results from the CGP evaluation study demonstrate very strong impacts on agricultural production and economic activity in general (AIR 2013). For example, the CGP increases the amount of agricultural land operated by 18 percentage points (a 34 per cent increase from baseline), as well as the use of

agricultural inputs. The CGP has a positive impact on the ownership of a wide variety of animals, both in terms of share of households with livestock (a 21 percentage point increase overall, from 49 per cent at baseline), as well as the number of animals owned in the case of ducks, chickens and goats. Further, beneficiary households experience approximately double the volume of purchase and sales of livestock compared with control households. These effects are likely to further benefit young children in the medium and long term. Taken together, the results demonstrate that nutrition can be improved through an integrated and holistic strategy instead of only pursuing targeted programmes in one sector such as health or agriculture. The wide range of impacts across different development domains make unconditional cash transfers such as the CGP a promising way to achieve poverty alleviation, economic growth and child human capital development, and should therefore be an important part of the development policy dialogue in countries like Zambia.

Notes

- 1 <http://wbro.oxfordjournals.org/cgi/reprint/20/1/29>
- 2 www2.sas.com/proceedings/sugi23/Posters/p205.pdf

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