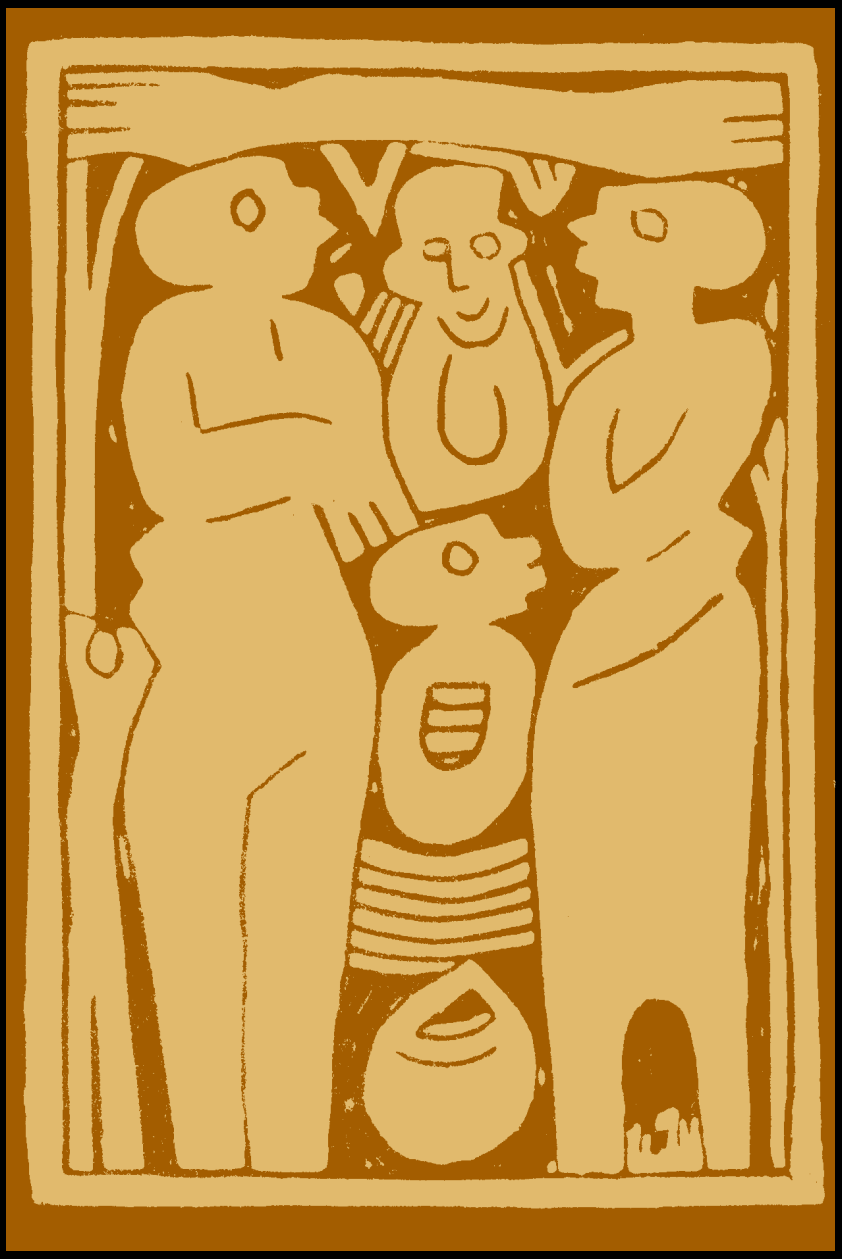

Quantitative Analysis of the Impact of the Child Support Grant

May 2008

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Quantitative Analysis of the Impact of the Child Support Grant

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This report was compiled and produced for the Department of Social Development, the South African Social Security Agency (SASSA) and the United Nations Children's Fund (UNICEF) by the Economic Policy Research Institute.

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Quantitative Analysis of the Impact of the Child Support Grant

May 2008

Executive summary

This report presents new evidence on the developmental impacts of South Africa's Child Support Grant (CSG), widely regarded as one of the government's most successful social protection interventions and the country's largest social cash transfer programme in terms of the number of participants. This nonexperimental evaluation employs a propensity score matching approach with the EPRI-constructed General Household Survey panel from 2002 to 2004, matching CSG-eligible children under the age of 7 in 2002 who received the CSG in 2003 and 2004 with eligible children not receiving the CSG in 2003 and 2004. The study documents positive, statistically significant effects of the CSG in reducing child hunger and improving school attendance (pre-school and early grades). In addition, some positive, statistically significant effects on maintaining household-level agricultural production and increasing access to cell phones are observed. These positive findings suggest the potential for a more extensive, forward-looking study to further explore and confirm the impacts of the Child Support Grant and support its expansion to all children.

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1. Introduction

The Child Support Grant (CSG) is South Africa's largest social cash transfer programme in terms of the number of participants, and one of the government's most successful social protection interventions. Previous studies have documented the programme's success in terms of cost-effectively reaching poor children and reducing poverty gaps (see section II of this report). In addition, many studies have begun to build an evidence base for the Child Support Grant demonstrating its impact in terms of reducing hunger and promoting nutrition, improving school attendance and promoting more positive health outcomes. This report aims to further that effort, providing more robust quantitative evidence with respect to the impact of the Child Support Grant on children's lives. This research also aims to support the development of appropriate policy interventions for older children (from 14 to 17 years of age) who are as yet not covered by the Child Support Grant.

South Africa's Child Support Grant programme was implemented in 1998 as part of the government's ongoing process of meeting the country's Constitutional provision for "progressive realisation of access to social security." Given the programme's rights-based orientation, the government did not plan an experimental design impact assessment. In the first few years of the programme, take-up rates remained very low – approximately 10% in 2000 (Samson et al. 2002). In 2001, the government substantially increased its commitment to the programme, and take-up rates began to increase dramatically. For example, take-up rates for six year-old children rose to 28% in 2002 and continued to climb to 63% in 2005. Much of this increase in take-up resulted from government outreach campaigns in rural areas that progressively reached more and more communities. This study analyses the resulting distribution of eligible children in 2003 and 2004 – some of whom had been successful in accessing the grant and others who had not yet been reached by the programme.

While the success in achieving the main objective of the Child Support Grant – the reduction of income poverty – has been well documented[1], this study aims to evaluate the broader social development outcomes, including school attendance, child hunger and other human development impacts.

The size of the Child Support Grant rose from R100 (US$15) in 2000 to R210 (US$30) in April 2008, usually in regular annual increments that increased the value of the grant faster than the inflation rate. The scope of the grant also increased from targeting poor children up to age 7 in 2002 to targeting poor children up to age 14 in 2005 (in stages over the three years). The grant is paid to the caregiver for each qualifying child, with the result that some qualifying households receive several grants while others receive only one. Given the differences in the number of adults and non-qualified children in households across the population, the absolute and relative magnitude of the Child Support Grant income varies substantially across households. The table below reports take-up rates by age cohort from 2002 to 2005.

Table 1: Take-up of the Child Support Grant by age and year

AGE	2002	2003	2004	2005
0	11.9%	14.25%	23.5%	25.3%
1	30.0%	35.8%	47.3%	53.8%
2	33.1%	39.5%	54.9%	60.7%
3	35.1%	41.9%	56.1%	64.4%
4	33.4%	39.9%	56.3%	60.8%
5	36.6%	43.6%	55.8%	62.5%
6	28.4%	33.9%	54.8%	63.2%
7	0.0%	23.4%	50.4%	56.6%
8	0.0%	6.6%	42.9%	56.8%
9	0.0%	3.0%	29.6%	51.6%
10	0.0%	1.0%	10.5%	44.4%
11	0.0%	0.9%	4.0%	29.2%
12	0.0%	1.1%	0.8%	12.8%
13	0.0%	.5%	1.1%	5.8%

1. Samson et al. (2004), Samson et al. (2007), Statistics South Africa (2008), Samson et al. (2008)

It is clear that the number of participants in the Child Support Grant programme increased substantially from 2002 to 2005, due to both increased take-up by children under the age of 7 and the expansion of the scope of the programme to reach all poor children up to the age of 14. Take-up rates for children under the age of 7 approximately doubled from 2002 to 2005. Since 2002 millions of additional children from the age of 7 to 13 (up to the child's 14th birthday) have been included in the programme.

Social cash transfers, both conditional and unconditional, have long been an important strategy for tackling poverty and promoting social development. However, considerable room exists to document the extent to which these programmes yield the expected impacts and what other outcomes can be attributed to these interventions.

There is an increasing demand by both governments and development partners for rigorous and convincing evidence regarding the impact of programmes and other interventions that aim to reduce poverty and promote other human development outcomes. In particular, practitioners – especially governments – want to know whether they are reaching their programme objectives and how their services can be improved. This paper provides the results of EPRI's work on this project, employing the propensity score matching approach to a panel of household surveys constructed by EPRI in consultation with Statistics South Africa and based on their General Household Surveys from 2002 to 2004. The sample includes 1,735 children who had not yet reached their 7th birthday when the household was surveyed in July 2002, of whom 716 children received the Child Support Grant in both 2003 and 2004 and the remaining 1,019 children did not receive the grant in either year. No child in the sample was receiving the Child Support Grant when the household was surveyed in July 2002.

After this introduction, section 2 provides a brief literature review of existing studies focused on the Child Support Grant and other South African social transfer programmes. Section 3 discusses the data and samples, while section 4 outlines and discusses the study's methodology. Section 5 presents the propensity score models and discusses the statistical analysis, including the results of balancing tests. Section 6 presents the main findings, in terms of the estimates of the impacts of the Child Support Grant on school attendance and self-reported hunger, as well as findings for additional outcomes, including child labour, household employment rates, farming activities, the use of social workers, and cell phone use. Section 7 concludes the report.

2. Literature review

While a lengthy bibliography of qualitative and non-experimental studies documents the impact of South Africa's social pensions in terms of developmental outcomes for children, the range of rigorous studies for the more recent Child Support Grant is less extensive. Breslin et al. (1997) document how social pensions are associated with a fragile household structure bonding grandparents with grandchildren and how they provide an extended support structure that is vulnerable to collapse when the grandparent dies. Ardington (1998) finds households use social pensions to pay for school fees and food for the entire household. Duflo (2000) finds substantial improvements in the weight-for-height and height-for-age status of female children living with female pensioners[2]. Case (2001) finds evidence that pension income is used to upgrade household sanitation facilities, and that individuals living in households that pool pension income are more likely to be in better health and less likely to experience hunger or depression[3]. Edmonds (2004) analyses the impact of the pension on child labour and schooling decisions, and finds that pension eligibility significantly reduces child labour and increases schooling, particularly when the pensioner is male. EPRI's studies find positive impacts of the social pension on children's health, nutrition and education[4]. A number of annotated bibliographies document the extensive studies available analysing the impact of the social pension[5]. The demonstrated success of social pensions indirectly reaching children suggests the possibility of greater impacts with more directly targeted child grants.

Initial studies of the Child Support Grant focused on analysing beneficiaries and providing more qualitative and descriptive analysis. The Department of Social Development (DSD) commissioned the first study of the grant, which involved a sample of 999 households and employed focus groups and case studies[6]. The analysis did not attempt to rigorously attribute the Child Support Grant's impact (it did not employ a control or comparison group), but rather quantified household characteristics and assessed operational issues. The study documented the importance of the Child Support Grant in terms of providing household income, reporting that 36% of the households relied solely on the grant for cash income. Most recipients (79%) reported that the grant improved their ability to care for their children, particularly in terms of purchasing food. The study's qualitative analysis provides substantial insight into the barriers applicants had to overcome in order to qualify for the grant. A second study of beneficiaries in 2003 in KwaZulu-Natal provided similar results, finding the Child Support Grant well targeted but documenting important barriers to take-up[7]. Studies commissioned by the South African government's Committee of Inquiry for Comprehensive Social Security reported consistent results and employed micro-simulation models to estimate the impact of increased take-up and programme extension[8].

Two subsequent studies employed more rigorous techniques, with one attempting to address the selection problems inherent in evaluating a programme with no randomised assignment of control and treatment groups. The Department of Social Development commissioned the first of these, which employed an instrumental variables approach to try to identify the impact of participation in the programme on education, nutrition, consumption, employment and other important outcomes[9]. The study documented the Child Support Grant's significant impact in terms of reducing poverty for participating households as well as statistically significant increases in school attendance, greater household allocations to food consumption and other

2. However, she finds little impact on male children and the statistical significance of the effects disappears when the pensioners are male.

3. These effects are larger when more than one pensioner is present in the household, which is assumed to reflect the impact of the associated greater social pension income.

4. Samson et al. (2002, 2004).

5. See Hunter (2002) for an exhaustive bibliography commissioned by the Department of Social Development, or Budlender and Woolard (2006) for a more updated (but less comprehensive) list. Google scholar reports 1,870 references for "old age pension" + "South Africa", compared to 585 references for "child support grant" + "South Africa" (on 19 April 2008).

6. Kola et al. (2000).

7. Case et al. (2004).

8. Samson et al. (2002).

9. Samson et al. (2004).

necessities, reductions in spending on alcohol, tobacco and gambling, and a lower incidence of child hunger. A subsequent ILO study using non-matched comparisons and probit analysis (without instruments) found similar results using a panel dataset from KwaZulu-Natal and a national cross-sectional household survey[10]. The study found statistically significant associations between receipt of the Child Support Grant and higher rates of school attendance, controlling for household demographics.

Two recent studies have used pooled and panel datasets and quasi-experimental techniques to try to more rigorously attribute impact. An EPRI study pooled cross-sectional national household surveys from 2002 to 2005 and employed exogenous variation in eligibility and grant take-up to evaluate the impacts of the Child Support Grant[11]. The study found that an increased probability of receiving a Child Support Grant is statistically significantly associated with increased school attendance, decreased self-reported child hunger, and increased labour force participation. A second study, using data for KwaZulu-Natal, takes advantage of exogenous variation in the duration of grant receipt by beneficiaries and utilises sophisticated continuous treatment approaches to estimate the impact of the Child Support Grant on child nutrition, as proxied by a statistical measure of height-for-age[12]. The study shows that children who start receiving the grant shortly after birth have significantly better nutritional outcomes, and the resulting increase in height-for-age implies an estimated 160%– 230% discounted rate of return on the government's investment in the cash transfers.

To date, however, no national study has employed the type of rigorous matching techniques that are increasingly recognised as a credible alternative to randomised experimental methodologies. Most previous studies (with the exception of Agüero et al., 2007) have used instrumental variables techniques that usually cannot adequately control for selection bias. This study addresses that gap by using a household panel constructed from repeated cross-sections extracted from national household surveys. The analysis employs a propensity score matching approach to address the potential selection bias problem associated with non-experimental evaluations in which selection into treatment is non-random.

10. Budlender and Woolard (2006).

11. Samson and Williams (2007), Williams (2007).

12. Agüero et al. (2007).

3. Data and samples

The objective of this analysis is to generate more robust quantitative evidence on the impact of the Child Support Grant (CSG) on children's outcomes, in particular, the extent to which the programme reduces hunger among children and improves their school attendance. The data for this analysis are derived from Statistics South Africa's General Household Survey (GHS). The data on children from surveys of approximately 30,000 households over three years (2002–2004) were linked to allow for the analysis of changes in children's outcomes over this period. In constructing the linked panel, EPRI has engaged in discussions and consultations with Statistics South Africa, including the Statistician-General Pali Lehohla and other officials at Statistics South Africa, who have provided invaluable guidance and advice regarding the construction of this panel. It is the understanding of the authors that this is the first study to harness the panel nature of the General Household Survey. Appendix 2 details the methodology and describes the characteristics of the derived panel.

During these three years, the CSG was not only increasing in value due to regular annual increments that outpaced the inflation rate, but the take-up rate also increased rapidly in response to a government-led campaign to register all those eligible for the grant. These three years – 2002 to 2004 – coincide with the period of the most rapid increase in take-up of the Child Support Grant in South Africa's history. The coverage of the grant also expanded from targeting poor children up to age 7 in 2002 to targeting poor children up to age 14 in 2005 (in stages over these years). The grant is paid to the caregiver for each qualifying child, and in 2003 and 2004, one-third of the participating households received more than one grant.

The sample frame for this analysis is the set of children under age 7 who were age-eligible and satisfied criteria that indicated a high likelihood of passing the Department of Social Development's means test (identified in a micro-simulation of the means test) for the Child Support Grant in 2002. (The GHS oversamples the groups who are likely to qualify for the Child Support Grant and over-represents children who are actually receiving it.) Analysis of these data from the 2002 GHS indicate that an estimated one-third of the children eligible for the CSG actually received it in 2002.

As the means test applied by the Department of Social Development was not well understood by the targeted households, and sometimes not even by the social workers administering the test, there were errors of inclusion and exclusion (as estimated based on micro-simulations of the eligibility criteria.) In addition, awareness of the potential for receiving the grant grew over time; it was rarely anticipated prior to 2000. Furthermore, as the path of mobile registration units to rural areas was at least partly independent of social conditions in the communities, it is possible that this created a source of exogenous variation in awareness and registration for the CSG that we can use in identifying programme impacts. While the public campaign to increase enrolments progressed to a take-up rate of 58% by 2004, at any point in time, there was a range from the very poorest to near poor communities that were targeted by the mobile registration and grant application units. As a result, in 2002, 2003 and 2004, it is possible to identify comparable enumeration areas with low (or zero) and relatively high take-up rates for the child support grants.

Table 2: Child Support Grant receipt, 2003–04

	CHILD SUPPORT GRANT IN 2004		
CHILD SUPPORT GRANT IN 2003	*Yes*	*No*	*Percent of total*
Yes	745	0	41
No	0	1062	59

The "treatment" in this study is receipt of the Child Support Grant in both 2003 and 2004; approximately 41 percent of the 1807 eligible children in the study sample reported receiving the CSG in both 2003 and 2004. None of the 1807 eligible children were receiving the CSG in 2002 (the "pre-treatment" or baseline year).

The impact analysis uses data from the 2002 GHS to provide a rich pre-treatment baseline (July 2002)

for both children receiving the CSG, and for those not receiving the CSG. These data include the information necessary to thoroughly apply the complete means test administered by the Department of Social Development for eligibility into the programme, along with other factors that might be expected to influence take-up of the grant in 2003. Importantly, data are available from the 2004 GHS that allows us to construct the same measures for 2004, so that estimates of the impact of the CSG can be calculated based on changes in outcomes observed between the baseline year, 2002, and the follow-up year, 2004.

The tables below show baseline (2002) hunger levels, hunger levels in 2004, and the number and percentage of children for which hunger is reduced between 2002 and 2004, separately for those receiving the CSG in 2003 and 2004 and for eligible children with no grant receipt during this period. (Hunger is measured for all children in the household with a single question, which is used to proxy each child's hunger status.) The basic descriptive statistics and a chi-square test indicate that differences in hunger levels between these two groups are statistically significant at $\alpha < 0.05$ in both 2002 and 2004 (i.e. children receiving the CSG are more likely to experience hunger at baseline). At the same time, hunger is declining among eligible children whether or not they receive the CSG; reductions in hunger over this period are approximately the same for both groups, (the difference is not statistically significant).

Descriptive statistics for the other primary outcome investigated in this study, school attendance, are shown in the table below: the number and percentage of school-age children in school in 2002 and 2004, and the number and percentage of children who were not in school in 2002 but are attending in 2004 (again, separately for those receiving the CSG in 2003 and 2004 and for eligible children with no grant receipt during this period). All children were under age 7 in 2002. "School" refers to pre-school and early grades.

For school attendance, all of the above differences between the two groups – those eligible and receiving the grant and those eligible but without the CSG – are statistically significant at $\alpha < 0.05$. A higher percentage of children without the grant are in school in 2002 and 2004, but in this case, children receiving the grant are closing the gap (newly attending school) at a significantly faster pace.

Table A.1 describes the variables generated using the CSG data and the conceptual reasons for their inclusion in the analysis. The rationale for use of these

Table 3: Hunger and Child Support Grant receipt, 2002-2004

HUNGER IN 2002						
CSG grant recipient 2003-04		Never	Seldom	Sometimes	Often	Always
no	(count)	624	103	219	59	50
	(row %)	59.15	9.76	20.76	5.59	4.74
yes	(count)	386	82	193	49	27
	(row %)	52.37	11.13	26.19	6.65	3.66

HUNGER IN 2004							HUNGER REDUCED	
CSG grant recipient 2003-04		Never	Seldom	Sometimes	Often	Always	no	yes
no)	(count)	746	66	170	50	30	746	316
	(%)	70.24	6.21	16.01	4.71	2.82	70.24	29.76
yes	(count)	487	46	160	37	15	507	238
	(%)	65.37	6.17	21.48	4.97	2.01	68.05	31.95

variables relates to information and awareness about the availability of the grant, networks for accessing this information, costs of accessing the grant and net benefit indicators, poverty and need for the grant, and controls for geographical area and supply-side/administrative factors that might influence grant receipt. Table 5 shows the means of these variables for both recipients of the CSG in 2003 and 2004 and eligible children who did not receive the CSG over this period. The reported t-tests for differences in means between these groups suggest that eligible children receiving the CSG in 2003 and 2004 were statistically significantly more disadvantaged than the others. These children were more likely to sometimes go hungry and to have gone to a DSD office, and the household was more likely to rely mainly on social grants and to receive grants other than the CSG. Children receiving the CSG over this period were also significantly less likely to have access to a fixed telephone line, piped water, and a flush toilet, and the household heads had significantly lower education levels and were less likely to be able to read and write. In addition, the households of CSG-receiving children were significantly more likely to have monthly expenditures of less than R800, among other differences shown in Table 5.

Table 4: Schooling and Child Support Grant receipt, 2002-2004

		IN SCHOOL IN 2002		IN SCHOOL 2004		IN SCHOOL IN 2004 (NOT IN 2002)	
CSG grant recipient 2003		no	yes	no	yes	no	yes
no	(count)	767	295	414	648	696	366
	(%)	72.22	27.78	38.98	61.02	65.54	34.46
yes	(count)	630	113	336	409	443	302
	(%)	84.79	15.21	45.1	54.9	59.46	40.54

Table 5: Baseline (2002) child and household characteristics by Child Support Grant receipt

VARIABLE	Received CSG in 2003-04	No CSG receipt	t-test	
			t	p>|t|
Child(ren) seldom hungry	0.110	0.098	0.82	0.411
Child(ren) sometimes hungry	0.258	0.204	2.66	0.008
Child(ren) often hungry	0.068	0.057	0.98	0.326
Child(ren) always hungry	0.036	0.047	-1.09	0.274
Social development office within 15-29 min walk	0.296	0.292	0.16	0.870
Social development office within 30-44 min walk	0.278	0.229	2.34	0.019
Social development office within 45-59 min walk	0.128	0.128	0.06	0.955
Social development office within 60 min or more	0.184	0.182	0.15	0.882
Knows of a local DSD office	0.510	0.530	-0.83	0.408
Feels safe	0.507	0.523	-0.66	0.510
Household relies mainly on social grants	0.313	0.246	3.07	0.002
Household has access to agricultural land	0.256	0.242	0.63	0.531
Household has access to a fixed line telephone	0.113	0.150	-2.22	0.026
Household has a flush toilet	0.272	0.388	-5.02	0.000
Household has access to mains electricity	0.723	0.700	1.07	0.283
Household close to an improved water source	0.180	0.139	2.31	0.021
Household has access to piped water	0.504	0.552	-1.95	0.052
Household head is unemployed	0.124	0.113	0.73	0.466
Child has made use of a DSD office	0.018	0.008	1.93	0.053
Household head has used a DSD office	0.112	0.105	0.44	0.657
Household head can read or write	0.654	0.713	-2.65	0.008
Household size	6.696	6.883	-1.36	0.172
Household receives grant other than CSG	0.408	0.342	2.82	0.005
Age of child in 2002	2.696	3.469	-7.90	0.000
Age of child in 2002 (squared)	10.872	16.362	-8.86	0.000
Child is male	0.476	0.514	-1.56	0.120
Household head is female	0.528	0.499	1.21	0.228
Age of household head	51.729	49.951	2.32	0.021
Education level of household head	5.187	6.263	-4.86	0.000
Eastern Cape	0.113	0.190	-4.36	0.000
Northern Cape	0.022	0.048	-2.78	0.005
Free State	0.101	0.080	1.45	0.148
KwaZulu-Natal	0.134	0.179	-2.49	0.013
Northwest	0.103	0.103	0.02	0.983
Gauteng	0.046	0.079	-2.77	0.006
Mpumalanga	0.124	0.069	3.97	0.000
Limpopo	0.296	0.157	7.04	0.000
Household expenditure R400-799/month	0.412	0.356	2.36	0.018
Household expenditure R800-1199/month	0.124	0.164	-2.29	0.022
Household expenditure R1200-1799/month	0.043	0.079	-3.03	0.003
Household expenditure R1800/month or more	0.028	0.093	-5.42	0.000
Self-reported optimism about the future	0.346	0.385	-1.63	0.103
Child is a double orphan	0.003	0.009	-1.56	0.119
Mother lives in the household	0.858	0.763	4.87	0.000
Father lives in the household	0.261	0.292	-1.43	0.153

4. Methodology

To estimate the causal effect of the CSG on children's outcomes, one would theoretically like to randomly assign some fraction of the eligible children to receive the grant and others to a control group of children who would be denied access to the grant. This would assure that the children benefiting from the grant would be statistically equivalent to those not receiving it across all observed and unobserved characteristics of the households and children. With a randomised, experimental design, the impact of the programme would be calculated simply as the difference between the outcomes of children in the experimental and control groups in 2004. However, this was clearly not an option in this study design, given the rights-based nature of the programme and the national government's explicit priority to enrol as quickly as possible all children eligible for the CSG. Furthermore, the discussion above shows that the actual CSG recipients differ in important, statistically significant ways from those who were not receiving the grant in 2003–04. Thus, it is imperative to use a methodology that adjusts for any observed and unobserved factors that may influence both selection into the programme (receipt of the CSG) and children's outcomes in order to obtain unbiased estimates of the CSG impact.

Fortunately, as described above, the data available in the 2002-2004 GHS allow us to apply a relatively rigorous methodology for the non-experimental estimation of CSG programme impacts. The data include a very large number of measures of child and household characteristics related to take-up of the grant and children's outcomes; the use of mobile registration and grant application units may have introduced some exogenous variation that could serve as an instrument to net out the influence of unobserved factors on receipt of the CGS, and we have comparable measures of these factors over multiple time periods that allow us to look at how children's hunger and school attendance change over time, rather than just at their level of outcomes following receipt or non-receipt of the grants. The statistical method that we have chosen to apply is differences-in-differences propensity score matching.

The simplest form of statistical matching pairs each "treatment" child with a comparison child (i.e. one not receiving the CSG) who looks similar on observed characteristics. The basic idea is that rather than compare the average outcomes of the treatment group with the average outcomes in the comparison group in 2004, we first find CSG recipient children that look a lot like eligible children that did not receive the grant (on characteristics that we can measure) in 2002, and we compare how their hunger levels and school attendance change between 2002 and 2004, assessing if the "difference in differences" are statistically significant.

In practice, more complex matching techniques are typically applied that also allow for weighting of cases in the comparison group and alternative specifications as to how a match is determined. In studies such as this in which there are a large number of relevant variables available for use in matching, propensity score matching is now the most common approach, as it reduces the process of matching to a single dimension, i.e. a propensity score, or the predicted probability that an individual is a grant recipient. In the first stage of the analysis, the propensity score is estimated using the combined sample of treatment and comparison children (and information on their characteristics), and the propensity score is subsequently used to match treatment and comparison group members so that the distribution of their characteristics is the same, or balanced, in the second-stage estimation of impacts. In fact, one can apply a statistical test to verify that the propensity score balances characteristics between the treatment and comparison group members, and it is also possible to check whether there is sufficient overlap between the two groups for a reasonable comparison. At the same time, it is important to bear in mind the assumption made (in any matching analysis) that there are no unobservable variables that influence selection into the programme *and* programme outcomes; that is, conditional on observable characteristics, the expected outcome in the absence of treatment should not depend on one's treatment status.

There are a number of other choices one can make in matching, including matching with or without replacement, imposing a common support, the choice of the number of nearest neighbours, the size of the caliper in radius matching, and others. In some cases, the choice implies a trade-off between bias and efficiency. For example, as Mueser et al. (2007) explain, if one allows matching with replacement, closer matches that reduce bias will result, but at the potential cost of increased sampling error. In this study, valuable information on eligibility criteria for grant receipt to use in defining the sample, relatively high quality data (a rich set of baseline measures with comparable follow-up measures) for predicting grant receipt, a sufficiently large sample size, and the ability to use a difference-in-differences estimator (that allows us to control for unobserved, fixed characteristics that might influence CSG take-up and children's outcomes) should produce fairly robust results across different propensity score matching specifications.

5. Estimation of propensity scores and balancing test results

As noted earlier, we began the process of model specification by identifying a set of variables from the 2002–2004 GHS that we know and/or expect will predict receipt of the Child Support Grant (see Tables 5 and A.1). Since only eligible children (in the treatment and comparison groups) are included in the sample, we expect these models may identify other factors relating to children's (or household's) motivation and ability to apply. For example, the private costs of the CSG application process – including time costs, transportation expenses, and requirements for documentation – may be more burdensome to some households than others. In addition, the expected return depends on the life horizon of the CSG payment, which in turn is affected by the child's age; the older the child, the lower the total return from the investment in application. At the same time, awareness of the programme and the lag between application and receipt may also affect participation. We know that administrative processes also varied by province from 2002 to 2004, although many of those disparities have now been reduced or eliminated. The caregiver's demand for the grant may also depend on the depth of household poverty, while extreme destitution may limit ability to apply.

The propensity score (first stage model) predicting receipt of the CSG was estimated with the set of variables shown in Table 5, (after refinements to eliminate variables that consistently showed no predictive power and to maximize sample size). Two binary outcomes are being predicted in the impact estimation – a reduction in the level of hunger reported in children from the baseline (2002) to follow-up (2004) and an increase in school attendance (from not attending in 2002 to attending in 2004) – and the propensity score model specifications differ slightly for each of these two outcomes. In particular, the propensity score model for use in the school attendance estimation includes indicator variables for children's level of hunger in 2002.

In addition, we tested a number of alternative propensity score matching techniques, including: radius matching (with different size calipers), kernel matching, local linear regression (with different kernel types), and nearest-neighbour matching. In applying each of these techniques, we calculated standard errors using bootstrapping methods. Since we did not see important differences in the results or balancing performance using these different techniques, we present the first-stage model results and balancing tests from the local linear regression (with kernel type biweight)[13]. Table A.2 shows the results of these propensity score models, where Model 1 is the propensity score specification for use in estimating reduced hunger, and Model 2 is the model that generates propensity scores for estimating increased school attendance.

There is little difference between the two models in the coefficient estimates and their statistical significance, so we briefly discuss the results of both. In both models a longer walk to the social development office positively predicts receipt of the CSG, although only a walk of 30–44 minutes is a statistically significant predictor. It is possible that this relationship reflects the efforts of the mobile registration units to get into rural areas, but possibly also the challenges of penetrating the most rural, poor areas and the higher costs to those households of accessing the grant. The age of the eligible child also appears to be non-linearly related to grant receipt: younger children are less likely to participate, perhaps due to caregivers' lack of awareness or a lag between birth, application and receipt of the grant, and as the child gets closer to the age threshold in 2002, he/she is also significantly less likely to receive the grant. Since most of the grant take-up in 2002 reflects participation of children enrolled in the prior two years, this may reflect a rational weighing of costs and benefits. Caregivers of children close to the age threshold might have anticipated that the relatively short benefits horizon did not justify the risks and costs associated with meeting the eligibility criteria. Children in households with a flush toilet, with more highly educated household heads, and with higher monthly household expenditures are significantly less likely to have a CSG recipient, likely reflecting their greater

13. With the kernel specified as biweight, local linear regression loops over the treatment observations to calculate the smoothed outcome and takes into account which observations were used in calculating the counterfactual (therefore making the balancing tests valid for local linear regression).

economic advantage. Alternatively, children in households headed by individuals who could read or write and that made use of a DSD office are significantly more likely to be receiving the CSG, likely reflecting these individuals' greater awareness and capability of applying for the grant. And although Model 2 shows that children in households reporting hunger in 2002 were more likely to be grant recipients, children in larger households were significantly less likely to receive the CSG, possibly reflecting the lower net benefits to the household of grant receipt. Eligible male children were also less likely to receive the grant. Finally, the province indicators suggest that eligible children in the Eastern Cape and Northern Cape were significantly less likely to receive the CSG, while eligible children in Limpopo and Mpumalanga were significantly more likely to be grant recipients.

The statistics reported in the bottom two lines of Table A.2 suggest that although there is considerable variation in CSG receipt that is not explained by these models (with pseudo R2 values of approximately 14%), the models correctly predict children's receipt or non-receipt in approximately three of out four cases (of all possible paired comparisons, totalling over 729,000, as indicated by the percent concordant measure).

Of course, the primary objective of this first-stage estimation is to generate propensity scores to use in matching, so as to balance characteristics between the treatment and comparison group members and calculate unbiased estimates of the CSG impact. Thus, before discussing the impact estimates, we look at the results of the balancing tests and assess the performance of the propensity scores in balancing the distribution of characteristics between the treatment and comparison groups. Table A.3 shows the results of the balancing tests, separately for the propensity scores used in estimating the impact of the CSG in reducing hunger and for those used in estimating the impact of the CSG on school attendance. For each observed characteristic, the table shows the means of the treatment and comparison groups before (unmatched) and after matching. The percent bias before and after matching is also shown (as well as the percent reduction in bias), and the last two columns present the results of t-tests for differences in means between the two groups (with statistically significant differences shown in bold).

Although there are a considerable number of results due to the relatively large number of variables used in estimating the propensity scores, the key findings of the balancing tests are immediately apparent. While there are many statistically significant differences in observed characteristics between the treatment group and comparison group members before matching, after matching there is not one statistically significant difference. In fact, the p-values associated with the t-tests are uniformly high after matching, suggesting that any differences at baseline are strongly rejected after matching. Correspondingly, the percent reduction in bias is very large for most variables (as high as 99.9%), except where the differences were small and statistically insignificant even before matching. For example, Tables 5 and A.3 show that children receiving the CSG in 2003 and 2004 were significantly more likely to be in households that rely mainly on social grants than eligible children without the grant, with a difference in means of approximately 0.067 between these two groups. After matching, this difference in means (the proportion of children in households relying mainly on social grants) is reduced to 0.007, implying close to a 90% reduction in bias and a difference that is statistically and substantively negligible between the groups. This latter finding holds for every other statistically significant difference observed at baseline and shown both in Tables 5 and A.3, including for very large differences between CSG and non-CSG children, such as the age of the child in 2002. Thus, we conclude that the estimated propensity scores perform very well in matching on observed characteristics, and we do not further control for these covariates (other than through the propensity scores) in the matching analyses. Assuming that there are no unobserved, changing characteristics influencing both CSG receipt and programme outcomes, our second-stage estimation should produce unbiased estimates of the impact of the CSG on hunger and school attendance among children.

6. Estimation of Child Support Grant impacts

As indicated above, we are estimating two binary outcomes in the impact models: whether hunger among children in the household was reduced from 2002 to 2004, and whether school attendance increased among children in the household from 2002 to 2004. Simple descriptive statistics indicated that hunger among children was (statistically) significantly more frequent at baseline (in 2002) in households that received the CSG in 2003, but they did not suggest a significantly larger reduction in hunger in these same households (relative to those not receiving the CSG) between 2002 and 2004. (Hunger is measured for all children in the household with a single question which is used to proxy each child's hunger status.) Alternatively, simple descriptive statistics showed that not only were children in the treatment group (statistically) significantly less likely to be attending school in 2002 than those in the comparison group, but they were also significantly more likely to increase their school attendance from 2002 to 2004. ("School" refers to pre-school and early grades, since all children in the sample are under age 7 in 2002.) Of course, these simple numbers do not take into account the differences in their characteristics that we observed and discussed above. We now turn to the results of the impact estimation generated by the difference-in-differences propensity score matching analysis.

Table A.4 presents a summary of the impact estimation results obtained using five alternative matching techniques. Radius caliper matching excludes matches for which the difference in propensity scores (of the matched treatment and comparison group members) exceeds the specified caliper, in this case, a conservative 0.01. Because a common support is imposed, cases that do not meet this criterion are excluded from the estimation. The third column in Table A.4 shows the number of cases dropped due to the imposition of a common support in each of the different matching estimations. The largest number of cases dropped was 20 (in radius matching for the reduced hunger outcome), representing just 1% of the total number of observations in the estimation. Thus, across all of the matching estimations, a negligible number of cases (or none) were dropped. This is not surprising, given the considerable overlap in the range and distributions of the propensity scores for the treatment group and comparison groups. Table A.5 shows histograms of the propensity scores used in the matching estimation for both sets of outcomes (hunger and schooling) by CSG receipt (treatment and comparison groups), and it also shows the means and ranges of the propensity scores. The distributions of the propensity scores for treatment and comparison group members not only have strong overlap, but they are also similarly shaped in terms of "thickness" over their very wide ranges (i.e. 0.006–0.896 and 0.087–0.922).

The kernel matching estimator we apply is based on a normal density function, and in the local linear regressions, we specify the kernel types as normal and biweight. Each of these first four techniques is implemented in Stata statistical software using the "psmatch2" module. The fifth technique in the analysis, nearest-neighbour matching with bias adjustment, is a newer technique that was developed in response to concerns first articulated by Abadie and Imbens (2002) that even after removing the conditional bias, matching estimators with a fixed number of matches may not reach the semiparametric efficiency bound for average treatment effects. Their alternative approach, recently incorporated into Stata as the "nnmatch" command, implements a bias-correction that removes the conditional bias asymptotically, making matching estimators root-N-consistent (see Abadie et al., 2004)[14].

The top half of Table A.4 presents the results from the models estimating a reduction in hunger among children between 2002 and 2004. Simple descriptive statistics suggested that hunger was being reduced among both children receiving the CSG and among non-participants over this period. However, after adjusting for differences in their characteristics through propensity score matching, we see larger reductions in hunger for CSG recipients than for those not receiving the CSG (the differences shown in the matched row for

14. The bias-corrected matching estimator (nnmatch using the bias adjustment option) adjusts the difference within matches for the differences in their covariate values.

each model estimated). As anticipated, the standard errors are slightly larger in the matching estimation as well. The estimate of the difference in reduction in hunger between treatment and comparison group members is fairly consistent across the first four matching methods, ranging from 0.042 to 0.049, but comes short of statistical significance at a 95% confidence level. However, the first three differences are very close to statistical significance at a 90% confidence level, and the estimated impact in the local linear regression with a biweight kernel type is statistically significant at a 92% confidence level. In addition, the final nearest-neighbour matching estimate that includes the bias adjustment shows a larger difference between the two groups in the reduction of hunger (0.074), and this estimate is statistically significant at close to a 99% confidence level. Thus, with the adjustments made for differences between the treatment and comparison groups through matching, the effect of receipt of the CSG on reducing hunger (from 2002 to 2004) is two to three times larger than the unmatched (raw) difference of 0.025.

In the bottom half of Table A.4, the results from the models estimating changes in school attendance from 2002 to 2004 are shown. The findings are unambiguous in this case; the impact of the Child Support Grant on school attendance is positive and statistically significant with greater than 95% confidence in each estimation. For the radius, kernel and local linear matching estimates, the matched difference of approximately 0.06 (the percentage point increase in households with children newly attending school in 2004) is the same as the unmatched difference between the treatment and comparison groups. The difference-in-difference estimate produced by nearest-neighbour matching with bias adjustment is again slightly larger than the others.

Other Child Support Grant impacts

In addition to the primary outcomes that were the focus of this study (reductions in hunger and increases in school attendance), we investigated the impact of the CSG on five additional outcomes. These include: changes in child labour, in particular, children's time spent fetching water and fuel; changes in household employment rates (i.e., percent of working-age members in the household that are employed); increases in the use of social workers by household members; changes in household farming activities (including field crops, horticulture, orchards, livestock, poultry and others), and new cell phone use (based on the question: Is there a cellular telephone available to this household for regular use?).

The surveys measure how many hours children spend collecting water and fuel (wood or dung), and child labour in these activities tends to increase with age. To the extent that the Child Support Grant improves the status of children and reduces poverty, it may decrease the demands on children for this type of labour. In other words, child labour hours may increase over time for both the treatment and comparison group, but we expect they may do so at a slower rate for children receiving the CSG.

The measured employment rate follows the methodology used by Statistics South Africa for analysing employment with census data, rather than that for Labour Force Surveys. For each child, a household gross employment rate is calculated by dividing the number of employed workers by the total number of working age individuals in the household. In theory, the Child Support Grant might reduce the need to work, and hence lower the measured employment rate, or it might relax liquidity constraints and improve household risk management, potentially raising employment rates. Studies have found both positive and negative impacts of cash transfers on labour market outcomes in South Africa[15].

We began by examining the changes in these outcomes for CSG recipients and the comparison group members between 2002 and 2004 using descriptive statistics. Table 6 shows the results of this descriptive analysis for each outcome. Although some simple differences (in changes from 2002 and 2004) between treatment and

15. See Samson (2004) and Samson and Williams (2007) for a review of this literature.

comparison groups are noticeable, particularly for child labour and farming activities (cultivation), only one of these differences was statistically significant (the change in child labour hours spent fetching fuel, p=0.031).

	CHILD SUPPORT GRANT IN 2003–04	
Average outcomes	**Yes (treatment)**	**No (comparison)**
Change in child labour hours spent fetching water	0.066	0.104
Change in child labour hours spent fetching fuel	0.007	0.133
Change in household employment rate	0.001	-0.013
Percent newly using a social worker in 2004 (from 2002)	6.98%	7.16%
Percent newly cultivating (change from 2002 to 2004)	6.71%	5.27%
Percent no longer cultivating (change from 2002 to 2004)	7.92%	10.36%
New cell phone use (change from 2002 to 2004)	25.23%	24.67%

Table 6: Descriptive statistics for additional outcomes

Looking at more detailed tabulations of these data, we saw, for example, that more than 95 percent of children (both with and without CSG receipt) had no change in child labour hours between 2002 and 2004. Just 24 (3.2%) of CGS recipient children and 39 (3.6%) of comparison group children reported an increase in child labour hours fetching water (with even smaller numbers for those fetching fuel), and thus, the differences in average child labour changes for the treatment and comparison groups shown above are based on a very small fraction of cases with changes over this period. We also looked at landline telephone use as well as cell phone use and the relationship between changes in the use of landlines and cell phones over the period 2002–2004. These tabulations showed very few changes in landline use and no relationship between the increased use of cell phones and landline phone usage.

However, as we demonstrated in the impact estimation above, it is important to control for both observed and unobserved differences between the treatment and comparison group members in analysing the CSG impacts. We again used difference-in-differences propensity score matching methods to control for observed characteristics and unobserved, fixed characteristics that might influence CSG receipt and the outcomes. The first-stage propensity score model estimated was the same as that shown in appendix Table A.2, Model 2, and the balancing tests reported in the latter half of Table A.3 also apply to this estimation[16]. In addition, we employed the same matching techniques as described above: radius caliper matching with a conservative 0.01 caliper; kernel matching based on a normal density function; local linear regression with kernel types normal and biweight, and nearest-neighbour matching with bias adjustment. We present the results in Table A.6, although for brevity, we only report the results from three matching techniques (radius caliper, local linear regression with kernel type normal, and nearest-neighbour matching with bias adjustment), as there were negligible differences in the results for the other two techniques.

The findings in Table A.6 show that for most of the outcomes, the adjustments made through matching do not change what we saw descriptively. There are no statistically significant impacts of CSG receipt on children's labour hours, household employment rates, use of a social worker, and new cultivation/farming activities. The statistically significant simple difference that we initially saw in changes in children's hours of labour fetching fuel is reduced and is no longer statistically significant after matching. However, in distinguishing changes in new cultivation from discontinuation of farming activities, we see that after matching, the proportion of households with children receiving the CSG that have stopped farming activities is lower than those not receiving the CSG by a statistically significant amount (a result that is consistent across the matching techniques). In other words, households receiving the CSG are significantly more likely to continue farming activities. For new cell phone use, the difference between households with children receiving the CSG

16. An alternative specification for the first stage propensity score model which did not include the household head's employment status was also tested but did not materially change any result.

and households of children in the comparison group is also statistically significant (albeit only for the nearest-neighbour matching technique with bias adjustment), suggesting that households with children receiving the CSG are significantly more likely to have acquired the use of a cell phone between 2002 and 2004.

Thus, this additional impact analysis suggests that receipt of the CSG may help to support and sustain farming activity. From 2002 to 2004, the number of poor households in South Africa cultivating land fell. This evidence suggests that the Child Support Grant may have improved household resilience in maintaining production in the face of this trend.

These additional results also suggest that the Child Support Grant may also help to improve communications through increased cell phone use (which does not displace landline telephone use). From 2002 to 2004, national access to cell phone services increased significantly. This evidence suggests that the Child Support Grant may enable households with children receiving the grant to better share in this improved access. Anecdotal evidence from South Africa suggests that cell phone services may improve labour market outcomes by reducing the transaction costs of labour market participation. In addition, a recent article in *The Economist*[17] reported that a typical developing country that realizes an increase in mobile phone penetration of 10% will boost GDP growth by approximately one percentage point.

In summary, the comparatively rigorous, difference-in-differences propensity score matching estimation produced promising results about the impact of the Child Support Grant on children's outcomes. Over a relatively short period of time, the Child Support Grant increased school attendance among recipient children and contributed to greater reductions in hunger among children. Specifically, the findings show that among all CSG-eligible children, school attendance was increasing and hunger was declining during the 2002–2004 period, but the reduction in hunger was approximately 4–7 percentage points greater and the proportion newly in school was about 6–8 percentage points higher among those receiving the grant. The CSG also supported the sustainability of household agricultural activities and increased access to cell phone use. Although these are relatively limited measures of the impact of the CSG, future evaluation work with additional data collection might be able to broaden the examination of this programme's impacts, including its effects on nutrition and health among household members and their productivity (either in school or the labour force). In addition, if there is a cumulative effect of continuing Child Support Grant receipt in improving children's nutrition and educational attainment, one might also expect to see larger impacts in the future, and/or possibly longer-term impacts on educational attainment and improved labour market outcomes.

In addition, EPRI considered testing other potential impacts, including (i) the spill-over impact effects of the CSG on siblings' school outcomes, for example school progressions, (ii) potential impact on children's morbidity and (iii) the potential impact on level of food expenditures or on the households' share of food expenditures over total expenditures. The small number of relevant observations did not support analysis of the first two impacts. For example, less than thirty observations in the sample had relevant information on a child's morbidity in both 2002 and 2004 – since this data was collected only when a case of morbidity was reported for a child. Food expenditure was not reported in 2002, so double-difference analysis was not possible.

17. "Halfway there: How to promote the spread of mobile phones among the world's poorest," May 29, 2008, *The Economist*.

7. Conclusions

South Africa's Child Support Grant, an unconditional social transfer programme, was originally designed to reduce poverty and promote social development for poor children under the age of seven. This nonexperimental study finds statistically significant effects of the programme in terms of increasing school attendance and reducing self-reported hunger for children. The study also finds some significant impacts in terms of reducing the likelihood that households stop cultivating their land and improving access to cell phone services. This study reinforces the emerging evidence base of quantitative studies since 2004 that is beginning to identify and document the impact of the Child Support Grant in reducing poverty, promoting human capital development and potentially contributing to economic growth.

This study lends preliminary support to this evolving consensus. Based on the first analysis of the EPRI-constructed General Household Survey panel from 2002 to 2004, both unmatched and matched comparisons indicate that children that begin to receive the Child Support Grant are less likely to face persistent hunger and more likely to begin attending school than comparably poor children that do not receive the social grant.

The evidence on human capital impacts is particularly important in light of the emerging debate about the role of conditionalities in cash transfer programmes. The Child Support Grant does not impose conditions on households for receipt of the grant. While an extensive body of studies find that conditional cash transfer programmes improve human capital development[18], few can specifically attribute these impacts to the incentives created by the conditionalities, rather than the income provided by the transfers. In fact, studies have documented some of the challenges of implementation of the conditionalities, including inadequate record-keeping and monitoring of compliance with conditions, which may contribute to loose implementation or ineffectiveness of the conditionalities (Tabor, 2002). The results of this study for South Africa's Child Support Grant contributes to this evolving debate, adding further evidence on the human development impact of unconditional programmes.

The choice of methodology for attributing impact matters. While the positive impact on school attendance is statistically significant for both unmatched and all matched approaches, the positive impact in reducing child hunger is not statistically significant with the unmatched analysis. In the matched analysis, the level of confidence we can place in the finding of reduced child hunger outcomes depends in part on which matching methodology is employed, although in general, any differences are small.

These positive findings are encouraging in terms of the potential for a more extensive and forward-looking study to demonstrate conclusively the positive impacts of the Child Support Grant, supporting its extension and political and economic sustainability. However, this report is constrained by the limitations of the data. The General Household Survey was not designed as a panel, and the data linking processes have reduced the statistical power of the study. In addition, the General Household Survey was not designed to evaluate the Child Support Grant and lacks important measures, such as anthropometric indicators that would more robustly quantify health and nutrition outcomes.

In spite of the limitations of this and preceding studies, the emerging evidence base suggests that the extension of the Child Support Grant to all poor children up to their 18th birthday holds the potential to cost-effectively and efficiently reduce South Africa's poverty gap while promoting developmental outcomes. Nevertheless, this report and the review of the existing literature document the need for more rigorous and comprehensive research assessing the impact of the Child Support Grant.

18. See Heinrich (2007) for a review of several studies on conditional cash transfers.

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Appendix A: Tables referenced in the main report

Table A.1: Variables used in the propensity score estimation

VARIABLE DESCRIPTION	REASON FOR INCLUSION
Child attending school in 2002	Poverty indicator, network indicator
Self-reported child hunger index	Demand-side, need indicator
Knows of a local DSD office	Information/awareness indicator
Feels safe	Poverty indicator, cost of accessing grants
Household relies primarily on remittances	Demand-side, need indicator
Household relies primarily on social grants	Information/awareness indicator
Household has access to agricultural land	Poverty indicator
Household's primary mode of transport is walking	Poverty indicator, cost of accessing grants
Household has access to a fixed line telephone	Poverty indicator, cost of accessing grants
Household has access to a cellular telephone	Poverty indicator, cost of accessing grants
Household has a flush toilet	Poverty indicator
Household has access to mains electricity	Poverty indicator
Household is close to an improved water source	Poverty indicator
Household has access to piped water	Poverty indicator
Household head is employed	Poverty indicator, network indicator
Household head is unemployed	Poverty indicator, network indicator
Child has made use of a DSD office	Information/awareness indicator, cost of accessing grants
Household head has made use of a DSD office	Information/awareness indicator, cost of accessing grants
Child has been ill with flu or diarrhoea	Poverty indicator
Child has problems at school due to lack of books	Poverty indicator
Child has problems at school due to poor teaching	Poverty indicator
Child has problems at school due to lack of supplies	Poverty indicator
Child has problems at school due to poor facilities	Poverty indicator
Child has problems at school due to fees and costs	Poverty indicator
Child has problems at school due to large classes	Poverty indicator
Child's school fees are R1 to R100	Poverty indicator
Child's school fees are R101 to R200	Poverty indicator
Household head can read or write in at least 1 language	Poverty, network indicator, cost of accessing grants
Household size	Net benefit indicator
Social development office within 15 minute walk	Information/awareness indicator, cost of accessing grants
Household receives any other grant other than a CSG	Information/awareness indicator, cost of accessing grants
Age of child in 2002	Net benefit indicator
Age of child in 2002 squared (for non-linear effects)	Net benefit indicator
Child is a boy	Gender preference indicator
Household head is female	Network indicator, poverty indicator
Age of household head	Network indicator, poverty indicator
Education level of household head (up to 12 years)	Network indicator, poverty indicator
Eastern Cape	Supply-side proxy/control
Northern Cape	Supply-side proxy/control
Free State	Supply-side proxy/control
KwaZulu-Natal	Supply-side proxy/control
Northwest	Supply-side proxy/control
Gauteng	Supply-side proxy/control
Mpumalanga	Supply-side proxy/control
Limpopo	Supply-side proxy/control
Household expenditure level category	Poverty indicator
Self-reported optimism about the future	Motivation, poverty indicator
Household owns books	Poverty indicator
Mother is alive	Mother may be more likely to apply
Father is alive	Father may be more likely to apply
Child is a double orphan	Poverty/vulnerability
Mother lives in the household	Mother may be more likely to apply
Father lives in the household	Father may be more likely to apply

Table A.2: Propensity score model results

Propensity score model predicting receipt of Child Support Grant
Local linear regression with kernel type=biweight

	MODEL 1				MODEL 2			
Variables	**Coefficient**	**Standard error**	**t**	**p>|t|**	**Coefficient**	**Standard error**	**t**	**p>|t|**
Child(ren) seldom hungry					0.156	0.112	1.40	0.162
Child(ren) sometimes hungry					0.234	0.084	2.77	0.006
Child(ren) often hungry					0.109	0.141	0.77	0.440
Child(ren) always hungry					0.097	0.177	0.55	0.583
Social development office within 15-29 minute walk	0.144	0.108	1.33	0.183	0.135	0.109	1.24	0.215
Social development office within 30-44 minute walk	0.241	0.114	2.10	0.036	0.237	0.115	2.06	0.039
Social development office within 45-59 minute walk	0.103	0.135	0.76	0.448	0.098	0.136	0.72	0.472
Walk to social development office is 60 minutes or more	0.122	0.127	0.96	0.338	0.114	0.127	0.89	0.373
Knows of a local DSD office	0.110	0.075	1.46	0.144	0.101	0.075	1.34	0.181
Feels safe	-0.071	0.067	-1.06	0.288	-0.044	0.068	-0.65	0.515
Household relies mainly on social grants	0.123	0.117	1.05	0.295	0.092	0.118	0.78	0.435
Household has access to agricultural land	0.128	0.092	1.38	0.166	0.126	0.093	1.35	0.176
Household has access to a fixed line telephone	0.166	0.109	1.53	0.126	0.181	0.109	1.66	0.096
Household has a flush toilet	-0.262	0.106	-2.47	0.014	-0.267	0.106	-2.51	0.012
Household has access to mains electricity	0.101	0.085	1.19	0.233	0.119	0.085	1.40	0.163
Household close to an improved water source	0.121	0.102	1.19	0.235	0.128	0.102	1.25	0.210
Household has access to piped water	0.037	0.104	0.35	0.725	0.045	0.104	0.43	0.664
Household head is unemployed	0.167	0.104	1.60	0.109	0.164	0.104	1.58	0.115
Child has made use of a DSD office	0.599	0.305	1.96	0.050	0.614	0.308	1.99	0.046
Household head has used a DSD office	-0.052	0.111	-0.46	0.642	-0.057	0.112	-0.51	0.609
Household head can read or write	0.290	0.111	2.61	0.009	0.281	0.112	2.51	0.012
Household size	-0.041	0.013	-3.11	0.002	-0.045	0.013	-3.32	0.001
Household receives grant other than CSG	0.188	0.114	1.65	0.099	0.212	0.114	1.86	0.063
Age of child in 2002	0.187	0.060	3.13	0.002	0.188	0.060	3.14	0.002
Age of child in 2002 (squared)	-0.051	0.001	-5.36	0.000	-0.052	0.001	-5.39	0.000
Child is male	-0.141	0.065	-2.15	0.031	-0.137	0.065	-2.09	0.037
Household head is female	-0.047	0.080	-0.58	0.561	-0.051	0.080	-0.64	0.523
Age of household head	0.002	0.003	0.72	0.472	0.002	0.003	0.73	0.463
Education level of household head	-0.034	0.013	-2.64	0.008	-0.032	0.013	-2.50	0.012
Eastern Cape	-0.365	0.168	-2.17	0.030	-0.394	0.169	-2.34	0.019
Northern Cape	-0.404	0.213	-1.89	0.058	-0.447	0.214	-2.08	0.037
Free State	0.236	0.164	1.44	0.151	0.204	0.165	1.23	0.217
KwaZulu-Natal	-0.208	0.162	-1.28	0.199	-0.220	0.163	-1.35	0.176
Northwest	0.070	0.165	0.42	0.672	0.049	0.166	0.30	0.767
Gauteng	-0.107	0.180	-0.59	0.554	-0.127	0.181	-0.70	0.481
Mpumalanga	0.531	0.168	3.17	0.002	0.510	0.168	3.03	0.002

	MODEL 1				MODEL 2			
Variables	**Coefficient**	**Standard error**	**t**	**p>|t|**	**Coefficient**	**Standard error**	**t**	**p>|t|**
Limpopo	0.373	0.155	2.41	0.016	0.379	0.155	2.44	0.015
Household expenditure R400-799/month	-0.085	0.079	-1.08	0.282	-0.076	0.081	-0.94	0.345
Household expenditure R800-1199/month	-0.225	0.109	-2.07	0.038	-0.204	0.110	-1.85	0.064
Household expenditure R1200-1799/month	-0.518	0.156	-3.31	0.001	-0.472	0.158	-2.98	0.003
Household expenditure R1800/month or more	-0.842	0.167	-5.05	0.000	-0.804	0.168	-4.80	0.000
Self-reported optimism about the future	-0.114	0.069	-1.65	0.099	-0.114	0.069	-1.65	0.099
Child is a double orphan	-0.433	0.462	-0.94	0.348	-0.372	0.460	-0.81	0.418
Mother lives in the household	0.459	0.092	4.97	0.000	0.461	0.093	4.97	0.000
Father lives in the household	-0.112	0.091	-1.24	0.215	-0.110	0.091	-1.21	0.226
Intercept	**-0.409**	**0.299**	**-1.37**	**0.171**	**-0.490**	**0.302**	**-1.63**	**0.104**
Sample size	**n=1735**				**n=1735**			
Pseudo R-squared	**0.137**				**0.141**			
Percent concordant	**74.00%**				**74.30%**			

Table A.3: Balancing test results for model estimating reduced hunger

(model specification: local linear regression, kernel type=biweight)

Variable	**Sample**	**Treatment**	**Comparison**	**% bias**	**% reduction in bias**	**t-test**	
						t	**p>|t|**
Social development office within 15-29 minute walk	Unmatched	0.296	0.292	0.8		0.16	0.870
	Matched	0.296	0.294	0.3	56.3	0.07	0.947
Social development office within 30-44 minute walk	Unmatched	0.278	0.229	11.3		2.34	0.019
	Matched	0.278	0.274	0.9	92.5	0.16	0.876
Social development office within 45-59 minute walk	Unmatched	0.128	0.128	0.3		0.06	0.955
	Matched	0.128	0.138	-2.7	n.a.	-0.51	0.613
Walk to social development office is 60 minutes or more	Unmatched	0.184	0.182	0.7		0.15	0.882
	Matched	0.184	0.189	-1.1	n.a.	-0.21	0.831
Knows of a local DSD office	Unmatched	0.510	0.530	-4		-0.83	0.408
	Matched	0.510	0.510	-0.1	98.5	-0.01	0.991
Feels safe	Unmatched	0.507	0.523	-3.2		-0.66	0.510
	Matched	0.507	0.494	2.6	19	0.49	0.623
Household relies mainly on social grants	Unmatched	0.313	0.246	14.9		3.07	0.002
	Matched	0.313	0.322	-1.9	87	-0.35	0.725
Household has access to agricultural land	Unmatched	0.256	0.242	3		0.63	0.531
	Matched	0.256	0.263	-1.6	46.3	-0.31	0.760
Household has access to a fixed line telephone	Unmatched	0.113	0.150	-11		-2.22	0.026
	Matched	0.113	0.112	0.2	98	0.04	0.965
Household has a flush toilet	Unmatched	0.272	0.388	-24.7		-5.02	0.000
	Matched	0.272	0.270	0.6	97.6	0.12	0.908
Household has access to mains electricity	Unmatched	0.723	0.700	5.2		1.07	0.283
	Matched	0.723	0.744	-4.5	14.5	-0.87	0.385
Household close to an improved water source	Unmatched	0.180	0.139	11.2		2.31	0.021
	Matched	0.180	0.172	2.3	79.2	0.42	0.674
Household has access to piped water	Unmatched	0.504	0.552	-9.5		-1.95	0.052
	Matched	0.504	0.485	3.9	58.7	0.74	0.460
Household head is unemployed	Unmatched	0.124	0.113	3.5		0.73	0.466
	Matched	0.124	0.118	1.9	45.1	0.36	0.716

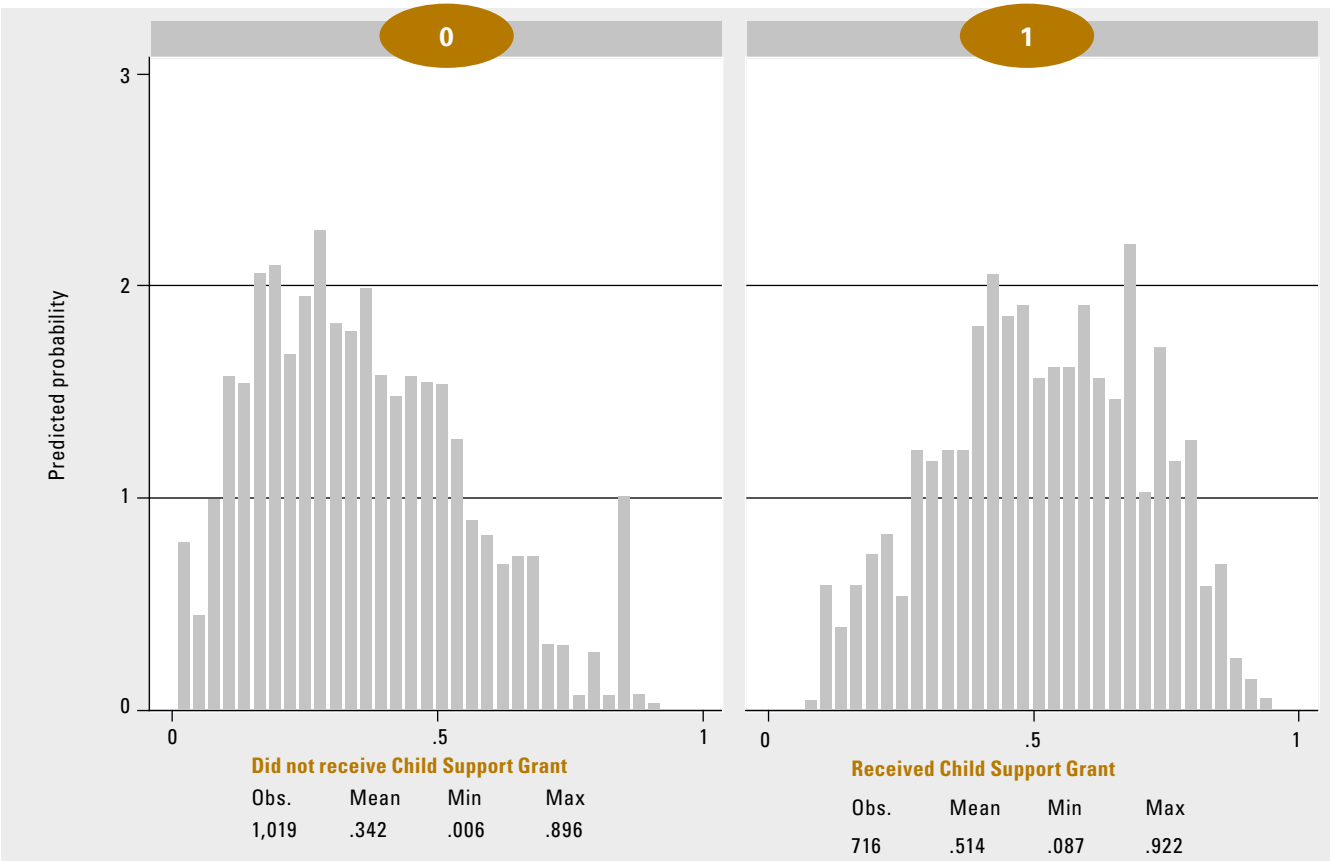
Variable	Sample	Treatment	Comparison	% bias	% reduction in bias	t-test	
						t	p>|t|
Child has made use of a DSD office	Unmatched	0.018	0.008	9.1		1.93	0.053
	Matched	0.018	0.017	0.6	93	0.10	0.918
Household head can read or write	Unmatched	0.654	0.713	-12.9		-2.65	0.008
	Matched	0.654	0.646	1.6	87.8	0.29	0.773
Household size	Unmatched	6.696	6.883	-6.7		-1.36	0.172
	Matched	6.696	6.636	2.1	68.5	0.42	0.677
Household receives grant other than CSG	Unmatched	0.408	0.342	13.7		2.82	0.005
	Matched	0.408	0.399	1.7	87.4	0.32	0.747
Age of child in 2002	Unmatched	2.696	3.469	-38.8		-7.90	0.000
	Matched	2.696	2.751	-2.8	92.8	-0.56	0.579
Age of child in 2002 (squared)	Unmatched	10.872	16.362	-43.9		-8.86	0.000
	Matched	10.872	11.093	-1.8	96	-0.37	0.712
Child is male	Unmatched	0.476	0.514	-7.6		-1.56	0.120
	Matched	0.476	0.470	1.2	84.4	0.22	0.823
Household head is female	Unmatched	0.528	0.499	5.9		1.21	0.228
	Matched	0.528	0.563	-7.1	n.a.	-1.35	0.178
Age of household head	Unmatched	51.729	49.951	11.3		2.32	0.021
	Matched	51.729	52.09	-2.3	79.7	-0.42	0.675
Education level of household head	Unmatched	5.187	6.263	-23.8		-4.86	0.000
	Matched	5.187	5.132	1.2	94.9	0.23	0.817
Eastern Cape	Unmatched	0.113	0.190	-21.6		-4.36	0.000
	Matched	0.113	0.116	-0.7	96.7	-0.15	0.879
Northern Cape	Unmatched	0.022	0.048	-14		-2.78	0.005
	Matched	0.022	0.024	-0.8	94.3	-0.18	0.854
Free State	Unmatched	0.101	0.080	7		1.45	0.148
	Matched	0.101	0.089	4	43.4	0.73	0.463
KwaZulu-Natal	Unmatched	0.134	0.179	-12.3		-2.49	0.013
	Matched	0.134	0.126	2.1	82.7	0.43	0.664
Northwest	Unmatched	0.103	0.103	0.1		0.02	0.983
	Matched	0.103	0.108	-1.5	n.a.	-0.28	0.780
Gauteng	Unmatched	0.046	0.079	-13.8		-2.77	0.006
	Matched	0.046	0.042	1.6	88.2	0.36	0.716
Mpumalanga	Unmatched	0.124	0.069	18.9		3.97	0.000
	Matched	0.124	0.135	-3.6	81.2	-0.59	0.555
Limpopo	Unmatched	0.296	0.157	33.7		7.04	0.000
	Matched	0.296	0.298	-0.4	98.8	-0.07	0.947
Household expenditure R400-799/month	Unmatched	0.412	0.356	11.5		2.36	0.018
	Matched	0.412	0.409	0.6	94.5	0.12	0.906
Household expenditure R800-1199/month	Unmatched	0.124	0.164	-11.3		-2.29	0.022
	Matched	0.124	0.124	0	99.9	0.00	0.999
Household expenditure R1200-1799/month	Unmatched	0.043	0.079	-15.1		-3.03	0.003
	Matched	0.043	0.041	1.2	92.3	0.26	0.792
Household expenditure R1800/ month or more	Unmatched	0.028	0.093	-27.6		-5.42	0.000
	Matched	0.028	0.030	-0.8	97.2	-0.21	0.836
Self-reported optimism about the future	Unmatched	0.346	0.385	-8		-1.63	0.103
	Matched	0.346	0.334	2.5	68.5	0.48	0.630
Child is a double orphan	Unmatched	0.003	0.009	-7.9		-1.56	0.119
	Matched	0.003	0.004	-1.1	85.9	-0.29	0.776
Mother lives in the household	Unmatched	0.858	0.763	24.2		4.87	0.000
	Matched	0.858	0.841	4.3	82.1	0.89	0.375
Father lives in the household	Unmatched	0.261	0.292	-7		-1.43	0.153
	Matched	0.261	0.258	0.7	89.7	0.14	0.889

Table A.4: Balancing test results for model estimating newly attending school in 2004
(model specification: local linear regression, kernel type=biweight)

Variable	Sample	Treatment	Comparison	% bias	% reduction in bias	t-test	
						t	p>|t|
Child(ren) seldom hungry	Unmatched	0.110	0.098	4		0.82	0.411
	Matched	0.110	0.098	4.1	n.a.	0.77	0.443
Child(ren) sometimes hungry	Unmatched	0.258	0.204	12.9		2.66	0.008
	Matched	0.258	0.279	-4.8	62.5	-0.87	0.386
Child(ren) often hungry	Unmatched	0.068	0.057	4.8		0.98	0.326
	Matched	0.068	0.064	1.6	65.6	0.30	0.764
Child(ren) always hungry	Unmatched	0.036	0.047	-5.4		-1.09	0.274
	Matched	0.036	0.028	4	25.8	0.86	0.392
Social development office within 15-29 minute walk	Unmatched	0.296	0.292	0.8		0.16	0.870
	Matched	0.296	0.291	1	n.a.	0.20	0.845
Social development office within 30-44 minute walk	Unmatched	0.278	0.229	11.3		2.34	0.019
	Matched	0.278	0.278	-0.1	99	-0.02	0.983
Social development office within 45-59 minute walk	Unmatched	0.128	0.128	0.3		0.06	0.955
	Matched	0.128	0.130	-0.4	n.a.	-0.07	0.944
Walk to social development office is 60 minutes or more	Unmatched	0.184	0.182	0.7		0.15	0.882
	Matched	0.184	0.195	-2.7	n.a.	-0.51	0.614
Knows of a local DSD office	Unmatched	0.510	0.530	-4		-0.83	0.408
	Matched	0.510	0.522	-2.4	40	-0.46	0.648
Feels safe	Unmatched	0.507	0.523	-3.2		-0.66	0.510
	Matched	0.507	0.496	2.3	29.2	0.43	0.667
Household relies mainly on social grants	Unmatched	0.313	0.246	14.9		3.07	0.002
	Matched	0.313	0.306	1.5	89.6	0.28	0.778
Household has access to agricultural land	Unmatched	0.256	0.242	3		0.63	0.531
	Matched	0.256	0.270	-3.2	n.a.	-0.60	0.546
Household has access to a fixed line telephone	Unmatched	0.113	0.150	-11		-2.22	0.026
	Matched	0.113	0.121	-2.2	80.1	-0.43	0.664
Household has a flush toilet	Unmatched	0.272	0.388	-24.7		-5.02	0.000
	Matched	0.272	0.267	1.2	95.1	0.24	0.812
Household has access to mains electricity	Unmatched	0.723	0.700	5.2		1.07	0.283
	Matched	0.723	0.739	-3.3	36.1	-0.65	0.518
Household close to an improved water source	Unmatched	0.180	0.139	11.2		2.31	0.021
	Matched	0.180	0.176	1.2	88.8	0.23	0.821
Household has access to piped water	Unmatched	0.504	0.552	-9.5		-1.95	0.052
	Matched	0.504	0.481	4.6	52	0.86	0.390
Household head is unemployed	Unmatched	0.124	0.113	3.5		0.73	0.466
	Matched	0.124	0.123	0.5	84.9	0.10	0.921
Child has made use of a DSD office	Unmatched	0.018	0.008	9.1		1.93	0.053
	Matched	0.018	0.013	4.5	50.9	0.77	0.440
Household head has used a DSD office	Unmatched	0.112	0.105	2.2		0.44	0.657
	Matched	0.112	0.110	0.5	76.5	0.10	0.924
Household head can read or write	Unmatched	0.654	0.713	-12.9		-2.65	0.008
	Matched	0.654	0.655	-0.3	97.9	-0.05	0.960
Household size	Unmatched	6.696	6.883	-6.7		-1.36	0.172
	Matched	6.696	6.647	1.8	73.9	0.34	0.731
Household receives grant other than CSG	Unmatched	0.408	0.342	13.7		2.82	0.005
	Matched	0.408	0.385	4.8	65.2	0.89	0.373
Age of child in 2002	Unmatched	2.696	3.469	-38.8		-7.90	0.000
	Matched	2.696	2.761	-3.3	91.5	-0.66	0.509

Variable	Sample	Treatment	Comparison	% bias	% reduction in bias	t-test	
						t	p>|t|
Age of child in 2002 (squared)	Unmatched	10.872	16.362	-43.9		-8.86	0.000
	Matched	10.872	11.089	-1.7	96	-0.36	0.717
Child is male	Unmatched	0.476	0.514	-7.6		-1.56	0.120
	Matched	0.476	0.479	-0.5	92.9	-0.10	0.919
Household head is female	Unmatched	0.528	0.499	5.9		1.21	0.228
	Matched	0.528	0.561	-6.5	n.a.	-1.24	0.214
Age of household head	Unmatched	51.729	49.951	11.3		2.32	0.021
	Matched	51.729	51.745	-0.1	99.1	-0.02	0.985
Education level of household head	Unmatched	5.187	6.263	-23.8		-4.86	0.000
	Matched	5.187	5.219	-0.7	97	-0.14	0.892
Eastern Cape	Unmatched	0.113	0.190	-21.6		-4.36	0.000
	Matched	0.113	0.120	-1.8	91.6	-0.38	0.701
Northern Cape	Unmatched	0.022	0.048	-14		-2.78	0.005
	Matched	0.022	0.024	-0.7	95.1	-0.16	0.874
Free State	Unmatched	0.101	0.080	7		1.45	0.148
	Matched	0.101	0.085	5.4	23.4	1.00	0.317
KwaZulu-Natal	Unmatched	0.134	0.179	-12.3		-2.49	0.013
	Matched	0.134	0.127	2.1	83.3	0.42	0.676
Northwest	Unmatched	0.103	0.103	0.1		0.02	0.983
	Matched	0.103	0.108	-1.5	n.a.	-0.29	0.774
Gauteng	Unmatched	0.046	0.079	-13.8		-2.77	0.006
	Matched	0.046	0.042	1.8	87.3	0.39	0.695
Mpumalanga	Unmatched	0.124	0.069	18.9		3.97	0.000
	Matched	0.124	0.133	-3.1	83.7	-0.51	0.609
Limpopo	Unmatched	0.296	0.157	33.7		7.04	0.000
	Matched	0.296	0.299	-0.7	97.8	-0.13	0.898
Household expenditure R400-799/month	Unmatched	0.412	0.356	11.5		2.36	0.018
	Matched	0.412	0.412	0	99.7	0.01	0.995
Household expenditure R800-1199/month	Unmatched	0.124	0.164	-11.3		-2.29	0.022
	Matched	0.124	0.127	-0.7	94.2	-0.13	0.896
Household expenditure R1200-1799/month	Unmatched	0.043	0.079	-15.1		-3.03	0.003
	Matched	0.043	0.038	2.2	85.8	0.49	0.622
Household expenditure R1800/ month or more	Unmatched	0.028	0.093	-27.6		-5.42	0.000
	Matched	0.028	0.028	-0.2	99.2	-0.06	0.950
Self-reported optimism about the future	Unmatched	0.346	0.385	-8		-1.63	0.103
	Matched	0.346	0.341	1.2	85.3	0.22	0.822
Child is a double orphan	Unmatched	0.003	0.009	-7.9		-1.56	0.119
	Matched	0.003	0.004	-1.3	84	-0.32	0.749
Mother lives in the household	Unmatched	0.858	0.763	24.2		4.87	0.000
	Matched	0.858	0.848	2.3	90.3	0.49	0.627
Father lives in the household	Unmatched	0.261	0.292	-7		-1.43	0.153
	Matched	0.261	0.264	-0.6	91	-0.12	0.904

Table A.5: Histograms of propensity scores (for hunger and schooling outcomes, respectively)



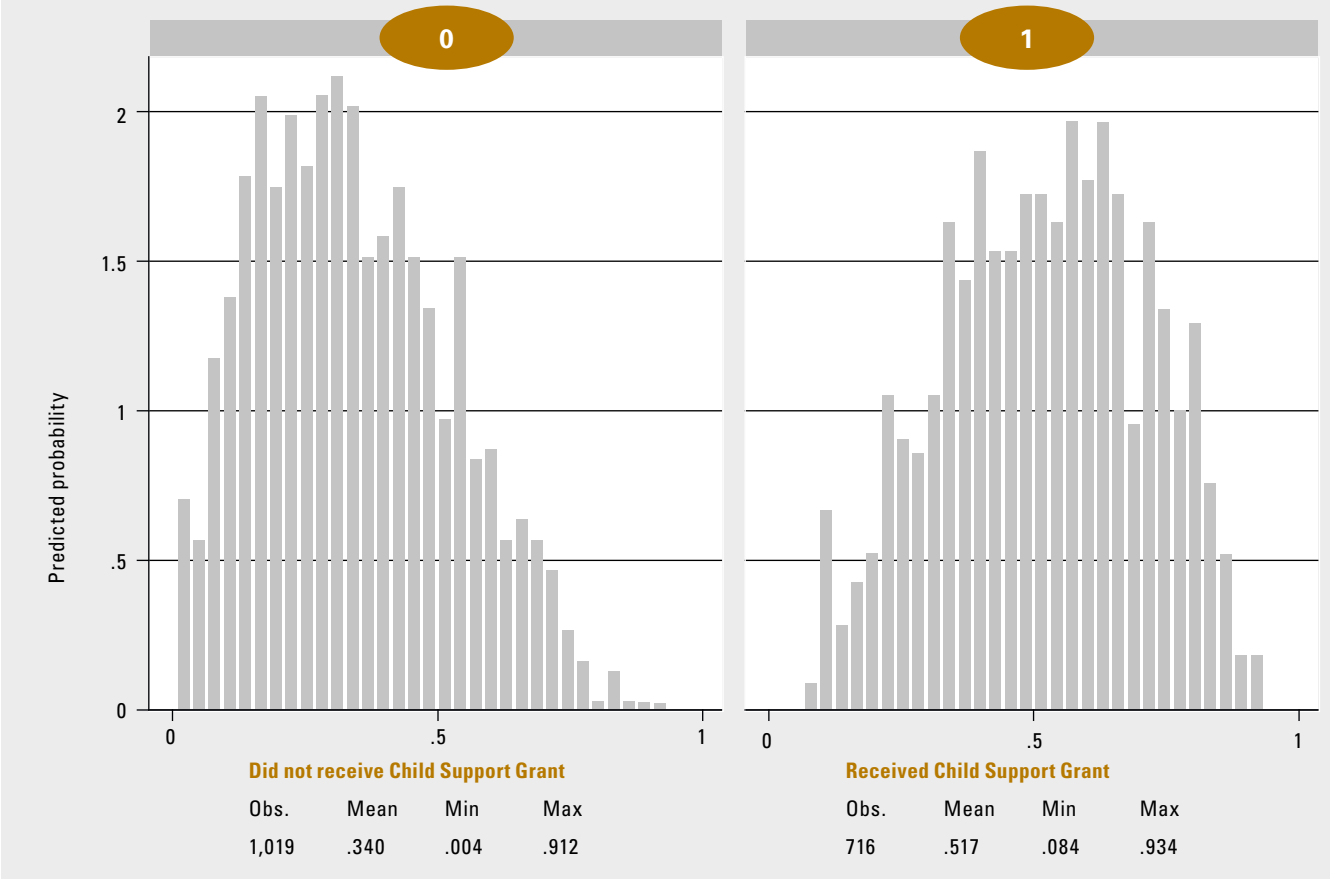


Table A.6: Additional difference-in-differences propensity score matching estimation results

OUTCOME: CHANGE IN HOURS OF LABOUR FETCHING WATER (2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.060	0.101	0.041	0.039	1.05
Matched samples							
Radius, caliper=0.01	1729	6	0.061	0.043	0.018	0.052	0.34
Local linear regression (kernel-type=normal)	1735	0	0.060	0.043	0.017	0.050	0.34
Nearest-neighbour with bias adjustment	1735	0	0.060	0.589	0.011	0.040	0.27
OUTCOME: CHANGE IN HOURS OF LABOUR FETCHING FUEL (2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.007	0.098	0.091	0.042	2.19
Matched samples							
Radius, caliper=0.01	1729	6	0.000	0.023	0.023	0.046	0.51
Local linear regression (kernel-type=normal)	1735	0	0.000	0.021	0.021	0.054	0.38
Nearest-neighbour with bias adjustment	1735	0	0.000	0.034	0.034	0.053	0.65
OUTCOME: CHANGE IN HOUSEHOLD EMPLOYMENT RATE (2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1709	n.a.	-0.000	-0.016	0.016	0.014	1.15
Matched samples							
Radius, caliper=0.01	1703	11	-0.001	-0.024	0.023	0.018	1.01
Local linear regression (kernel-type=normal)	1709	1	-0.001	-0.019	0.018	0.018	1.27
Nearest-neighbour with bias adjustment	1709	0	-0.000	-0.015	0.015	0.020	0.74
OUTCOME: INCREASED USE OF A SOCIAL WORKER (2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.071	0.067	0.004	0.012	0.36
Matched samples							
Radius, caliper=0.01	1729	6	0.072	0.063	0.009	0.016	0.56
Local linear regression (kernel-type=normal)	1735	0	0.071	0.063	0.008	0.016	0.56
Nearest-neighbour with bias adjustment	1735	0	0.071	0.063	0.008	0.018	0.42

OUTCOME: NEWLY CULTIVATING/FARMING (CHANGE FROM 2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.068	0.053	0.015	0.011	1.34
Matched samples							
Radius, caliper=0.01	1729	6	0.068	0.068	0.015	0.015	1.01
Local linear regression (kernel-type=normal)	1735	0	0.068	0.060	0.008	0.015	0.57
Nearest-neighbour with bias adjustment	1735	0	0.068	0.052	0.016	0.017	0.95
OUTCOME: NO LONGER CULTIVATING/FARMING (CHANGE FROM 2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.078	0.101	0.023	0.014	1.63
Matched samples							
Radius, caliper=0.01	1729	6	0.079	0.136	0.057	0.019	3.10
Local linear regression (kernel-type=normal)	1735	0	0.078	0.123	0.045	0.018	2.51
Nearest-neighbour with bias adjustment	1735	0	0.078	0.131	0.053	0.017	3.17
OUTCOME: NEWLY USING A CELL PHONE (CHANGE FROM 2002 TO 2004)							
Propensity score matching method	*# in estimation*	*# off comm. support*	*Mean* Treatment*	*Mean Comparison*	*Difference in means*	*Standard error*	*T-statistic*
Unmatched sample	1735	n.a.	0.250	0.246	0.004	0.021	0.17
Matched samples							
Radius, caliper=0.01	1729	6	0.252	0.222	0.030	0.027	1.09
Local linear regression (kernel-type=normal)	1735	0	0.250	0.220	0.030	0.027	1.14
Nearest-neighbour with bias adjustment	1735	0	0.250	0.179	0.071	0.029	2.42

Appendix B: Technical appendix – additional information on matching methodologies

The general approach of matching is to estimate counterfactuals for each treated person so that his or her treated outcome (which is observed) can be compared to what would have happened in the absence of treatment (which we estimate using the comparison group). Although more flexible than linear regression, matching still requires a maintained assumption about the relationship between the treated (D=1) and untreated (D=0). Cross-sectional matching is valid only if after controlling for observable characteristics X, a person's ultimate treatment status is not related to what their outcome would have been in the absence of treatment. In other words, people select into treatment based on observables only. In order to relax this assumption, we use a panel or "difference in differences" version of the matching estimator that allows a time-invariant (unobserved) difference in outcomes between the treated and untreated. These estimates use dependent variables (Y) defined as the difference between pre- and post-treatment outcomes for each individual. The following mean-independence assumption must hold for the periods t (before treatment) and t' (after treatment):

$$E(Y0t' - Y0t \mid D = 1, X) = E(Y0t' - Y0t \mid D = 0, X) \text{ for } X \varepsilon S$$

where S is defined as the overlapping support among the treatment and comparison groups, i.e. S = Supp(X | D=1) ∩ Supp(X | D=0). This assumption implies that the outcome trajectories of the treatment and comparison groups must match, but their outcome levels are allowed to differ by an unobserved constant. This panel version of the matching estimator often performs better than its cross-sectional counterpart, in part because it allows for this unobserved heterogeneity.

The common application of matching we use, called propensity score matching, is a two-step process in which we first estimate the probability of treatment based on the conditioning variables. By generating predicted probabilities of treatment (i.e., propensity scores), we reduce the matching process to the one-dimensional problem of comparing treated and untreated workers with similar propensity scores (rather than requiring matches on all of the X variables). Upon estimation of the propensity score, we perform the matching estimation using radius matching, kernel matching, local linear regression, and nearest-neighbour matching.

Nearest neighbour matching is one of the most straightforward matching procedures. An individual from the comparison group is chosen as a match for a treated individual in terms of the closest propensity score (or the case most similar in terms of observed characteristics). Variants of nearest neighbour matching include "with replacement" and "without replacement," where in the former case, an untreated individual can be used more than once as a match, and in the latter case, it is considered only once.

To avoid the risk of poor matches, *radius matching* specifies a "caliper" or maximum propensity score distance by which a match can be made. The basic idea of radius caliper matching is that it uses not only the nearest neighbour within each caliper, but all of the comparison group members within the caliper. In other words, it uses as many comparison cases as are available within the caliper, but not those that are poor matches (based on the specified distance).

Kernel and local linear matching are non-parametric matching estimators that have in common that only a few observations from the comparison group are used to construct the counterfactual outcome of a treated individual. In other words, these techniques compare the outcome trajectory of each treated person to a weighted average of the outcome trajectories of untreated persons with similar propensity scores (with the highest weight being placed on those with scores closest to the treated individual). One major advantage of these approaches is the lower variance, which is achieved because more information is used. A drawback of these methods is that some of the observations used may be poor matches. Hence, the proper imposition of the common support condition is of major importance for these approaches.

When applying kernel matching, one also has to choose the kernel function and the bandwidth parameter. The kernel matching estimator we apply is based on a normal density function, and in the local linear regressions, we specify the kernel types as normal and biweight.

Appendix C: Methodology for the General Household Survey and the EPRI GHS Panel

Overview of the General Household Survey

Statistic South Africa's General Household Survey (GHS) was designed as an annual household survey to specifically measure living standards indicators for representative South Africa households, particularly with respect to education, health, livelihoods and employment, housing and access to services. The survey collects information about various aspects of living conditions for members of over 30 000 households across South Africa, sampling "dwelling units" in all of the country's nine provinces. The Statistics South Africa survey team employs face-to-face interviews to complete the questionnaire for each household visited.[19]

The questionnaire always includes three specific modules (among others) that EPRI's panel creation process employs – a household information module (HOUSE), an individual information module (PERSON) and an employment and livelihoods module (WORKER). In addition, the panel can link in any of the other modules as required, given the unique identifiers at a record level that join the various modules. Across all the modules, the GHS questionnaire in 2002 asked 156 questions, in 2003 162 questions and in 2004 176 questions, most of which were asked identically in all three years. The population covered by the survey includes all private households in South Africa's nine provinces as well as those living in workers' hostels. The covered population excluded those living in collective living quarters such as students' hostels or institutions such as old age homes, hospitals, prisons and military barracks.

GHS sample design[20]

Statistics South Africa employs a multi-stage stratified sample design using probabilities that are proportional to size principles (based on number of households in each sampling unit). Statistics South Africa has built a master sample frame for all its regular household surveys which includes all enumeration areas (EAs) constructed for the 1996 census. Small enumeration areas (less than a hundred households) are combined with adjacent EAs to constitute primary sampling units (PSUs). The master sample is stratified by province and by urban/rural classification. Approximately 3,000 primary sampling units are selected each year, and ten "dwelling units" are drawn from each PSU based on a pre-existing sampling list. In most cases, the PSUs and the selected dwellings are the same from year to year, yielding the heretofore undocumented (and imperfect) panel character of the General Household Survey.

Statistics South Africa carries out a two-stage weighting procedure where by the PSU inclusion probability is given by

$$P_{PSU} = \frac{n_{PSU}}{N_{PSU}} .n_S$$

where N_{PSU} is the number of households making up each PSU (as determined during the fieldwork for the 1996 census), n_S is the number of PSUs in each stratum (which is a unit which breaks each province down into the urban areas and rural areas), and N_{PSU} is the number of households in each stratum (again as determined during the fieldwork for the 1996 census). The probability of a household being included is

$$P_{HH} = \frac{n_{HH}}{H_{HH}}$$

where n_{HH} is the number of selected dwelling units in each PSU, H_{HH} is the number of dwelling units in the respective PSU at the time of the survey. The unadjusted household weight would be $1/P_{HH}$. Adjusting for non-response, the adjusted household weight is $1/P_{HH}.r_{HH}$ where r_{HH} is the calculated response rate based on the formula

$$r_{HH} = \frac{n_{RESP}}{n_T}$$

19. Statistics South Africa (2005). "General Household Survey, July 2004", Statistical release P0318. Pretoria.

20. This section is drawn from the General Household Survey metadata, expanded based on consultations with Statistics South Africa.

where n_{RESP} is the number of responding households and n_T is the total number of households per PSU that Statistics South Africa visited. The adjusted sample weights are calculated as

$$W_{HH} = \frac{1}{P_{PSU}.P_{HH}.r_{HH}}$$

Statistics South Africa uses a SAS macro called CALMAR in order to benchmark W_{HH} to the mid-year population estimates that StatsSA reports. Each year, Statistics South Africa adjusts these mid-year estimates to reflect population estimates for July of the respective year, which is when the General Household Survey fieldwork is conducted.

Constructing the EPRI GHS panel

Statistics South Africa assigns each household a unique household number (UQNR) and each person within a household with a person number. From year to year, the unique household numbers are the same from household to household, although the identifying person numbers are enumerated each year based on the current household membership – from 1 to *n*, where *n* is the number of members in the household. As a result, the person number cannot be used to link individuals from one year to the next. As individuals leave and enter households, the person numbers are shuffled. For example, consider a household that in 2002 consists of a middle-aged woman whose husband is a migrant worker and therefore not considered part of the household by the survey, and her two children in their twenties. They will be assigned person numbers 1–3, respectively. Now suppose that her husband returns in 2003. When the household is re-surveyed, he will likely be listed as person 1, while his wife and two children are persons 2–4.

In order to match the individuals across the years – and to verify the panel nature of the General Household Survey from 2002 to 2004, EPRI has compared the time invariant and sequentially time variant indicators in the three surveys on a household by household basis, after employing a matching algorithm that links individual records together for all members within each household. Time invariant variables are assumed to be gender, language and population group. Sequentially time variant variables include age, which is assumed to increase by 0, 1 or 2 years for a potentially matching individual. These fields are sometimes reported with error, particularly for older South Africans who may have no documentation of their true age.

The Child Support Grant is paid to a child's primary caregiver, who the Social Assistance Act of 2004 defines as "a person older than 16 years, whether or not related to a child, who takes primary responsibility for meeting the daily care needs of that child."[21] However, the General Household Survey does not ask this question, so it is necessary to assign them. This process is important for determining which household member collects the grant and whether a child is eligible to receive a grant, since the means test is applied to the caregiver and his/her spouse. In assigning caregivers and determining eligibility, EPRI largely follows the methodology of Budlender et al. (2005):

"All children who are living with their mothers have the mother as primary caregiver. For these children, we need to know the income of the mother, if any. If the mother is married, we also need to know the income of her husband. If the mother is not married and not widowed, we need to have an estimate for maintenance.

All children who are living with their father but not with their mother have the father as primary caregiver. For these children, we need to know the income of the father, if any. If the father is married, we also need to know the income of his wife. We do not include any estimate for maintenance because we assume that fathers will seldom be the primary caregiver if the biological mother of the child is still alive.

All children who are not living with either parent but are the grandchild of the household head have a grandparent as primary caregiver. For these children we need to know the income of the head of household and their spouse.

21. Social Assistance Act of 2004, Chapter 1, Section 1

All children who are not covered by any of the above categories have an adult woman as their primary caregiver. For these children we take the mean income of all employed adult women in the child's household."

More than half the children are assigned to their mothers as primary caregiver, and the remaining to their fathers, grandparents, and other women on the household roster. Departing from Budlender et al's procedure, EPRI allocates otherwise unassigned children to an adult male in the household. A small number of children live in child-only households and were excluded from the Child Support Grant programme over this time period – and are excluded from this analysis.

The income of the primary caregivers and their partners is computed following Budlender et al. (2005), with the modifications to income reporting described below. For those who report only categorical incomes, she assigns the logarithmic mean of the category boundaries, causing a large cluster of individuals at a single income level. EPRI takes a different approach, following the methodology of Ardington, Lam, Leibbrandt, and Welch (2006), mapping the categorical respondents onto the income distribution of the discrete respondents within each category. To minimise the random assignment across this within-interval distribution, EPRI departs from the methodology of Ardington, Lam, Leibbrandt, and Welch (2006) and estimates a wage function for the discrete respondents and using this model to predict wages for categorical respondents. Within each salary category, EPRI ranks categorical respondents based on their predicted wage and use this ranking to map them onto the actual intra-categorical wage distribution of discrete respondents. The wage function that is used to generate the predicted salary ranking is run on the sample of discrete respondents, and includes a total of 55 explanatory variables, including household and individual characteristics, as well as provincial dummies. The log of salary is used as the dependent variable.

Comparing the EPRI GHS panel to GHS 2002

This section compares how representative the GHS panel from 2002 to 2004 is, compared to the full GHS survey for 2002. The GHS 2002 survey is nationally representative and weighted to the 1996 census. The following tables and discussion compare children under 7 (up to and including age 6) in both the panel and the full survey. This group represents those who were age-eligible for the Child Support Grant in 2002.

There are 13,795 children in the 2002 General Household Survey under age 7, weighted to be representative of 6,321,093 children in the entire population. Of these, the panel survey captures 5,083 of these children in all three years, weighted to 2,237,131 in the entire population.

Table C.1 reports that the average household size of the panel – at 6.68 people per household – is slightly larger than the average for the entire 2002 survey – at 6.56 people per household. The nationally weighted figures are slightly smaller since smaller households appear to be somewhat under-sampled in the survey. In addition, 46.41% of the children in the panel are in female-headed households, compared to only 44.34% of the children in the full GHS survey for 2002.

In part, these differences are explained by the geographic distribution of the sample. Overall, 36.85% of

Table C.1: Average household size, gender of household head

	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Average HH size	6.68	6.56	6.65	6.52
Pct. of children who are in female-headed households	46.41%	44.34%	45.99%	44.23%

Table C.2: Province

AMONG CHILDREN AGED 6 AND UNDER

	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Western Cape	434	1,349	193,608	607,760
Eastern Cape	774	2,018	361,662	965,618
Northern Cape	222	664	37,900	121,213
Free State	410	1,022	144,417	359,953
KwaZulu-Natal	729	2,442	393,639	1,342,187
North West	608	1,434	225,565	545,563
Gauteng	404	1,514	275,618	1,047,580
Mpumalanga	501	1,370	171,248	479,668
Limpopo	1,001	1,982	433,474	851,551
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*

PERCENTAGES SUM DOWN

	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Western Cape	8.54%	9.78%	8.65%	9.61%
Eastern Cape	15.23%	14.63%	16.17%	15.28%
Northern Cape	4.37%	4.81%	1.69%	1.92%
Free State	8.07%	7.41%	6.46%	5.69%
KwaZulu-Natal	14.34%	17.70%	17.60%	21.23%
North West	11.96%	10.40%	10.08%	8.63%
Gauteng	7.95%	10.97%	12.32%	16.57%
Mpumalanga	9.86%	9.93%	7.65%	7.59%
Limpopo	19.69%	14.37%	19.38%	13.47%
Total	*100.00%*	*100.00%*	*100.00%*	*100.00%*

CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)

	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Western Cape	32.17%	100%	31.86%	100%
Eastern Cape	38.35%	100%	37.45%	100%
Northern Cape	33.43%	100%	31.27%	100%
Free State	40.12%	100%	40.12%	100%
KwaZulu-Natal	29.85%	100%	29.33%	100%
North West	42.40%	100%	41.35%	100%
Gauteng	26.68%	100%	26.31%	100%
Mpumalanga	36.57%	100%	35.70%	100%
Limpopo	50.50%	100%	50.90%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

the children in the whole survey are included in the panel. As Table C.2 indicates, this varies by province. Only 26.68% of children from the full 2002 survey in Gauteng are included in the survey, while 50.50% of the children from the full survey in Limpopo are included. Gauteng is a wealthier province with smaller households and a lower proportion of female-headed households.

The proportions for the other provinces vary between these two extremes, with KwaZulu-Natal having the lowest proportion of representation in the panel. The province represents 17.70% of the entire 2002 GHS sample, but only 14.34% of the panel. The two provinces with the lowest representation in the panel (relative to their weight in the full survey and hence the population) – KwaZulu-Natal and Gauteng – are also under-sampled in the full survey. In the full survey, KwaZulu-Natal includes 17.70% of the sample but 21.23% of South Africa's population, while Gauteng includes 10.97% of the sample but 16.57% of the population.

Table C.3 shows how representative is the panel of the black population compared to the white population. Based on Statistics South Africa's definition of population groups, 84.56% of the panel are classified

Table C.3: Population group

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
African	4,298	11,210	1,912,711	5,199,346
Coloured	553	1,633	196,268	586,800
Indian	52	233	24,634	115,928
White	180	707	103,518	413,063
Other	0	12	0	5,956
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
African	84.56%	81.26%	85.50%	82.25%
Coloured	10.88%	11.84%	8.77%	9.28%
Indian	1.02%	1.69%	1.10%	1.83%
White	3.54%	5.13%	4.63%	6.53%
Other	0%	0.09%	0%	0.09%
Total	*100.00%*	*100.00%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
African	38.34%	100%	36.79%	100%
Coloured	33.86%	100%	33.45%	100%
Indian	22.32%	100%	21.25%	100%
White	25.46%	100%	25.06%	100%
Other	0%	100%	0%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.4: Household location/type

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Rural	2,774	7,244	1,262,726	3,288,105
Urban informal	365	1,327	164,028	646,434
Urban formal	1,944	5,224	810,377	2,386,554
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Rural	54.57%	52.51%	56.44%	52.02%
Urban informal	7.18%	9.62%	7.33%	10.23%
Urban formal	38.25%	37.87%	36.22%	37.76%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Rural	38.29%	100%	38.40%	100%
Urban informal	27.51%	100%	25.37%	100%
Urban formal	37.21%	100%	33.96%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.5: Relationship of caregiver to child

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Mother	4,322	11,449	1,918,769	5,290,667
Father	72	260	31,879	123,606
Grandparent	561	1,648	230,803	712,073
Uncertain	128	438	55,680	194,747
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Mother	85.03%	82.99%	85.77%	83.70%
Father	1.42%	1.88%	1.42%	1.96%
Grandparent	11.04%	11.95%	10.32%	11.27%
Uncertain	2.52%	3.18%	2.49%	3.08%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Mother	37.75%	100%	36.27%	100%
Father	27.69%	100%	25.79%	100%
Grandparent	34.04%	100%	32.41%	100%
Uncertain	29.22%	100%	28.59%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.6: Caregiver's education level

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
No education	543	1,605	226,416	691,369
Primary	1,356	3,706	590,970	1,637,360
Less than matric	2,136	5,712	947,950	2,640,490
Matric	1,014	2,663	458,172	1,297,695
Tertiary	31	105	12,921	52,997
Total	*5,080*	*13,791*	*2,236,429*	*6,319,911*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
No education	10.69%	11.64%	10.12%	10.94%
Primary	26.69%	26.87%	26.42%	25.91%
Less than matric	42.05%	41.42%	42.39%	41.78%
Matric	19.96%	19.31%	20.49%	20.53%
Tertiary	0.61%	0.76%	0.58%	0.84%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
No education	33.83%	100%	32.75%	100%
Primary	36.59%	100%	36.09%	100%
Less than matric	37.39%	100%	35.90%	100%
Matric	38.08%	100%	35.31%	100%
Tertiary	29.52%	100%	24.38%	100%
Total	*36.84%*	*100%*	*35.39%*	*100%*

as "African" compared to only 81.26% of the total GHS in 2002. Only 22.32% of the Indian children in the full survey sample are included in the panel, compared to an average of 36.85% for all population groups.

Table C.4 shows that the panel sample over-represents rural areas and under-represents urban informal areas. 54.57% of the panel live in rural areas, compared to 52.51% of the full GHS survey, while only 7.18% of the panel live in urban informal areas, compared to 9.62% of the full survey. Since Limpopo is largely rural, and Gauteng includes large concentrations of urban informal dwellings, this bias is associated with the provincial distribution discussed above. The weighted distributions are similar. Urban formal areas constitute 38% of both the panel and the full 2002 GHS survey.

Table C.5 shows the distribution of the panel compared to the full survey broken down by the caregiver's relationship to the child in the sample. Since caregivers are responsible for qualifying the child for the grant, this is an important variable.

85.03% of the children have mothers as primary caregivers in the panel, compared to 82.99% of the full survey. Administrative data confirms that the overwhelming majority of applicants are mothers. Children with fathers as primary caregivers represent 1.42% of the panel yet 1.88% of the full survey. An alternative way of quantifying this is that the panel includes 27.69% of the children with fathers as primary caregivers, compared to 36.85% of children overall. Children with grandparents (mainly grandmothers) as primary caregivers represent 11.04% of the panel yet 11.95% of the full survey. Approximately 3% of the caregivers

are unidentified. The population distribution is fairly similar.

The caregiver's level of education may affect their ability to navigate the bureaucracy and effectively qualify for the Child Support Grant. The differences in the educational distribution of the caregivers are associated with the provincial distribution of the sample. 10.69% of the panel has no education – compared to 11.64% of the full 2002 GHS survey. Limpopo has some of the lowest historic school attendance and achievement rates and is over-represented in the survey. Likewise Gauteng has some of the highest rates and is under-represented.

Table C.7 shows the distribution of the samples by household expenditure category, as classified by Statistics South Africa. Each group's share of the panel is within one percentage point of the respective share of the full GHS survey in 2002.

Table C.8 shows the distribution by self-reported indicators of child hunger. The relative distributions are very close, with the panel including a slightly lower proportion (60.71%, compared to 61.88% in the full survey) of children who are never hungry because there wasn't enough food.

School attendance is an important determinant of participation in the programme as well as a central outcome variable. 24.80% of the panel attends school, compared to 21.90% of the full survey. The school attendance variable captures primary school as well as pre-school activities.

More established areas are more likely to be re-surveyed year after year because the officials from Statistics South Africa are less likely to find a need for the survey roster to be reconstructed. If the enumeration area has not changed substantially from the previous year, the survey roster from a year ago is likely to remain in use. However, in less established areas that are still in substantial transition, there is a greater likelihood that the enumeration areas will look substantially different to officials from Statistics South Africa from one year to the next as they preview the area prior to the survey. In this case there is a greater likelihood that a new survey roster will be constructed – with a different set of households. Under these circumstances, the respective households drop out of the panel.

These less established areas may also be less likely to have nearby schools, which may explain why the school attendance rates in the panel are approximately three percentage points higher than in the full survey.

The universe of children in the sample for the propensity score matching analysis is the set of children under 7 who are age-eligible and satisfy criteria that indicate a high likelihood of passing the Department of Social Development's means test for the Child Support Grant in 2002. Table C.11 shows the proportions within the panel and the full survey that meet these criteria. The relative proportions are virtually identical – with 64.45% of the children in the panel satisfying these criteria and 64.56% of children in the full GHS survey in 2002 meeting these criteria. Likewise, the weighted proportions are similar – with 62.97% of the estimated population of children based on the panel satisfying these criteria and 62.76% of the estimated population of children based on the full GHS survey in 2002 meeting these criteria. The proportions in both samples are higher because the GHS appears to tend to over-sample the groups who are likely to qualify for the Child Support Grant.

The percentage of children receiving the Child Support Grant in the panel is different from the percentage in the full survey, as documented in Table C.11. As the table indicates, 26.13% of the children in the panel actually received the Child Support Grant (whether they actually meet the criteria or not) and 22.95% of the children in the full GHS survey in 2002 actually receive the grant (with the same caveat applying).

A different way to look at the same characteristic is to calculate the probability that a child in the survey will be included in the panel, conditional on receipt of the Child Support Grant. A child receiving the grant has a 41.95% probability of being included, compared to a child not receiving the grant, who has a 35.33% chance of being included.

Table C.12 illustrates the implications of the previous two tables in terms of estimated exclusion and inclusion

Table C.7: Household expenditure category, R/month

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
0-399	1,440	4,007	641,849	1,831,101
400-799	1,758	4,600	761,438	2,065,669
800-1199	705	1,882	299,257	826,642
1200-1799	385	999	161,090	449,730
1800-2499	220	656	96,719	300,199
2500-4999	276	744	126,955	367,797
5000-9999	141	429	67,052	220,100
10000+	47	166	28,875	97,971
Don't know/ refuse/unspecified	111	312	53,896	161,884
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
0-399	28.33%	29.05%	28.69%	28.97%
400-799	34.59%	33.35%	34.04%	32.68%
800-1199	13.87%	13.64%	13.38%	13.08%
1200-1799	7.57%	7.24%	7.20%	7.11%
1800-2499	4.33%	4.76%	4.32%	4.75%
2500-4999	5.43%	5.39%	5.67%	5.82%
5000-9999	2.77%	3.11%	3.00%	3.48%
10000+	0.92%	1.20%	1.29%	1.55%
Don't know/ refuse/unspecified	2.18%	2.26%	2.41%	2.56%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
0-399	35.94%	100%	35.05%	100%
400-799	38.22%	100%	36.86%	100%
800-1199	37.46%	100%	36.20%	100%
1200-1799	38.54%	100%	35.82%	100%
1800-2499	33.54%	100%	32.22%	100%
2500-4999	37.10%	100%	34.52%	100%
5000-9999	32.87%	100%	30.46%	100%
10000+	28.31%	100%	29.47%	100%
Don't know/ refuse/unspecified	35.58%	100%	33.29%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.8: Children under age 17 who went hungry in the past 12 months

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Never	3,086	8,537	1,362,215	3,917,587
Seldom	447	1,161	196,140	529,471
Sometimes	1,075	2,807	466,782	1,288,439
Often	284	750	126,171	335,392
Always	141	375	58,195	161,812
Don't know/refuse/unspecified	50	165	27,628	88,392
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Never	60.71%	61.88%	60.89%	61.98%
Seldom	8.79%	8.42%	8.77%	8.38%
Sometimes	21.15%	20.35%	20.87%	20.38%
Often	5.59%	5.44%	5.64%	5.31%
Always	2.77%	2.72%	2.60%	2.56%
Don't know/refuse/unspecified	0.98%	1.20%	1.23%	1.40%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Never	36.15%	100%	34.77%	100%
Seldom	38.50%	100%	37.04%	100%
Sometimes	38.30%	100%	36.23%	100%
Often	37.87%	100%	37.62%	100%
Always	37.60%	100%	35.96%	100%
Don't know/refuse/unspecified	30.30%	100%	31.28%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.9: School attendance

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Attend	1,259	3,020	558,662	1,387,816
Do not attend	3,818	10,767	1,675,932	4,929,925
Total	*5,077*	*13,787*	*2,234,594*	*6,317,741*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Attend	24.80%	21.90%	25.00%	21.97%
Do not attend	75.20%	78.10%	75.00%	78.03%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Attend	41.69%	100%	40.25%	100%
Do not attend	35.46%	100%	34.00%	100%
Total	*36.82%*	*100%*	*35.37%*	*100%*

Table C.10: CSG income eligibility (existing means test cutoffs)

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	3,276	8,906	1,408,765	3,967,032
No CSG	1,807	4,889	828,366	2,354,061
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	64.45%	64.56%	62.97%	62.76%
No CSG	35.55%	35.44%	37.03%	37.24%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	36.78%	100%	35.51%	100%
No CSG	36.96%	100%	35.19%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.11: Household receives at least one CSG

AMONG CHILDREN AGED 6 AND UNDER				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	1,328	3,166	566,412	1,405,267
No CSG	3,755	10,629	1,670,719	4,915,826
Total	*5,083*	*13,795*	*2,237,131*	*6,321,093*
PERCENTAGES SUM DOWN				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	26.13%	22.95%	25.32%	22.23%
No CSG	73.87%	77.05%	74.68%	77.77%
Total	*100%*	*100%*	*100%*	*100%*
CHILDREN IN PANEL AS PERCENTAGE OF CHILDREN IN FULL GH02 SAMPLE (1– ATTRITION RATE)				
	Unweighted		Weighted	
	In 02-04 panel	*In full GHS02*	*In 02-04 panel*	*In full GHS02*
Receives CSG	41.95%	100%	40.31%	100%
No CSG	35.33%	100%	33.99%	100%
Total	*36.85%*	*100%*	*35.39%*	*100%*

Table C.12: Exclusion and inclusion error for children aged 6 and under

PANEL UNWEIGHTED								
				Percentages sum across		Percentages sum down		
	HH rec grant	*HH does not rec grant*	*Total*	*HH rec grant*	*HH does not rec grant*	*HH rec grant*	*HH does not rec grant*	*Total*
Child eligible	1,086	2,190	3,276	33.2%	66.8%	81.8%	58.3%	64.5%
Child ineligible	242	1,565	1,807	13.4%	86.6%	18.2%	41.7%	35.5%
Total	*1,328*	*3,755*	*5,083*	*26.1%*	*73.9%*	*100%*	*100%*	*100%*
FULL SAMPLE UNWEIGHTED								
				Percentages sum across		Percentages sum down		
	HH rec grant	*HH does not rec grant*	*Total*	*HH rec grant*	*HH does not rec grant*	*HH rec grant*	*HH does not rec grant*	*Total*
Child eligible	2,577	6,329	8,906	28.9%	71.1%	81.4%	59.5%	64.6%
Child ineligible	589	4,300	4,889	12.0%	88.0%	18.6%	40.5%	35.4%
Total	*3,166*	*10,629*	*13,795*	*23.0%*	*77.0%*	*100%*	*100%*	*100%*
PANEL WEIGHTED								
				Percentages sum across		Percentages sum down		
	HH rec grant	*HH does not rec grant*	*Total*	*HH rec grant*	*HH does not rec grant*	*HH rec grant*	*HH does not rec grant*	*Total*
Child eligible	460,722	948,043	1,408,765	32.7%	67.3%	81.3%	56.7%	63.0%
Child ineligible	105,690	722,676	828,366	12.8%	87.2%	18.7%	43.3%	37.0%
Total	*566,412*	*1,670,719*	*2,237,131*	*25.3%*	*74.7%*	*100%*	*100%*	*100%*
FULL SAMPLE WEIGHTED								
				Percentages sum across		Percentages sum down		
	HH rec grant	*HH does not rec grant*	*Total*	*HH rec grant*	*HH does not rec grant*	*HH rec grant*	*HH does not rec grant*	*Total*
Child eligible	1,137,511	2,829,521	3,967,032	28.7%	71.3%	80.9%	57.6%	62.8%
Child ineligible	267,756	2,086,305	2,354,061	11.4%	88.6%	19.1%	42.4%	37.2%
Total	*1,405,267*	*4,915,826*	*6,321,093*	*22.2%*	*77.8%*	*100%*	*100%*	*100%*

errors for the Child Support Grant. According to these estimates for the panel, in 2002 33.2% of the children eligible for the Child Support Grant actually received it, compared to 28.9% for the full survey. Estimated exclusion error for the panel in 2002 was 66.8% compared to an estimate of 71.1% from the full survey. While measured eligibility is roughly the same in both the panel and the full survey, estimates of receipt are higher in the panel. This yields the result of higher estimated inclusion and lower estimated exclusion.

Definitions of terms (from StatsSA GHS 2004 metadata)

The population of working age – people aged 15–65 years.

Not economically active population includes people who are not available for work, such as full-time scholars and students, full-time homemakers, those who are retired and those who are unable or unwilling to work.

Economically active population includes people aged 15–65 who are employed and those not employed.

Official and expanded definition of unemployment
Statistics South Africa (StatsSA) uses the following definition of unemployment as its official definition. The unemployed are those people within the economically active population who: (a) did not work during the seven days prior to the interview, (b) want to work and are available to start work within two weeks of the interview, and (c) have taken active steps to look for work or start some form of self-employment in the four weeks prior to the interview. The expanded definition of unemployment excludes criterion (c).

Workers include the self-employed, employers and employees.

Formal dwellings include a house on a separate stand, a flat or apartment in a block of flats, a townhouse, a room in a backyard, and a room or flatlet on a shared property.

Informal dwellings include shacks or shanties in informal settlements or in backyards.

Piped water in dwelling or on site refers to piped water inside the household's own dwelling or in their yard. It excludes water from a neighbour's tap or a public tap that is not on site.

Clean water refers to piped water (regardless of from where) and water from a water carrier/tanker.

Electricity for cooking, heating and/or lighting refers to electricity from the public supplier.

Hygienic toilet facility refers to a flush toilet, chemical toilet or pit latrine with a ventilation pipe.